Topics in Regulatory Economics and Policy

Pier Luigi Parcu
Timothy J. Brennan
Victor Glass *Editors*

The Economics of the Postal and Delivery Sector

Business Strategies for an Essential Service

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Topics in Regulatory Economics and Policy

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Preface

This book collects the contributions presented during the 28th Conference on Postal and Delivery Economics, jointly organized by the Florence School of Regulation – Communications and Media (FSR C&M) at the European University Institute and the Center for Research in Regulated Industries (CRRI) at Rutgers Business School. Originally planned as an in-person conference, the evolution of the pandemic made this impossible. As a result, the conference was online for the first time in its history. Despite the new format, the conference remained a point of reference for the community of operators and regulators in the postal and delivery sectors.

The discussion this year included consolidated topics, such as the evolution of competitive dynamics in the sector, the business strategies of postal operators, the definition and funding of Universal Service Obligation, e-commerce, and the role of Universal Postal Union, and explored emerging issues such as the role of postal operators in addressing sustainability targets and the impact of Covid-19 pandemic on the postal dynamics.

The conference was made possible by the contribution of generous supporters. We would like to thank the following contributors for their financial support, for joining the organizing committee along with others, and for their intellectual contributions, advice, and encouragement: Bruno Basalisco, Claire Borsenberger, Mateusz Chołodecki, Alberta Corona, Stefano Gori, Felix Gottschalk, Annegret Groebel, Philip Groves, John Hearn, Farouk Karim, Karol Krzywicki, Piotr Lukomski, Leonardo Mautino, and Sandro Mendonça.

This year's conference benefited greatly from the efforts of the Conferences Unit of the Robert Schuman Centre for Advanced Studies and, in particular, Elisabetta Spagnoli and the team of the FSR C&M, who converted the residential event into an online one in record time, offering participants the opportunity to continue the exchange on issues relevant to the sector. We are very grateful to Chiara Carrozza, FSR C&M Coordinator, for her support during the editing process for this book.

We would like to thank the distinguished keynote speaker of the event: Mr. Jean-Yves Muylle from DG Internal Market, Industry, Entrepreneurship and SMEs (GROW) of the European Commission. We would also like to thank the candidates for the UPU elections who shared their vision for the UPU during a special "virtual"

roundtable: Mr. Pascal Clivaz; Mr. Jean-Paul Forceville, Mr. Jack Hamande, Mrs. Marcela Maron, Mr. Masahiko Metoki, and Mrs. Marjan Osvald.

Most of all this year, we thank all authors and participants of the conference. It was reassuring to see the cohesion of the community and the willingness to continue contributing to the debate in the sector despite the difficult circumstances.

The usual disclaimers apply. In particular, the views expressed reflect the views of the authors and are not necessarily those of the editors or supporters.

Firenze, Florence, Italy — Pier Luigi Parcu
Baltimore, MD, USA — Timothy J. Brennan
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Contents

Competition in the Postal and Delivery Markets in Europe

Pier Luigi Parcu, Chiara Carrozza, Niccolò Innocenti, Anna Pisarkiewicz, and Paula Gori

1 Introduction

In the recent decades, the liberalization of the postal and delivery industry and the accompanying regulation has attempted to create a competitive environment in the sector and in its different market segments. Moreover, even the "last mile" of the legacy network that in various sectors has remained an unavoidable bottleneck, in the postal industry it has become, over time, an increasingly competitive business. Declining volumes of letters, and increasing volumes of parcels driven by skyrocketing e-commerce, have turned even last mile delivery into a battleground for retailers and postal operators.

A thorough analysis of the state of competition in the sector is hampered by the quality of available data and, therefore, the feasibility of carrying out a complete comparative study is limited (ERGP, 2019). This difficulty in assessing competition is well reflected in the academic research which, to date, remains fragmented. It tends to cover only a specific part of the sector, for example, either mail or parcels (Perboli & Rosano, 2019), the impact of a chosen factor (i.e., universal service obligation, technology and innovation, or urbanization) (Crew & Brennan, 2016). It is often limited geographically to experiences of a particular country (Pilinkienė et al., 2016) or to the divides between different areas within the same country (last mile delivery in urban versus rural areas) (Bradley et al., 2018).

This chapter aims to contribute to the existing research by attempting an overview of the state of competition in the sector, considering both mail and parcels across a range of diverse postal ecosystems and adopting a comparative perspective. In particular, it will examine whether, in light of the ongoing changes, incumbent

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postal operators are likely to keep dominating the industry, and whether new entrants' strategies are more likely to succeed nationally or in niche segments. It will also contribute to the lively debate as to whether access – negotiated or regulated – to the incumbent's postal network is a more sustainable outcome with respect to end-to-end competition.

After this introduction, the chapter is divided into five parts. Section 2 provides an overview of the different competitive settings of the postal sector in major European countries. Sections 3 through 5 present case studies of three selected countries–the Netherlands, the United Kingdom, and Italy. In Sect. 6, we propose our conclusions on the competition trends we expect to observe in Europe.

2 A General Overview of Competition in the Postal Sector

This section attempts to identify, in a very general manner, specific characteristics and competitive patterns by analyzing the postal data of ten European countries.[1] The classification is based on two indicators on the concentration and the structure of the sector with the aim to differentiate the present level of competition in the countries.[2] Given the aim of the study and the availability of data, this section consider the postal sector as a whole, including different markets (e.g. letters and parcels) and levels of the value chain (e.g. last mile).

The first indicator used is the well-known Herfindahl-Hirschman Index (HHI),[3] calculated on data of broad postal revenues and is presented in Fig. 1. According to

[1] The ten European countries analyzed in this chapter (Belgium, Denmark, Finland, France, Germany, Italy, Spain, Sweden, the Netherlands and The United Kingdom) have been selected because they are representative of the main geographical markets: northern, central and southern Europe. We excluded the eastern European countries from the analysis because the market liberalization is more recent and less data are available. The data are drawn from the firm-level AMADEUS database Bureau Van Dijk (Van Dijk Bureau, 2011) and Eurostat. The selection of the NACE codes relevant for the postal sector is based on Wolday and Engedal (2011). For the sake of consistency all the data refers to the year 2018. The analysis in this section refers to the postal activities as a whole, without a distinction between mail and parcel.

[2] In the literature, there is not unanimous consensus regarding which indicators better capture the level of competition in a market. Some authors suggest that also profitability may be useful to capture the level of competition (Oxera, 2019). However, indicators of competition based on profits might be less adequate than those based on revenues or employees for a comparative and preliminary evaluation. In fact, the comparison between different countries requires the use of data built following similar rules and accounting systems are not necessarily consistent among countries.

[3] $HHI = \sum_{i=1}^{n} (S_i)^2$ where i represent the firms that vary from 1 to n; n represents the number of firms competing in the market; and Si is the market share of the firm being considered. By construction, the index's maximum value is 10,000 (100^2 in case there is only one firm in a market). The HHI is a well-established index that measures the concentration of the market. For instance, this index is commonly used by antitrust authorities to evaluate changes in the market structure in the case of a [possible] merger (US Department of Justice, 2010).

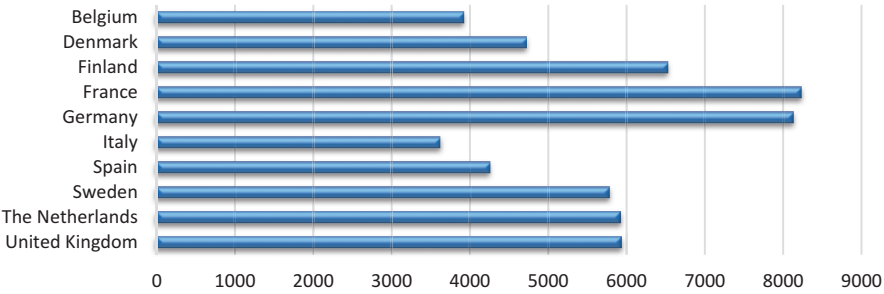

Fig. 1 Herfindahl index
Source: our elaboration on AMADEUS database

conventional antitrust practice, when the value of the HHI index is higher than 2500 there is little doubt that a market can be considered highly concentrated.[4] Our peculiar use of the HHI, applied not to "antitrust" markets but to total revenues of the sector, cannot indicate specific relevant markets' concentration but provides a general indication of the potential for competition within the sector.

Considering that no EU country among those examined has values below the 2500 threshold, the postal sector appears to be considered highly concentrated everywhere. Nonetheless, relevant differences emerge. Germany, France and Finland have the highest values of this HHI, indicating that, in these countries, the largest part of the postal sector is in the hands of very few large players. The sector appears to be relatively less concentrated in Italy, Spain and Belgium.

A second, very general indicator, shown in Fig. 2, is the Competition Index developed by Bishop and Gripaios (2010). This is a proposed indicator of relative competition, as it measures the extent to which a country's economy is characterized by the presence of a plurality of small players with respect to large ones. Countries characterized by a higher value of the index may be exposed, at least potentially, to a higher level of competition from small firms. More precisely, this index measures the competition in the postal sector as the proportion of firms with fewer than 100 workers in a country, divided by the same measure at the aggregate level, i.e., in our case considering all the 10 countries.[5]

A value above 1 of the Competition Index means that the country typifies a more fragmented, and presumably higher, level of competition than the average, while a value lower than 1 means the opposite. Figure 2 below shows that there are four countries that are characterized by a more fragmented and hence presumably higher

[4] See the European Commission "Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings" (2004/C 31/03).

[5] The index is calculated by $C = \frac{n_{cp}}{N_{cp}} / \frac{n_p}{N_p}$ where n_{cp} represents the number of firms with less than 100 employees in the country c in the postal sector p, and N_{cp} the number of all firms in the postal sector divided by the same proportion at aggregate level (here the 10 countries).

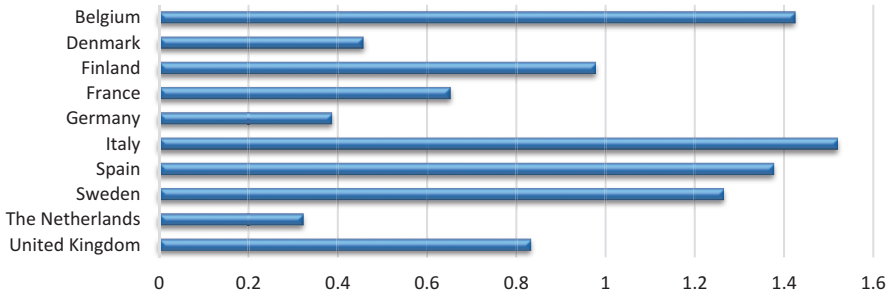

Fig. 2 Indicator of competition
Source: our elaboration on the AMADEUS database

level of competition. This second index appears largely diversified, with striking differences between otherwise similar countries, for instance the Netherlands has the lowest value and Belgium one of the highest. The Netherlands value, only slightly above 0.3, means that competition is primarily related to few large companies rather than to the presence of many small players, the value well above 1 of Belgium suggests the opposite.

Italy and Spain show similar patterns, both characterized by high values of the Competition Index. The particularly high indicator for Italy, with a value above 1.5, means that competition in Italy is characterized by a very high number of "small" firms.[6]

Even if these two indices of sector concentration and fragmentation are built to explore different aspects of competition and are computed using different data (revenues and employees, respectively), putting them together shows that they can lead to substantially comparable indications. Fig. 3 shows the values of the two indices side by side and clearly suggests that countries characterized by the highest concentration in postal services generally also present a low level of competition fragmentation. Countries such as Germany, the Netherlands and France, typically have one or two leading firms, which enjoy the largest market share, and relatively few small firms. Other countries, such as Italy, Spain and Belgium, present less concentrated and fragmented markets, showing more players with a significant market share plus a larger number of small firms.

Notwithstanding the limitations regarding the definition of the postal sector as a whole, these indices suggest the presence of three clusters of countries that are identified by similar values in terms of sector concentration and competition fragmentation. The first cluster, comprises Italy, Belgium and Spain, and appears to be

[6]This measure, however, cannot take into account the eventual capacity of small firms to pool together into networks or aggregate as consortiums, especially in the context of tenders or other large orders.

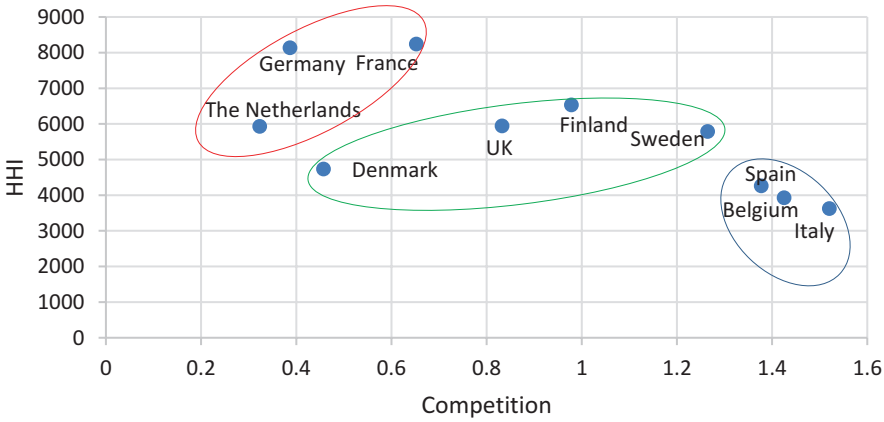

Fig. 3 Relation between HHI and competition index

characterized by a relatively lower level of concentration and a relatively high level of competition fragmentation. The opposite cluster, composed of Germany, France and the Netherlands, is characterized by a low level of competition fragmentation and a high level of concentration. The Netherlands do not reach the values of Germany and France in terms of concentration, but it has the lowest value of the Competition Index in the cluster.

Finally, a central cluster is composed of the UK, Finland, Sweden and Denmark. These countries are characterized by relatively average values for both indicators. In this third cluster, the most representative countries seem to be the UK and Finland, as their values are really close to the average for both indicators.

Regarding Italy and the Netherlands, it is important to remember that the data refer back to 2018, and thus depict the situation existing before certain important events. Since 2018, Italy saw the acquisition by the incumbent, of one of the largest competitors (Poste Italiane acquiring Nexive), and the Netherlands saw the merger between the two largest players in the country (PostNL and Sandd B.V.). For this reason, we may expect a further substantial increase of the HHI in Italy and the Netherlands in the following years (see below).

The aim of the present section was to suggest three "patterns" of competition through the analysis of secondary data. The subsequent section provides an in-depth qualitative analysis of these possible clusters. In particular, it analyses the institutional and regulatory dynamics and the market structure of one country for each of the three clusters identified: the Netherlands for the first cluster, which is characterized by high concentration and low fragmentation; the UK, which represents the intermediate cluster; and Italy, which well represents the cluster of countries that are characterized by competition fragmentation and relatively lower concentration.

3 Limited Competition and Increasing Concentration in the Netherlands' Markets

3.1 Legal and Regulatory Context for Competition

The state-owned Dutch Post Posterijen, Telegrafie en Telefonie (PTT) was privatized in 1989, and eventually became known as PostNL. The Dutch Postal Act 2009 liberalized the sector, in advance of the deadline of the 31 December 2010, set by the European Union in Directive 2008/6/EC. The Postal Act, along with the Postal Decree and General Postal Guidelines Decree set, among other things, the requirements for the Universal Service Obligation (USO) and identified PostNL as the designated provider. Political discussions about the modernization of the USO and its financial viability have been a constant in the last 10 years in the Netherlands. The Decree of 29 October 2015, amending the Postal Act 2009 in relation to the modernization and flexibility of the universal postal service, introduced important changes such as the reduction of the number of delivery days, the number of postal agencies and the number of letterboxes.

In July, 2017, the Dutch Ministry of Economic Affairs published a report on the future of the Dutch postal market (WIK 2016), concluding that maintaining an affordable, accessible and qualitatively good universal service was becoming too challenging for the USO provider, due to the ongoing decline in mail volume. On the basis of this report, the Government undertook a dialogue with the main actors in the sector, at the end of which the State Secretary sent her conclusions and recommendations about the future of the postal sector to the Parliament, and this provides the basis for the future of the postal policy in the country.[7] In particular, the document introduced the key adage "*competition where possible and cooperation where necessary*" in order to analyze where competition is feasible and where cooperation is required.

In 2014, regulatory *ex ante* supervision, to be carried out by the Nederland's Authority for Consumers and Markets' (ACM) has been significantly extended with the introduction of the significant market power (SMP) regime, inspired by the regulation prevailing in the electronic communications sector. This new form of supervision is currently under discussion. The Dutch DG Energy, Telecommunications and Competition is of the opinion that a new form of entry regulation is required, but that it should be implemented "*in a lighter, more appropriate manner than is currently the case*".

[7] "The Future of Postal Market", 15 June, 2018, DG Energy, Telecommunications and Competition (unofficial translation).

3.2 Market Structure and Key Market Players

As everywhere, future demand for postal services in the Netherlands is mainly driven by digitalization. However, this trend is extraordinarily strong in the Netherlands in comparison to many other European countries. The market for parcels has grown tremendously over the past few years because of the high propensity of Dutch consumers to shop online. In 2019, the total volume of parcels sent increased by 12.8% over the previous year. With the delivery of 576 million parcels in 2019, parcel delivery providers were able to generate 10% more turnover than in 2018, reaching a total of 2.79 billion euros. In both the mail and parcel markets, PostNL is the largest service provider.

At the beginning of the 2000s, the number of providers active in this market was increasing, with Sandd B.V emerging as the major competitor to PostNL.[8] In practice, Sandd was PostNL's only national competitor in the postal market until February 2019, when PostNL notified to ACM, the Dutch regulator, its intention to acquire the company. ACM, which has authority to review mergers, after a thorough investigation, decided to deny the authorization to the acquisition.[9] In its view, without Sandd's competitive pressure, PostNL's prices for business mail would likely increase by 30–40%. Also, prices for consumer mail were expected to increase more than they would without the acquisition.

Moreover, according to ACM's analysis, the acquisition was not necessary to secure the provision of the universal service, as argued by PostNL, since PostNL would be able to continue to provide the universal service under economically acceptable conditions. After the ACM's rejection of the proposed merger in September 2019, PostNL and Sandd, disagreeing in particular with the asserted sustainability of the postal service, applied to the Ministry of Economic Affairs and Climate Policy for an exceptional approval under Article 47 of Dutch competition law. This Article allows the Ministry to apply to mergers a different framework, which can take into account arguments related to the public interest, including employment, and the continuity and affordability of the universal postal service. At the end of September 2019, the Ministry granted its approval subject to a set of conditions. This has been the first time, in the Netherlands, that the Minister approved a merger overruling ACM's refusal to grant the authorization.[10]

In the parcels market, competition in the Netherlands is more intense than in mail. The cross-border parcel market segment is the most competitive, but also in

[8] Sandd B.V had been active in the country since 1999, and offered transportation, sorting, distribution, and delivery of addressed printed media, such as direct mail and magazines to subscribers.

[9] https://www.acm.nl/en/publications/acm-does-not-grant-license-acquisition-postal-operator-sandd-postnl

[10] The decision can be found here (in Dutch): https://www.rijksoverheid.nl/actueel/nieuws/2019/09/27/onder-strenge-voorwaarden-vergunning-voor-overname-sandd-door-postnl

the domestic market, there are four main competing parcel services providers: PostNL, DHL Parcel, DPD and GLS, each with its own infrastructure.[11] There are also various niche companies active in providing specialized services.

Despite this apparently competitive picture, the parcels' market is highly concentrated, PostNL and DHL basically account for 90% of the market. Data collected by ACM for 2019, reveal that PostNL had a market share of 60–65% in the domestic market, based on volume and turnover (in comparison to 55–60% in 2015). The second firm, DHL Parcel, had 25–30% market share in both cases (the same as in 2015). DPD and GLS, the third and fourth players, respectively have both a market share of 0–5%, based on volume, and 5–10% and 0–5%, respectively, based on turnover.

Looking closely at the domestic parcels market, ACM's analysis for 2019 reveals that the competitive positions between the competitors varies across segments. The B2B segment is more evenly distributed among the four providers, while in B2C the market it is mostly concentrated with PostNL and DHL Parcel. The size of the B2B segment was 96 million in 2019 (5% more than in 2018) and the turnover €449 million (4% more than in 2018). PostNL was the largest parcel carrier also in this segment, with a market share of 50–55%, based on volume. DHL Parcel and GLS follow, with 30–35% and 5–10% market shares, respectively. DPD's market share is 5–10% by volume. In comparison to a year before, DHL Parcel's share has increased (as in recent years), and GLS and DPD's shares have fallen (as in recent years). The volume of the B2C segment was 280 million in 2019 (17% more than in 2018) and the revenue €938 million (18% more than in 2018). This segment is almost entirely controlled by PostNL and DHL Parcel. PostNL is by far the largest parcel carrier in the B2C segment, with a market share of 65–70%, based on volume. DHL Parcel's market share in the same segment, as in the previous year, is around 25–30%. In C2X, the segment that includes services that are designed to carry parcels on behalf of consumers and small businesses, the dominance of PostNL is even stronger than in the other segments.

In conclusion, the ACM found that in 2019 the concentration in the postal and delivery markets of the Netherland had further increased in all market segments in comparison to the previous years, a situation that the new merger can only reinforce.

[11] The Netherlands Authority for Consumers and Markets (2016), The Dutch Parcel Market, November 2016.

4 An Intermediate Case: United Kingdom

4.1 Legal and Regulatory Context for Competition

The UK transposed the three EU Postal directives into the national legal order through the Postal Service Act 2000 and the Postal Service Act 2011. Beginning with the Postal Service Act 2000, the UK started liberalizing its postal market allowing the introduction of a certain degree of competition.[12] Full liberalization had been introduced in 2006, 4 years before the 2010 deadline established by the Third Postal Directive.[13]

The postal regulator's (Ofcom) primary duty is to secure the provision of a financially sustainable and efficient universal postal service, while promotion of competition in the postal market. In accordance with Section 38(4) of the Postal Act, Ofcom may impose access to the universal service provider's network only if such an obligation will simultaneously promote efficiency and effective competition and will confer significant benefits on the users of postal services. To date, however, Ofcom has never decided to impose a general access obligation.[14]

Since the adoption of the regulatory framework in 2012, which was to expire in 2019, there have been a number of important market developments, which led Ofcom to launch, in June 2015, a general review of the existing regulation. The objective of the review was to ensure that regulation remains appropriate and that it is sufficient to secure the efficient and sustainable provision of the universal postal service. While Ofcom acknowledged that the Royal Mail faces a number of challenges that could affect its ability to earn future returns within the 5–10% EBIT margin range, which Ofcom considers indicative of a reasonable commercial rate of return, it decided that, in the immediate future, the universal postal service is likely to remain financially sustainable. Ofcom's overall conclusion was that "market

[12] The liberalization allowed a general increase of the service quality mainly due to two forces, innovation introduced by new operators and by Royal Mail ("track and trace", "two-day, time-certain product",) and more customer choice (House of Commons, 2005).

[13] Moreover, following the passing of the Postal Services Act 2011, the UK has become one of only a few European countries that have fully privatized their incumbent postal operator.

[14] Both universal and general access conditions require the provider to do either or both give access to its postal network to other postal operators, or to users of postal services, and maintain a separation for accounting purposes between such different matters relating to access (including proposed or potential access) to its postal network as OFCOM may direct. Furthermore, in deciding what obligations to impose in either a USP or general access condition, Ofcom must take into account five factors, which are listed in Section 38(8) and Section 50(5). These five factors are: (i) the technical and economic viability, with regard to the state of market development and of installing and using facilities that will make the proposed access unnecessary; (ii) the feasibility of giving the proposed access; (iii) the investment made by the universal service provider (Section 38(8)), or by the postal operator (Section 50(5)), in relation to the matters in respect of which access is proposed; (iv) the need to ensure effective competition in the long term; and (v) any rights to intellectual property that are relevant to the proposal

conditions and shareholder discipline are more likely to be effective in securing an efficient and financially sustainable universal postal service than the imposition of additional regulation" (Ofcom, 2017). Consequently, it decided to extend the application of the current framework until 2022.

4.2 Market Structure and Key Market Players

The Royal Mail Group is the UK's incumbent, and consequently the largest, postal operator. Today, Royal Mail faces competition only in the growing parcels business, whereas its position in the final mile letter deliveries remains unchallenged. While the volume of addressed letters has been in steady decline across the whole of Europe, the UK continues to have a relatively high number of letters per capita (151 per annum) compared to other European countries.[15] Still, Royal Mail expects addressed letter volume to decline annually by 4–6% in the medium-term, mostly due to continuing e-substitution.

In contrast to the decline in the letter market, the parcels market has witnessed strong growth in recent years (by 11% in 2017–2018) due to the increasing popularity of online retail shopping (Ofcom, 2018). Two trends, in particular, have invigorated competition in that market in recent years. First, the number of retailers that offer their own delivery services has grown. For example, with the launch of its own delivery service, Amazon was able to capture 3% of the UK parcel market in just 1 month. Second, in-store collection and delivery services have also grown significantly. Furthermore, as parcel carriers continue to invest in new capacity, pricing pressure increases. According to the Royal Mail's estimate, at present there is approximately a 25% overcapacity in the UK parcel market (Royal Mail, 2018).

In the UK letters market, two forms of competition are theoretically possible—access and end-to-end, also known as direct delivery or bypass competition. Access competition, which allows other operators to offer postal services to larger business customers for letters and large letters, without setting up a delivery network, continues to prevail. In 2018–2019, it accounted for 65% of all letter volumes, a 2% increase in comparison to the previous year. End-to-end competition, in which a postal operator undertakes the entire process of collecting, sorting and delivering mail, is a relatively new form of competition, and was present only on an extremely limited scale. It reached a peak of 1.3% of all letter deliveries in 2014–2015, due to the entry and growth of Whistl (formerly known as TNT Post), which sought to establish itself as an end-to-end operator. However, after Whistl exited the market in 2015, the share of end-to-end operators fell to approximately 0.1% in 2017–2018, re-establishing access to Royal Mail network as the only form of last-mile delivery in UK's letter markets (UK House of Commons, 2020).

[15] This is 30% above the average of 117 letters per capita for ERGP countries (ERGP, 2019).

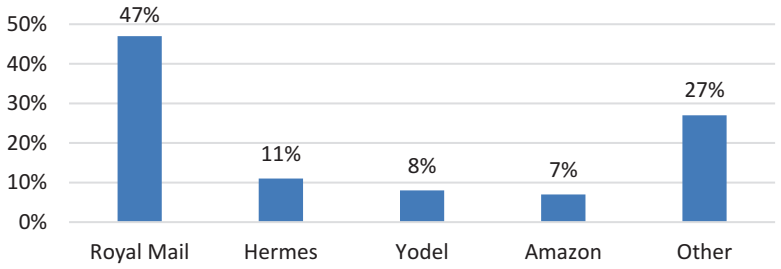

Fig. 4 Distribution of the courier parcel market in the United Kingdom in 2017
Source: Statista Dossier Postal Services in the United Kingdom.

The parcel market in the UK is largely unregulated. While, similarly to the letters market, Royal Mail offers an access service for parcels; this access product is not mandated by regulation, but it is offered by the incumbent operator voluntarily on a commercial basis. Yet, access competition in the parcels market remains small, both in terms of volume and revenues, as end-to-end competition prevails, since most parcel operators rely on their own networks.

In recent years, there have been some relevant mergers in the parcel sector. In March, 2019, Delivery Group, which is also an access letters operator, acquired ONEPost, another access letters and parcels operator. In December, 2018, Whistl acquired the Spark Ecommerce Group, a fulfilment and contact centre company. Previously, Whistl had acquired Parcelhub and Mail Workshop in July, 2018, and Prism DM in August, 2017. In September 2018, DHL Parcel UK and Smith News concluded an agreement, on the basis of which DHL took over the parcel shop network that was used by Smith News' Pass My Parcel (Ofcom, 2019).

In synthesis, in the UK, Royal Mail retains a *de facto* monopoly of postal delivery, but with a significant share of intermediate access to its network. It is a major player in parcel delivery (Fig. 4) but faces lively competition from sizable operators strengthened by a recent process of consolidation and a significant capability to implement their own end to end parcel's delivery networks.

5 The less Concentrated Italian Postal Market

5.1 Legal and Regulatory Context for Competition

As established by Legislative Decree n. 58/2011, which transposed the third European postal directive and concluded the process of liberalization, the former incumbent Poste Italiane (in the following also PI) was entrusted with the provision of universal service until 30 April 2026, subject to a potential revocation every 5 years if the obligations of the contract are not fulfilled.

Regarding access, AGCOM, the Italian regulator, has the power to impose such an obligation, if necessary, as provided by Legislative Decree No. 261 of 1999. AGCOM intervened in the matter of access for the first time in 2013 when, in the aftermath of a market analysis, it found that Poste Italiane had a dominant position in the provision of single consignments, and that it did not offer wholesale services for multiple consignments. Having identified these as barriers to entry, it adopted resolution 728/13/CONS, which imposed on Poste Italiane an obligation to negotiate a wholesale offer with other operators for access to its postal network at fair and reasonable terms. To further facilitate access by competing operators to Poste Italiane's network, in 2017 AGCOM adopted a new access resolution (Review of the provisions regarding access to the network and infrastructure of Poste Italiane).[16] This resolution built on the access regime that had been laid down in the past, but also provided that, in the event that alternative operators request access to certain delivery areas where only Poste Italiane has a network (technically defined as Extra-Urban2 – 'EU2 areas'), PI must apply cost-oriented tariffs.

Despite the fact with mandatory access the incumbent operators face a risk of cream skimming by competitors, AGCOM decided that Poste Italiane should nonetheless negotiate access to its network, for the entire territory, on fair and reasonable conditions. According to AGCOM, such an approach is warranted as, in order to promote competition from alternative operators, Poste Italiane still has high levels of the market share and that its network is not entirely replicable, at least for ordinary mail.

5.2 Market Structure and Key Market Players

The Italian postal market has followed the trends observed in the other countries. Recent data released by AGCOM (2020) show that, between 2015 and 2019, the Italian postal sector experienced an overall decrease in volumes of 23%, but with a 16.3% increase in revenues.[17] The increase in revenues, mainly due to the provision of new mail products outside the scope of universal service, appears to be linked to the increased ability of operators to enhance their performance through the development of new value-added services.

In the same period, the parcel segment had recorded an important overall growth. In particular, the parcel segment that falls outside the universal service has grown remarkably, by 82%, in terms of volume and 45.1%, in terms of revenue. The growth of volumes, much higher than the growth of the corresponding revenues, indicates the increasing competition in this specific segment of the market.

[16] AGCOM (2020), Resolution 384/17/CONS.

[17] The same trend occurred in many other European countries, even if the Italian case showed values largely above the average. European countries included in the ERGP report 2019 showed an average decrease of 3.6% of volumes and an increase of 1.9% of revenues in the same period.

According to data from AGCOM (2020), at the beginning of this year, 3159 firms were active in the postal market that is 3.4% more than in 2018. Poste Italiane competes in postal services (letters) mainly with two types of operators: national operators that cover 75–80% of the territory, and regional operators, that cover approximately 17–27%. In terms of the share of the consignments, in their respective areas of activity, national competitors accounted for roughly 10%, whereas the regional operators accounted for 20–50%.

The emergence of the end-to-end competition model in Italy was recognized in two recent AGCOM resolutions, in which the Authority highlighted that alternative operators have substantially duplicated the network of Poste Italiane, reaching a coverage (for the category of "*indescritta*" ordinary mail) of around 94% of the population.[18] In addition to the high level of competition that is based on alternative networks, the authority, as already mentioned, has introduced obligations for "access" to retail services and to Poste Italiane's network by competitors, determining a *hybrid* model that is quite unmatched in other European countries.

Regarding the market share of mail services that do not fall within the scope of the universal service, in 2019, Poste Italiane held a share of approximately 73%, up 1.7% compared to the previous year, while the market shares of all the other postal operators were either slightly decreasing or stable.

Figure 5 shows the strong position of Poste Italiane, which in the 2019 consolidates the leadership in relation to mail services, and the position of the next actor (Nexive), with a market share close to 20%, decreasing of 1.4% in comparison to the previous year.

However, the anomalous Italian situation, in which PI has one significant competitor in postal delivery, comparing to the present *de facto* monopolistic situation of the Netherlands and the UK, has changed at the beginning of 2021. Poste Italiane has acquired from the Dutch company PostNL and the Germany company Mutares Holding the entire share capital of Nexive, its only significant competitor.

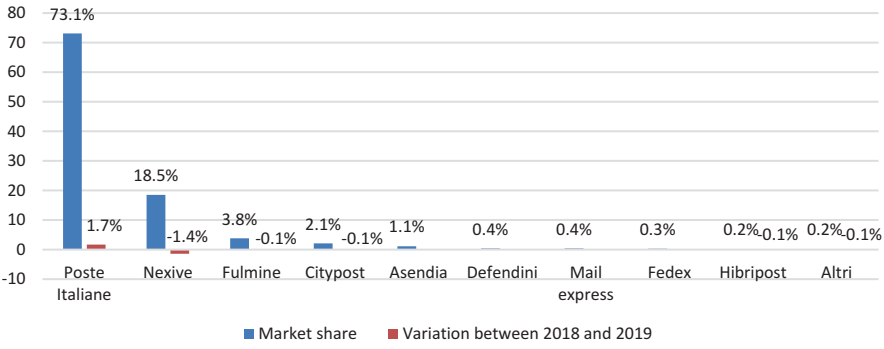

Fig. 5 Market share of postal services (letters) outside of the USO, 2019
Source: AGCOM (2020)

[18] Delibera 384/17/Cons and Delibera 452/18/Cons.

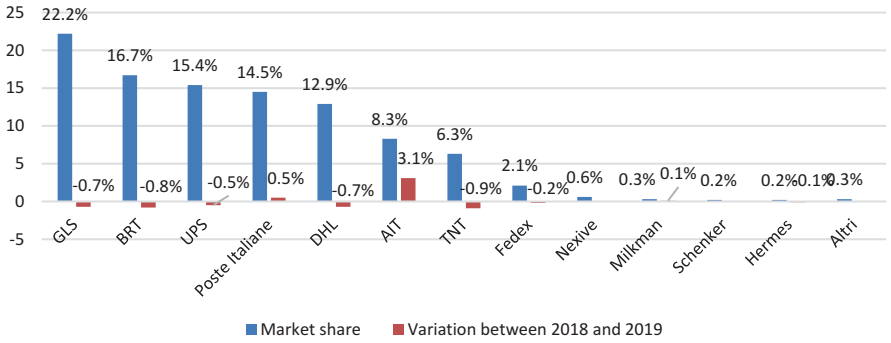

Fig. 6 Market share of postal services (parcels) outside of the USO, 2019
Source: AGCOM (2020)

While negotiations started in 2018, difficulties in the business mail sector, recently exacerbated by the Covid sanitary emergency, have accelerated consolidation in the sector. The concentration was facilitated by an article in the so-called August Decree that authorizes mergers involving companies active in market characterized by (a) high labor intensity, (b) a loss in the last three financial exercises (years) and c) considered of national general economic interest.[19] This provision allowed Poste Italiane, the incumbent postal operator, to acquire Nexive without the expected opposition from the Italian competition authority.

In the parcel segment, in Italy, there are numerous companies of comparable size operating nation-wide and fiercely competing amongst themselves. Figure 6 shows that while five operators have a market share higher than 10% (GLS, BRT, UPS, Poste Italiane and DHL), no operator has a market share above 25% and Poste Italiane is only the fourth player in the market. It is worth noting the strong increase in the market share of Amazon (AIT) which, with an increase of 3.1% in the last year, has now reached 8.3% of the market.

At present, Amazon is the only vertically integrated online platform in the parcel delivery sector while it remains one of the main customers of many other postal operators. In any case, e-commerce platforms, such as Amazon, appears to have a strong potential capability to compete in parcel delivery with respect to more traditional postal operators.

Italy today probably remains the most competitive market in postal delivery in Europe. In particular, it is certainly unique in contemporaneously having E2E competition, although after the Nexive acquisition only from local operators, and a highly regulated access regime. Regarding parcel delivery, the fact that PI has only the fourth highest market share is anomalous with respect to other countries, where competition in parcels is present but incumbent postal operators are still the market leaders. The acquisition of Nexive may certainly have reduced the anomaly of the

[19] Law Decree of 14 August 2020, n. 104, Urgent measures to support and revive the economy, art.75.

relatively high competition in the mail markets but it is very unlikely to influence the situation in the parcel sector.

6 Conclusion

In fully liberalized postal and delivery markets, at least three different levels of competition are possible: (i) end-to-end competition, where new entrants develop and operate alternative networks; (ii) access-based competition, where competition takes place only in some sections of the delivery chain and, (iii) a mixed bypass model, where duplicated and alternative infrastructures coexist with access to the incumbent's network, and where new entrants engage in end-to-end competition in some parts of the country while relying on the incumbent's infrastructure in others.

From a purely competitive point of view, the end-to-end model is apparently preferable. However, since its liberalization, the postal sector in the European Union has undergone significant changes, which have altered its economics considerably. Demand for traditional postal services (i.e., mail) has been rapidly declining, very much affected by the substitution of paper mail by digital alternatives, resulting in diminishing scale effects for postal operators. With respect to parcel delivery, the growth of e-commerce has led to significant growth in volume accompanied by substantial changes in market structure.

These changes have put the sustainability of the postal services that are included within the scope of the USO at risk. This has, in turn, ignited an intense debate about the impact of the different models of competition between operators with different responsibilities with respect to the universal service, and more fundamentally on the very scope and sustainability of the universal service.

This debate, however, as we discussed earlier, encounters different market realities. From the analysis emerges an important distinction that must be made when assessing the different models of competition. It is clear that the positions of the incumbent postal operators and competitive dynamics differ considerably in the letter and in the parcel sector across countries.

In the UK's, where E2E competition was always very modest, the letter market share of end-to-end operators fell to approximately 0.1% in 2017/2018, after the exit of Whistl from the market. In both Italy and the Netherlands, E2E competition in the letter market was more relevant. In Italy, the market shares of PI in this segment were around 73%; in the Netherlands, the market share was in the range of 75–80%. However, after the approval of the *PostNL/Sandd* merger, the Dutch postal market now is a *de facto* monopoly. In Italy, the acquisition of Nexive by PI, reestablished a super dominant market share of above 90%.

The lecture for the future of competition in the letter's markets appears clear. On the one hand, the exit from letter delivery of Whistlt in the UK and the mergers in the Netherland and Italy appear to witness the fragility of a competitive equilibrium in a rapidly declining mail industry. On the other hand, the evolution of the UK

market suggests that a well-regulated access policy may lead to some sort of equilibrium, possibly favoring a more orderly transition to digital substitution.

In contrast, the competitive dynamics in parcel markets remain more heterogeneous across the three competitive clusters and our case studies confirm this variability. In all three countries, E2E competition essentially prevails. In the Netherlands, PostNL has an approximately 55–65% market share, in the UK Royal Mail has 41% (in terms of revenue), whereas in Italy Poste Italiane has approximately 20–30% of the deliveries. In the Netherlands, where the incumbent operator has the highest market share, concentration is more significant, as there are basically only two main competing operators (90% of the market is shared between PostNL and DHL). Instead, in the UK and in Italy, the parcel market today appears quite competitive.

For parcels, the growth of e-commerce justifies further investment and innovation which, in turn, makes entry and competition economically feasible. In contrast, declining volume in the letter market makes it increasingly improbable that a sound business case can be built around any form of E2E competition, even in the "best" case scenarios where new entrants are allowed to skim off the incumbent's revenues by engaging in competition in some areas while seeking access in others.

In conclusion, the declining volumes in the mail (letter) market, and the increasing volumes in the parcel market, appear to present an important bearing on the future of investment in the postal sector and suggest some indications for its final competitive assets. At present, it is likely that the postal and parcel markets competitive assets will continue to diverge, one toward more concentration and the other toward more competition, following a trend dictated by the different evolutions of their respective demands.

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Cartels in the Postal Industry: A Behavioral Theory Consideration of the Game Theory of Leniency Policies

Adam Goodman and Gráinne Murphy

1 Introduction

In recent decades, there has been increasing impetus within European and global competition authorities to eradicate cartels.[1] A cartel is formed when two or more firms enter into an agreement to fix the price or restrict the supply for a good or service. Cartels are recognized to result in harm because they lead to higher prices by limiting quantities, choice, and innovation offered to consumers. Recognizing the detrimental impact of collusion, competition authorities have put in place mechanisms to detect and inhibit cartels. One of the policies that has been introduced to combat cartels are leniency programs designed to destabilize and expose existing cartels and act as a deterrent to the establishment of potential cartel agreements.

The illegality of cartels means that the communications and agreements between the member firms are conducted in secret, so it has typically been difficult for authorities to expose the collusion. Trust that its fellow cartelists will not betray and reveal the agreement to authorities is intrinsic to the establishment and stability of any cartel. Leniency programs are systems set up by authorities that, in exchange for revealing and providing evidence on the cartel, gives a cartelist total or partial exemption from the penalty that it would have received for its involvement. As we set out in Sect. 4, the theory that informs the leniency policy suggests that by reducing or eliminating the cost of reneging on the agreement by offering immunity, the trust between the cartelists is destabilized and whistle blowing can become the best strategy to follow.

[1] See, for example, the OECD's recommendation regarding cartel regulation, here: https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0452

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Almost 90 jurisdictions[2] operate a leniency program to combat cartels. There are, however, differences in the specifics of programs or the wider legal framework in which the programs operate between different jurisdictions. For the purposes of this paper, we focus on the policies implemented by the European Commission, and the Competition and Markets Authority (CMA) and concurrent competition authorities (for example Ofcom) in the UK. In Sect. 2, we set out the key elements of the programs. In Sect. 3 we give an overview of cartels in the postal industry that were discovered via the leniency policy.

In Sect. 4, we discuss reasons why the outcomes predicted by the theory might not be realized by leniency programs by exploring the game theory behind the policy, and how game theory predicts these outcomes when key assumptions are changed. We believe that a potential source of difference between the success of leniency programs as predicted by the theory, and any lesser efficacy of the leniency policies enacted, could be due to unrealistic and artificially narrow assumptions as to how cartelists behave, inherent to the classical theoretical modelling.

2 The Implementation of Leniency Policy

Many countries employ leniency programs to combat cartels, all of which operate by offering to a cartelist that exposes and provides evidence on the cartel either complete exemption from the fines that it would have received, or a reduction in those fines. While the central characteristics are consistent across jurisdictions, there are differences in the particulars of the application of the various programs. For this paper, we have regard to the key features of the programs enacted by the European Commission[3] and the CMA,[4] which we set out below.

2.1 The Process of Claiming Leniency and the Dispensations Available

The *first* business that is granted immunity by either authority will be able to benefit from immunity from any fines that would have been imposed, and an agreement not to pursue a criminal prosecution for its role in the cartel if the whistle blower is an individual. In order to qualify as first mover, and therefore enjoy full immunity, the

[2] Figure 2 of the OECD's *Review of the Recommendation of the Council concerning Effective Action against Hard Core Cartels* (2019), shows total leniency policies by year of introduction. Found at: https://one.oecd.org/document/DAF/COMP(2019)13/en/pdf

[3] The landing page for the European Commission's leniency policy is found here: https://ec.europa.eu/competition/cartels/legislation/leniency_legislation.html

[4] The main page for the CMA's leniency policy is found here: https://www.gov.uk/guidance/cartels-confess-and-apply-for-leniency

company needs to satisfy the authority that the evidence provided would facilitate a targeted inspection or establish a cartel infringement.[5]

In the UK and EU, any firms that comes forward after the first whistle-blower could also gain concessions. A second applicant would have to provide to the authority evidence of "significant added value"[6] such that the authority judged that it strengthened its ability to make an infringement finding on the remaining cartel participants. A company granted this status could benefit from a 30 to 50%[7] reduction in their fine. Indeed, a third applicant could be allowed dispensation of up to 20%[7] of a fine if it could convince the authority that the value of its evidence could significantly add value to the prosecution on top of that provided by the first two applicants.

To manage and provide potential applicants with clarity on whether they would be treated as a first, second or third whistle-blower a 'marker' system operates. The European Commission and/or CMA will grant a 'marker' to a successful applicant for leniency. This will identify to any other potential whistle-blower within the same cartel that they would be treated as a second or third applicant if its application were to be accepted. In the UK a "single queue system"[8] operates. Though several regulators enforce competition law, only the CMA can hand out markers for cartel leniency.

Once the marker is given, the authority sets a deadline for the company to provide the relevant evidence for the endorsement of the marker. The marker system has been set up to operate such that a company can inquire about the markers that may have been granted (for a certain cartel) while retaining its anonymity, in case it decides not to whistle blow.

Continuous cooperation by the whistle-blower is a key condition for any applicant to retain its immunity under the leniency programs. The evidence provided by the company must include all the appropriate details it had knowledge of on the operation of the cartel, and the authorities will require cooperation and the requirement for any relevant information needed for the whole period leading to a successful prosecution of the cartel.

[5] EU 2006 Leniency Notice, II Immunity from Fines, A) 8 a) and b), found at: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2006:298:0017:0022:EN:PDF

[6] See Table A – Types of leniency, here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/284417/OFT1495.pdf

[7] EU 2006 Leniency Notice, II Immunity from Fines, B) 26, found at: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2006:298:0017:0022:EN:PDF

[8] See guidance published by the CMA, here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/893921/information-note-on-arrangements-for--handling-of-leniency-applications.pdf

2.2 Other Key Features of the Programs

The authorities are very conscious that an applicant that exposes their part in a cartel or a cartel in which they were a member could open themselves up to litigants seeking damages for the harm caused by the cartel. The EU Damage Directive limits the liability of firms that have received immunity under the leniency program of the European Commission or a national competition authority "to their own direct or indirect purchasers or providers".[9] Furthermore, the EU Damage Directive also exempts leniency statements and settlements from disclosure to parties seeking civil damages. This is not necessarily the case across all jurisdictions around the world – so if a cartel operates globally it might still be exposed to civil action in another country after it has been exposed.

3 Case Studies in the Postal Industry

We next discuss three major cartel cases within the postal industry, that were brought to light via the leniency policy, under the EU and UK jurisdictions.

3.1 Royal Mail and the SaleGroup

Royal Mail and a reseller of its business parcel delivery services – The SaleGroup – admitted being part of an illegal anti-competitive agreement, with Ofcom concluding the case in November 2019. Both companies admitted to breaking competition law, and The SaleGroup agreed to settle the case.

In May 2018 Royal Mail reported to the CMA that its ParcelForce division had an agreement with The SaleGroup (trading as Despatch Bay) that neither company would offer parcel delivery services to each other's business customers. The CMA subsequently handed the matter over to Ofcom (as the regulator for postal services). Ofcom carried out an investigation into the alleged agreement.

ParcelForce provides parcel delivery services to its customers directly and via resellers. The SaleGroup, an online reseller of parcel delivery services, arranges deliveries for small and medium-sized business customers via multiple parcel operators rather than carrying out deliveries itself. The company also offered its customers a single point of contact for administrative services such as billing and invoicing. Both competed for customers at the retail level of the supply chain.

Ofcom gathered correspondence between Royal Mail and The SaleGroup which demonstrated that the two companies implemented, monitored, and enforced an

[9] See (38) at https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0104&from=en

agreement not to offer or supply parcel delivery services to each other's business customers from August 2013 to May 2018.

The two companies enforced the agreement generally through regular email correspondence, with one usually asking the other to withdraw a quote provided to one of its existing customers. Some of these offers had undercut the price a customer was paying at the time. So, when the quotes were withdrawn, this prevented customers from paying lower prices for the same parcel delivery services. The SaleGroup also shared a customer list with ParcelForce on one occasion, with the aim, at least in part, of making sure each company could avoid offering services to the other's customers.

Under the CMA leniency policy, Royal Mail, as the first company involved in the anti-competitive agreement to come forward, was granted immunity. The SaleGroup admitted liability and were fined £40,000 for their involvement in the cartel; a 20% reduction in their possible fine due to settling the case in this manner, though a significant fine given the small size of the firm.

3.2 French Parcel Cartel Case

Between 2004 and 2010, 20 parcel operators took part in a price fixing cartel where the firms colluded to artificially increase prices year-on-year. As part of a separate agreement, 15 of the firms involved also agreed to pass onto customers a diesel surcharge, following the increase in oil prices between 2004 and 2005. The cartel was discovered by the French competition authority, Autorité de la Concurrence, after Deutsche Bahn (DB) used the leniency policy to whistle blow on the arrangement in late 2008. The sanctions totaled 672 million euro and ranged from 0.5 to 200 million euro.[10]

DB's French subsidiary Schenker France received a reduced penalty of only 3 million euro due to DB blowing the whistle.[11] Shortly after DB came forward, Alloin Holding also provided additional details to Autorité de la Concurrence, which meant under the leniency policy they also received a reduced fine. Though it still received a fine of 32 million euro, this was a 30% reduction in what it could have been fined, under the French leniency policy.

Royal Mail was fined 55.1 million euro as part of the sanctions, as the French arm of its parcel operations, GLS France, was involved in the cartel. This fine was reduced from a possible 67.6 million euro because Royal Mail agreed not to contest the fine. La Poste, Gefco and TNT also received reduced fines (ranging between 16

[10] L'Autorité de la concurrence sans pitié avec la messagerie, Olivier Cognasse, published 15 December 2015, available at: https://www.usinenouvelle.com/editorial/l-autorite-de-la-concurrence-sans-pitie-avec-la-messagerie.N369554

[11] They were not eligible for full immunity despite being the first whistle-blower, as they were found to have attended an illegal meeting in 2010 whilst the case was on-going, 2 years after blowing the whistle.

and 19% reductions) for not contesting the fines. In addition, the French competition authority considered the firms' financial viability when setting the fines. Ciblex, Heppner, Lambert et Valette, XP France, Transport Henri Ducros and Ziegler received reductions of 90% due to severe financial difficulties. The agreements to fix prices all took place during meetings held by the delivery union, TLF. TLF were therefore also fined for facilitating the cartel by not using their role as the professional trade union to invigilate these meetings appropriately and allowing these agreements to be made. Case files showed that TLF also actively participated in the discussions to fix prices and protected the confidentiality of the firms involved in the cartel.

3.3 Spanish Parcel Cartel Case

Between September 2005 and April 2016, ten parcel operators took part in a cartel arrangement to minimize competition between each operator. The companies involved agreed not to compete by withholding offers from customers of the other firms in the cartel. Though it can be common practice for parcel operators to enter into commercial agreements with other operators for logistical reasons, for example to support their distribution network, non-compete agreements such as these are damaging to competition and worsen outcomes for consumers.

The cartel ended when GLS Spain, which is also a subsidiary of the Royal Mail Group, availed itself of the leniency policy and blew the whistle on the arrangement to the Spanish competition authority, Comisión Nacional de los Mercados y la Competencia (CNMC). As a result, they avoided a fine of 3.8 million euros.[12] The other nine firms involved received fines ranging from 1 to 21 million US dollars.[13]

The cartel agreements were mostly made orally, except for the agreements between International Courier Solutions (ICS) and CEX, Tourline and DHL. These firms had service provision agreements which included a unilateral non-compete clause which protected ICS clients from the subcontracted service providers. However, evidence showed that these unilateral non-compete clauses had gradually shifted to bilateral agreements. These agreements included all clients to both parties in the arrangement, not just ICS clients, and potential clients. There was also evidence that firms were sometimes required to withdraw offers from clients or made to offer a higher bid in order to block the offer from being accepted. The Spanish competition authority fined all firms involved (except for GLS) a total of 72 million US dollars.

[12] Source: Ashurst's Competition Newsletter, 9 April 2018. Found at https://www.ashurst.com/en/news-and-insights/legal-updates/parcel-delivery-cartels-fined-by-spanish-competition-authority/

[13] See https://qdd.oecd.org/subject.aspx?Subject=OECD_HIC

4 Game Theory of the Leniency Policy

The next section discusses the classical game theory that underpins the leniency policy, then examines this through a behavioral economic lens, to discuss what effect relaxing the classical assumptions might have on the likelihood firms will avail of the leniency policy.

4.1 Classical Game Theory of a Leniency Policy

Figure 1 shows the pay-off structure for a two-firm cartel under the leniency policy regime. A leniency policy is typically understood to be an iterated prisoner's dilemma because the game continues until a firm exposes the cartel, or the cartel ends for other reasons. If more than two firms are involved in the cartel, the first firm to blow the whistle would receive full immunity from the penalty. Any subsequent firm to come forward who can add significant value to the investigation could receive a reduction in penalty, though not full immunity. Therefore, the pay-off structure could be extended to include a probabilistic pay-off for the n^{th} firm to blow the whistle. Figure 2 shows a generalized example for a three or more firm cartel for

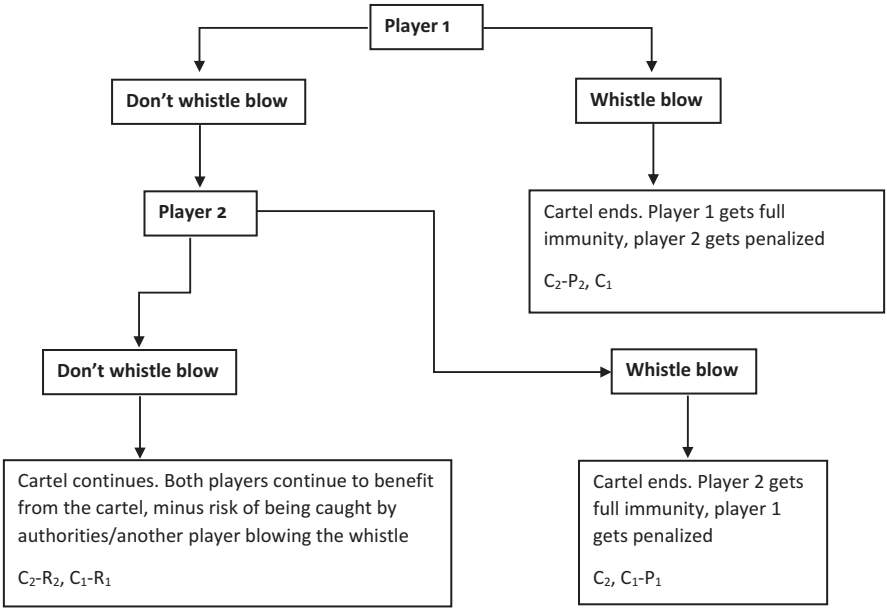

Fig. 1 Pay-off structure for the cartel leniency policy for two firms, under classical game theory. Where: *C* gains from participating in cartel, R = risk of being caught in cartel; P = full penalty for being involved in a cartel

the first two firms who could blow the whistle (assuming the others stay quiet), but we will not use this model to discuss the assumptions further.

For simplicity, we will discuss the assumptions of the game using a two-firm model. Logically, since only one firm can be the first to blow the whistle, unlike in a traditional prisoner's dilemma, there is no pay-off for both firms blowing the whistle in the two-firm model. Therefore, we have modelled the pay-off structure as a sequential prisoner's dilemma game.

The classical economic game theory behind a leniency policy assumes that the Nash equilibrium will be the strategy where either one or more firms involved in the cartel whistle blow. For this to hold, there are two key conditions that must be true. Firstly, the firms must be risk averse, and perceive the risk of their cartel being discovered, and/or the risk of the other firms involved blowing the whistle first, to be high enough to warrant acting to prevent this. That is $R > 0$.

Secondly, the penalty incurred for being discovered, without blowing the whistle, must be sufficiently high that $C - P < C - R$, or simply $P > R$. That is, the penalty the firm will incur if they are convicted must be greater than the disutility that comes with the constant risk of being in an undiscovered cartel. By setting penalties for being involved in a cartel, competition authorities destabilize them by introducing P into the equation. Competition authorities need to find the optimal level of P so that the leniency policy is an attractive offer.

For these two conditions to hold, there are several other assumptions that must be made. Firstly, firms participating in a cartel must have accurate information on the gains they are set to make from participating in the cartel, and on the degree of penalty for being discovered. Secondly, they must be rational, utility maximizing agents who would use this information to calculate the best outcome for them and act accordingly. Thirdly, they must be risk averse – for it may be perfectly rational for a risk seeking agent to conclude to not whistle blow, if for them $C - R > C$, or $C - R > C - P$. Finally, they need to have full information on the availability of a leniency policy, and how it works.

		Player 1	
		Does not whistle blow	**Whistle blow**
Player 2	**Does not whistle blow**	$C_2 - R_2$, $C_1 - R_1$	$C_2 - P_2$, C_1
	Whistle blow	C_2, $C_1 - P_1$	$0.5C_2 + a(C_2 - P_2/X) + b(C_2 - P_2)$, $0.5C_1 + 0.5(C_1 - P_1/X) + b(C_1 - P_1)$

Fig. 2 Algebraic pay-off for the first two firms to blow the whistle under the leniency policy regime. For simplicity this assumes there are one or more other firms in the cartel, none of which blow the whistle. Where: C = gains from participating in cartel; R = risk of being caught in cartel; P = full penalty for being involved in a cartel; X = degree of reduction in fees for whistle blowing, but not being first (must be at least 2, as penalty reductions for the second whistle blower are capped at 50%); a = probability that the player can add significant value to the investigation, given the other player has already come forward to whistle blow; b = probability that the player will receive the full penalty, i.e. they are the second player to whistle blow and they cannot add any value to the investigation. a + b = 0.5, or (a + blother player has come forward) = 1

Without these assumptions, in the classic game theory behind a leniency policy, there could be a Nash equilibrium where neither firm blows the whistle, which would render the policy ineffective for its purpose. Taking a more behavioral approach to game theory suggests that not all these assumptions would hold for a real cartel. We will now discuss these tenets of the behavioral model for a leniency policy in turn, setting out rationality, information asymmetry and imperfect information, risk and loss aversion, trust, and social capital.

4.2 Rationality and Heuristics

The classical game theory is built on an assumption that the cartelists' choices will be driven by rational decision-making. This could be viewed as an artificial assumption that weakens the validity of the predictions that the theory makes on whether cartelists will whistle blow or not. Behavioral economists posit that people don't (and indeed usually can't) make fully thought out, coldly deliberative decisions that maximize their welfare. They consider that people are limited in their ability and capacity to make a careful and comprehensive calculation of all available options to decide on the optimally rational choice, and instead use heuristics (bounded, decision-making short cuts) when making decisions. The actions of cartelists when considering their decisions on whistleblowing or not, might be alternatively viewed by consideration of their decisions using this heuristic decision-making approach. Heuristics are often the only possible way to make a decision when faced with imperfect information.

4.3 Information Asymmetry and Imperfect Information

One of the key tenets of the game theory underlying the leniency policy is that the cartelists have perfect information when deciding on the different courses of action they could take. However, this assumption is likely to diverge from the information that cartelists in reality will have on the payoffs; the certainty that an application for leniency will be accepted; indeed, even the knowledge of the existence of the leniency policy. In a world of imperfect, incomplete information, the choices of cartelists may differ from that predicted under the assumption of perfect information.

For firms to make a rational decision about whether to blow the whistle on their cartel agreement, they need to know accurately both the gains they are likely to make from the cartel arrangement, and the likelihood that the other party will blow the whistle. The former is easier for a firm to predict and model, as a firm should have information on this going into the cartel, or whilst the cartel is ongoing. The latter, however, would be based off more of an estimation, and this lack of full information is utilized by the leniency policy. Taking into account their level of risk aversion, and trust for the other parties involved (discussed below), the firm will take a

position on the probability of the other party blowing the whistle and decide how to act.

The fact that a degree of judgement is involved in the operation of the marker system (explained in Sect. 2) may lead to uncertainty for cartelists and deter them from entering the race to whistle blow that the game theory might predict. A potential whistle-blower might be put off by the uncertainty involved in the discretionary element of a competition authority's decision to accept or reject an application. This uncertainty is magnified for an applicant who is seeking a 'second' or later mover marker, as understanding what 'significant added value' may entail could, as Bloom (2006) stated appear to be open to considerable variation in each case, which increases the element of unpredictability.

Furthermore, for the leniency policy to be effective, firms need to be aware that it exists and understand how it works, and the penalties in place if a cartel they were part of were to be discovered. The CMA do a lot of advocacy work to ensure the policy is known to firms, but despite this many firms could still be unaware of its existence, and therefore a cartelist that would otherwise utilize the policy would be precluded from whistle blowing. The consequence of this information asymmetry is that by default the Nash equilibrium for the policy would fall to the firm who does know about the policy blowing the whistle. Smaller firms are more likely to suffer from this information asymmetry, and they could be more likely to be without in-house legal counsel and lack the resource to afford or prioritize good legal representation.

An adjunct to this is the possibility that a better-informed cartelist could use this information asymmetry to utilize the leniency policy in a 'strategic' way. A larger, or more knowledgeable, firm could utilize the leniency policy by entering into a cartel, benefit from the profits they will gain during the cartel arrangement, then whistle blow (as first mover) and avoid the penalties they otherwise might have suffered if they had been caught in the cartel. A further benefit to such an actor could be that their competition would be weakened by the penalties applied to the cartelist it has reneged on. However, in a qualitative study of cartelists, Jaspers (2020) found limited, although not non-existent, evidence of such strategic uses of the leniency policy.

4.4 Attitudes to Risk and Loss Aversion

A key criticism of the game theory which may have informed the leniency policy is that it is underpinned by artificially narrow and unrealistic assumptions on players' attitude to risk and loss. Incorporating a more realistic set of assumptions of how actors approach risk and loss is worthy of consideration because it might change the optimal outcome modelled by the game theory, and it might lead one to alter how to formulate and frame a leniency policy.

Incorporating firms' attitudes to risk and loss aversion into the game theory could be represented through the weights i, l *and* g where: i = firm's risk aversion (the

higher i is the more risk averse the cartelist is), l = the weight the firm applies to the loss incurred from the penalties for being discovered, and g = the weight the firm applies to the gains they make from the cartel. So, the algebra would be:

iR = *cartelist's perception of risk of being caught in cartel*
gC = *cartelist's perception of the future gains from participating in the cartel*
lC = *cartelist's perception of the future losses from the cartel ending*
lP = *cartelist's perception of the losses from being discovered in a cartel*

The pay-off structure for the game, extended from the classical game, is shown in Fig. 3. C without any coefficients is as before: it shows the gains from the cartel already made in the period before a decision about whether to whistle blow.

If a cartelist was a rational agent as per classical economic theory, then the weights they would apply to gains and losses would be equal; that is $g = l$. This would mean the pay-off structure is equal to that under classical game theory, set out in Fig. 3 (C can be interpreted as a value, so C + C in this model can be simply viewed as C). Observations from behavioral economics on agent's attitudes to loss suggest that classical game theory could lead to erroneous expectations of how they might act when presented with the leniency policy.

Kahneman and Tversky's seminal 'Prospect Theory' (1979), based on empirical evidence, posited that decisions made incorporate certain perception biases. People do not weight gains and losses equally, there is a 'loss-aversion' bias to their decision-making such that a *loss* of an item compared to an item *gained* of equivalent value would lead to a greater loss in utility (dissatisfaction) than the increase in utility (satisfaction) from the gain. If cartelists share a similar loss-aversion function, then the game theory may significantly overweight the projected payoff of whistleblowing and underweight the projected payoff of continuing with the cartel arrangement. In the model in Fig. 3, this manifests itself as l being sufficiently high that the pay-off for whistleblowing is lower than that of not blowing the whistle (assuming the other firm stays quiet).

Kahneman and Tversky's further observation that there is a 'certainty effect' is worthy of consideration as, if applicable, it is likely to again shift the Nash equilibrium. Prospect theory posits that people place undue weight on high probability events such that they view them as certain, and conversely people tend to treat low probability events as impossible. If this applies to cartelists and they consider they have a history of sustained cooperation with the other cartelists they could underweight the chance of a fellow cartelist whistleblowing and therefore their own consideration of the need to 'race' to whistle blow. If this is the case, then the Nash

		Player 1	
		Does not whistle blow	**Whistle blow**
Player 2	**Does not whistle blow**	$C_2 + gC_2 - iR_2$, $C_1 + gC_1 - iR_1$	$C_1 - lC_1$, $C_2 - lC_2 - lP_2$
	Whistle blow	$C_2 - lC_2$, $C_1 - lC_1 - lP_1$	N/A

Fig. 3 Algebraic pay-off structure for the cartel leniency policy game, adjusted for risk and loss aversion weights

equilibrium may be neither firm blowing the whistle. In the model in Fig. 3, the weight *i* would be low enough that the risk was perceived to be 0. Applying these insights to cartelists, a re-framing of the leniency policy to take account of this may increase its effectiveness.

Shifting our lens to risk preferences, cartelists have clearly been willing to accept an abnormal risk profile. Indeed, experimental evidence from Bigoni et al. (2008) suggests that less risk averse firms are more likely to form a cartel. If this is the case the classic game theory could be a weak predictor of the choices that such atypical actors might take. If cartelists are on average less risk averse, then the Nash equilibrium could shift to neither firm blowing the whistle, and the cartel could go undetected.

The level of risk that an actor adopts could vary by the management-ownership structure of the firm. Firms where owners are involved in making managerial decisions (often found in smaller firms) may be less risk-averse than large companies where the managers are less likely to own significant proportions of the company. Owner-managers are likely to have risked a significant proportion of their own capital in setting up and building the firm, and therefore could be considered to have a proven propensity for risk-taking. Firms where there is a separation between management and ownership – where stewardship is undertaken by management who see themselves as part of a profession – and decision-makers, are less likely to bear the fruits of risk-taking and could suffer more from engaging in a cartel, therefore finding it harder to find an equivalent position at another company if found to have engaged in illegal activity, may be more risk-averse. Any potential differences in attitudes to risk between different owner-management structures suggests that the uniformity and consistency of the approach to risk inherent in the game theory is too simplistic and significant enough to consider addressing when framing a leniency policy.[14]

Similarly, the degree of risk aversion a firm has may depend on its size, and this in turn will affect the pay-off for each firm, which might shift the Nash equilibrium. A smaller firm with more to lose may be more risk averse than a large firm where losses may be cushioned by other parts of the business. On the other hand, larger firms with established governance processes in place may be more risk averse. Large firms are more likely to be acting in the interest of shareholders, and therefore may be less willing to risk a large portion of their revenue participating in a cartel and risking being exposed.

There is mixed empirical evidence on the size of a firm and their degree of risk aversion, and it is likely there are cases when both sides of this are true. In addition, the financial penalty for being involved in a cartel is set as a percentage of revenue, so it will affect small or large firms proportionately. When setting penalties, the CMA take into account the relevant turnover, which takes into account the product

[14] In general, a lack of centralized decision making could make predicting outcomes using game theory for the leniency policy difficult.

market and geographic market in which the cartel operated.[15] This ensures that firm's operating on a larger scale are fined proportionately, and vice versa. In addition, in the French parcel cartel case, the French authorities reduced several firm's fines by up to 90% due to their financial difficulties, so these firms were not disproportionately punished compared to the larger more financially viable firms in the cartel. Crucially however, what is important to a firm's decision on whether to blow the whistle, and their acceptance of a certain risk threshold, is the perceived magnitude of the fine. So, though competition authorities may ensure fines are proportionate, different firms may perceive them to be a varying level of severity.

4.5 Trust

Another factor that plays a part in a firm's willingness to blow the whistle, is their trust in the other firm involved in the cartel. If this trust if high, they may view the risk of being exposed to be lower. There is some evidence that firms who participate in cartels have higher levels of trust for their fellow cartelists. There are several theoretical reasons for this. Firstly, a firm entering a cartel is opening themselves up to vulnerability of being exposed by the authorities. This mutual vulnerability can breed trust over time, which increases the longer the cartel continues for undetected (Leslie, 2006). Secondly, the cartel is mutually beneficial to the firms taking part in it, and it is argued that wanting this additional profit to continue provides a financially motivated reason to trust your fellow cartelist (who you could assume also wants to keep gaining more profit).

Thirdly, the often-informal nature of a cartel arrangement can breed trust, as a cartel would cease to exist without trust on the informal arrangement. Jaspers (2017) found that a cartel's stability was often characterized by the informal arrangements that underpinned it, but that conversely, cartels that relied on more formal mechanisms and bookkeeping showed stronger signs of distrust between the cartelists and decreased the stability of the cartel. The Spanish parcel cartel case was mostly built on oral agreements, though some firms did have contracts that documented the non-compete clause, although interestingly not GLS – the firm which ultimately exposed the cartel.

If firms trust each other sufficiently, then the expected Nash equilibrium in the leniency policy could shift to neither party blowing the whistle. If trust reduces the risk, R, of being detected by the other firm blowing the whistle, then the remaining risk are the factors external to the leniency policy that will cause the cartel to be detected. This needs to be greater than zero to keep the Nash equilibrium such that at least one firm exposes the cartel. Algebraically, the payoff when both parties don't blow the whistle are $C - R + T$, where T is the trust that the other firm won't

[15] See the CMA's guidance for setting penalties for cartels, published here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/700576/final_guidance_penalties.pdf

blow the whistle. For simplicity, T includes any residual risk that the other firm may blow the whistle, as the magnitude of T indicates this level of trust, and therefor perceived reduction in risk that the cartel will be exposed via the leniency policy. If trust is high and $R \leq 0$, that is the cartel cannot be detected via another channel, then not blowing the whistle is the dominant strategy.

As noted above, the leniency policy for cartels can be viewed as an iterated prisoner's dilemma, as the game doesn't end until one firm blows the whistle, or the cartel ends for exogenous reasons, such as a change in the market. In this respect, each firm can build up a reputation for being trustworthy, and a belief that the other firm is trustworthy, as the game continues. This could increase T over time and mean the Nash equilibrium falling to either firm blowing the whistle would get less likely as time goes on (ceteris paribus).[16]

4.6 Social Capital

Another concept the classical game theory behind leniency does not take into account is social capital. Building upon the idea of trust discussed above, if a cartelist has a good relationship with their fellow cartelists, and trusts that they will not blow the whistle, they may value this repayment of trust and feel good about this. Similarly, they may feel good about acting in the interest of the cartel arrangement and maintaining a good relationship with their fellow cartelists. This added benefit if included in the pay-off for keeping quiet may shift the Nash equilibrium to neither firm exposing the cartel. This can be likened to the concept of "warm glow" seen in scenarios such as charitable donations; where instead of being purely altruistic, donors also gain from feeling like they have done a good deed or seen to be doing a good deed.[17] However, this same feeling can shift to a negative one if the other firm blows the whistle and could be included as a further disutility in the event of one firm not blowing the whistle, whilst the other does.

In addition, a cartelist may not want to come forward to whistle blow for fear of damaging their reputation, both in the industry and among consumers, and to their fellow cartelists. By exposing the cartel, the whistle-blower by default also exposes their involvement in the cartel. So, though they do not receive the full financial penalties from the competition authorities, the damage to their reputation may be large enough to deter them from blowing the whistle. This could be financial damage either by turning customers away from their business, or by exposing themselves to further civil suits or damages they may be liable to in other countries. It could also be softer damages, not measured in financial units but measured by social capital. According to qualitative research carried out among cartelists who chose not to

[16] This can be shown algebraically using Bayesian inference, though it is more likely a cartelist would use heuristics to estimate this rather than complex formulae.

[17] There is a rich economic literature on the effect of "warm glow", for example Andreoni (1990).

make use of leniency policies, avoiding reputational damage was one of the main deterrents from using the policy (Jaspers, 2020). Taking these further losses into consideration could shift the Nash equilibrium of the leniency policy and render the policy ineffective.

Matthew Rabin (1993) puts forward a model that factors in judgement on how "nicely" the other player will behave. It is based on the idea that players behave better towards those who treat them better, and unfavorably towards those who cause them harm; the so-called "fairness equilibrium". When these social preferences are factored into a prisoner's dilemma payoff structure, Rabin's fairness equilibrium neatly models the concept of social capital in the leniency policy. Figure 4 shows example payoffs, where α is a weight which measures the value placed by the player on playing "fairly". Depending on the magnitude of α, the total payoff for both players cooperating could be higher than the classical payoff in a prisoner's dilemma. Similarly, this weight detracts from the pay-off for the player who cooperates if the other player defects. If α is high enough, then the Nash equilibrium would instead be for both players to cooperate.

In the case of the leniency policy, α could be viewed as the social capital gained from proving their trustworthiness and maintaining a good relationship and added to the benefit of not blowing the whistle. The model could be extended to factor in the reduction in pay-off to the firm blowing the whistle, by factoring in the negative social capital of revealing involvement in a cartel (Fig. 5). Unlike in Fig. 4, for simplicity α is not a weight, but the total amount of social capital gained (or lost) by the firm who chooses to stay quiet, to generalize the model. However, it will vary in size depending on how each firm weights this value. β is the sum of the negative social capital a firm will expose themselves to if they blow the whistle. This can include the risk of further civil suits by those affected by the cartel, the risk of legal action in different jurisdictions, and the damage to reputation of being involved in a cartel. Again, for simplicity this is not a weight, but it will vary by firm and by how probable they view their loss in soft power or financial capital to be.

Holding C, R and P constant, as discussed above, the value of α and β could shift the Nash equilibrium. To maintain a Nash equilibrium where a firm exposes the cartel, the disutility of whistleblowing and exposing yourself as a cartelist must be lower than the social capital of cooperating in the cartel. That is $\beta < \alpha + R < \alpha + P$; as the classical prisoners dilemma pay-off structure that allows the leniency policy to be effective assumes that $C > C - R > C - P$, which in this model is $C - \beta > C - R + \alpha > C - P - \alpha$. Assuming $R < P$, which allows the Nash equilibrium to fall so that at least one firm blows the whistle, means simply $\beta < \alpha$.

		Player 1	
		Cooperate	**Defect**
Player 2	**Cooperate**	4 + 0.75α, 4 + 0.75α	0 – 0.5α, 6
	Defect	6, 0 – 0.5α	0, 0

Fig. 4 Rabin (1993), Camerer (2003). Cooperate can be likened to not blowing the whistle, and defect to blowing the whistle in the cartel leniency policy

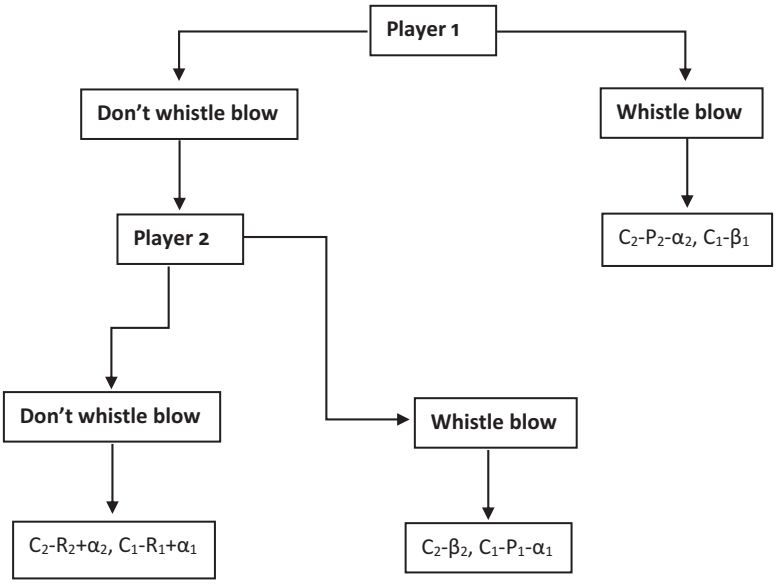

Fig. 5 Algebraic pay-off structure for cartel leniency policy, considering social capital. Where: C = gains from participating in cartel; R = risk of being caught in cartel; P = full penalty for being involved in a cartel, α = social capital of acting "kind", β = capital losses of exposing yourself as a cartelist

Conversely, if the disutility of whistleblowing and exposing yourself as a cartelist is higher than the social capital of cooperating in the cartel, then the Nash equilibrium would shift, and neither firm may expose the cartel, meaning the leniency policy is ineffective. That is $\beta > \alpha$, so $C - R + \alpha > C - \beta > C - P - \alpha$.

5 Conclusion

We have exhibited several cartel arrangements in the postal industry that were brought to light via the leniency policy. It will be interesting to watch in coming years if the level of exposure and consequent cartel dismantlement attained through the leniency policy continues.

Is the postal industry particularly susceptible to the establishment of cartels due to the often-common nature of commercial agreements between firms to enable them to have a wider geographic coverage? An interesting avenue for analysis would be to compare cartels in the postal industry with those in other industries to see if there is any merit to this theory.

Whilst the number of cartel closures may be evidence of the value of the leniency policy, we have also discussed its potential flaws by exploring behavioral biases that could affect how effective the leniency policy is at exposing cartels. Information

asymmetry is arguably a key factor that could reduce the effectiveness of the leniency policy, and by increasing awareness of the policy, one that could be remedied without changing the policy itself. As more large-scale cartels such as those mentioned in this paper are exposed via the leniency policy, this could spur a virtuous circle of awareness and more cartels being exposed.

As we have set out, there are various tenets that underly the classical game theory that might not be fully reflective of how cartelists might make decisions on whistleblowing on a cartel agreement. We suggest that there would be merit in an in-depth consideration of how another branch of economics – behavioral theory – might contribute to the enhancement of the existing leniency policy.

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When a Price Cost Test Is Unnecessary for Assessing Pricing Abuses – The Royal Mail Case

Nathan Francis

1 Introduction

The appropriate role of the As Efficient Competitor Test (AECT) in assessing alleged pricing abuses has been debated amongst competition policy economists and lawyers for years. This is especially so for pricing conduct that does not involve predation.[1] This paper considers this in the context of a recent case – the Royal Mail case.

[1] Of particular relevance to this paper is the extensive literature on the theory and practice of applying price cost tests to pricing practices other than predation. Articles include Salop (2017) who argues that conditional pricing practices should generally be assessed using a rule of reason approach rather than being treated like predatory pricing where price cost tests can have a role. Calzolari and Denicolò (2020) show that in theory where a dominant company enjoys a competitive advantage over its rivals and uses market-share discounts, a price cost test can be misleading or uninformative in terms of maximising welfare. On the other side, De Coninck (2018) argues that an AECT is generally relevant to all pricing practices. Similarly, Crane et al. (2013) argue that a price cost test should always apply when assessing pricing structure. Fumagalli and Motta (2016) argue that economics alone does not justify applying a price cost test to predation but not to loyalty discounts, but that loyalty discounts can have higher exclusionary potential and may warrant closer scrutiny.

While I am an Economic Principal at Ofcom, the opinions in this paper represent my own views and should not be interpreted as an official position of Ofcom. Nor is this paper intended to reflect Ofcom's view on the law in abuse of dominance cases.

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In 2018, Ofcom found that Royal Mail had abused its dominant position in the way it had set prices.[2] A key issue in Ofcom's decision and the subsequent appeal was whether it is necessary to demonstrate the AECT is failed to find abusive pricing conduct. Royal Mail argued that this was necessary, whereas Ofcom argued that it was neither necessary nor appropriate to use the AECT in this case. The appeal body, UK's Competition Appeal Tribunal (CAT), ruled in Ofcom's favor.[3]

The CAT's judgment on Royal Mail is the latest in a series of rulings in this important area. At least two of the cases discussed extensively during the appeal will be familiar to the postal industry – *Post Danmark I* and *Post Danmark II*.[4] Rather than considering this from the perspective of the law, this paper considers the issues from an economics perspective.

Section 2 describes what the AECT is and why there are generally good reasons for using it for assessing alleged pricing abuses. Section 3 describes the background to the Royal Mail case, including the relevant market and the pricing changes that was found to be abusive. Section 4 then gives a high-level summary of Ofcom's assessment of the case. Section 5 then uses the Royal Mail case to consider more generally when an AECT is relevant and when it is not. It distinguishes between situations where no prices are lowered and situations where some prices are lowered. Section 6 considers the implications of competition authorities using the AECT for assessing some pricing cases and not others and whether uncertainty over whether it will be used chills competition.

Finally, Section 7 offers conclusions on when the AECT is useful. These conclusions are limited in scope because they are largely by reference to the Royal Mail case. Because the features of that case strongly indicated that an AECT was not useful, that case only informs the general debate on when an AECT should be used to a limited extent. But it does at least clearly demonstrate that there are some pricing abuses that should not be assessed with an AECT.

2 Generally There Are Good Reasons for Using the AECT for Assessing Alleged Pricing Abuses

The AECT is a type of price-cost test. It explores if a rival can profitably compete with a dominant company's pricing structure if that rival had the same costs and efficiency as the dominant company, that is, if the rival were "as-efficient" as the dominant company. There are many difficult questions when implementing the AECT, such as which units to perform the test over, which costs to include and what

[2] https://www.ofcom.org.uk/__data/assets/pdf_file/0022/124591/01122-infringement-decision.pdf

[3] Royal Mail plc v Office of Communications [2019] CAT 27

[4] Case C-209/10 Post Danmark v Konkurrencerådet [2012] ECR I-0000 and Case C-23/14 Post Danmark A/S v Konkurrencerådet [2015] 5 CMLR 25.

time period to consider.[5] This paper abstracts from how exactly an AEC test should be done and focuses on the higher-level question of whether any AECT should be done.

The AECT originated in assessing alleged predatory pricing, where below-cost pricing by a dominant company can harm consumers' long-term interests. While consumers benefit in the short term from the lower prices, this can harm their long-term interests if the dominant company subsequently raises prices once its rivals have been excluded.

The AECT is an established test in EU competition law. The European Commission's Guidance (2009) says that the Commission will normally only intervene in pricing cases where an as-efficient competitor can be excluded, so giving prominence to the AECT. Importantly for this paper, this applies not just to predatory pricing, but to all pricing conduct, with the Guidance specifically mentioning conditional rebates and multi-product rebates.

The AECT has important strengths. Most importantly, the AECT will generally do a reasonable job of distinguishing between conduct that is beneficial for consumers and that which is detrimental. This is because allowing dominant companies to price low, provided above cost, is generally likely to be in consumers' interests. The AECT is generally seen as striking a good balance of the risk of false positives (i.e., over-enforcement and over-deterrence) versus the risk of false negatives (i.e., under-enforcement and under-deterrence).

Using the AECT does not discourage dominant companies from pricing low, subject to the limit of passing the test. If dominant companies know that competition authorities use the AECT, it therefore helps prevent the 'chilling' of competition. Without it, dominant companies may be unsure whether to compete by lowering prices because of the risk of being accused of behaving anti-competitively, with the associated risk of large fines and damages. This could result in dominant companies setting higher prices to accommodate inefficient rivals.

Because the AECT is based on the dominant company's own costs, the dominant company should be able to self-assess, in theory at least. This means that the AECT should give some 'legal certainty' about whether conduct is likely to be found to be abusive or not, as dominant companies do not need to speculate about the costs of rivals. While the AECT has these important strengths, later sections set out why it is not appropriate in all cases, especially if the pricing conduct does not involve low pricing.

[5] The European Commission's Guidance (2009) suggests that both average avoidable cost and long-run average incremental cost (LRAIC) can be relevant. For a discussion of some of the issues see Crocioni (2018).

3 Background to Royal Mail's Pricing Conduct

3.1 Bulk Mail Delivery

The Royal Mail case related to 'bulk mail', which is addressed mail sent out in large volumes by companies such as banks, utilities, government departments and advertisers. Bulk mail can be distinguished from single-piece mail, for example first class and second class stamped mail, typically posted in post boxes.

The value chain for bulk mail can be divided into two broad parts. Firstly, **retail services** consists of collecting the bulk mail from the companies that send it, sorting it to identify the relevant regional mail center (unless pre-sorted by the sender) and then transporting it to the regional mail centers. The retail segment is competitive in the UK. In addition to Royal Mail itself, there are rival companies. These are known as 'access operators', as they need access to Royal Mail's delivery network in order to compete. Retail services only accounts for around 10% of the total value chain.

Secondly, **delivery** of the bulk mail to the final recipients makes up the other 90% of the value chain. It consists of sorting the mail delivered to the regional mail centers to identify the relevant local delivery offices and transporting it to those local delivery offices. At the local delivery offices, it is sorted and sequenced into the individual walks for delivery to the final recipient. Royal Mail has a near monopoly on delivery of bulk mail in the UK.

3.2 Whistl Expands from Bulk Mail Retail Services into Delivery

Whistl was the largest provider of bulk mail retail services, with a market share around 40%, followed by UK Mail and Royal Mail.[6] In 2012, Whistl started to go beyond retail services to undertake its own bulk mail delivery activities in certain parts of the UK in competition with Royal Mail. Following successful pilots in small areas of London, in 2013 Whistl announced long term plans to grow its delivery operation so that it would cover 42% of all UK addresses by 2017.

Whistl was the first ever competitor to pose a challenge to Royal Mail's monopoly in the delivery of bulk mail. For the mail Whistl did not deliver itself, it would continue to rely on Royal Mail for delivery. Whistl therefore remained economically dependent on Royal Mail as it needed to offer a nationwide bulk mail service to its retail customers.

[6] At the time, Whistl was called TNT Post UK Limited and was a wholly owned subsidiary of PostNL.

3.3 Royal Mail's January 2014 Price Notification

Royal Mail offered different ways of charging for access to its delivery network. The details were complex, but the essential elements relevant to the case are as follows. If an access operator's mail had the same geographic profile throughout the UK as Royal Mail, then for that type of mail it could pay a uniform national price that did not vary with the delivery location of the item. Alternatively, where access operators had a different delivery profile to Royal Mail, they could effectively pay prices that varied reflecting the amount of mail in four different geographic zones (London, urban, suburban and rural). If these four zonal prices were weighted with Royal Mail's delivery profile then the two different ways of charging gave the same average price.

In January 2014, Royal Mail gave notice that it would change the terms of the access contract under which it provided delivery services.[7] There were two main changes.

The first entailed **rebalancing of the prices in the four geographic zones**. Royal Mail raised prices in rural and sub-urban zones and lowered prices in London and urban zones. This was driven primarily by the competitive threat from Whistl starting to deliver in London and urban areas, rather than by differences in Royal Mail's costs in different zones. London is the highest cost zone for Royal Mail, as its costs of operating in London (especially for staff costs) outweigh the benefits from higher density of delivery in London. Despite being the highest cost zone, the rebalancing meant London went from being a relatively high-price zone to a low-price zone. When the four zonal prices were weighted by Royal Mail's geographic delivery profile, the average price was unchanged.

The second was **the introduction of a "price differential"**. An access operator was required to pay a higher price for all its deliveries if it did not have the same geographic delivery profile as Royal Mail. This meant that if an operator itself delivered mail in some locations, and so would not have the same geographic delivery profile as Royal Mail, it would have to pay an additional price differential to Royal Mail for delivering its mail in the areas the operator did not itself cover. This price differential was in addition to paying the zonal prices which already reflected that the operator's geographic delivery profile.

[7] An interesting feature of this case was these revised prices did not actually come into force. In January 2014 Royal Mail notified access operators that the price changes would come into effect on 1 April 2014. However, when in February 2014 Ofcom opened an investigation into whether the changes were abusive, Royal Mail suspended the changes. Royal Mail's appeal to the CAT also involved arguing that it could not be an abuse if the prices had not had effect. The CAT agreed with Ofcom that Royal Mail's notification of the price changes was an abuse.

4 Ofcom's Finding of Abuse and Subsequent Appeal

Ofcom found the second aspect of the price changes, the price differential, to be abusive. Ofcom found that the price differential would effectively amount to a price increase which would apply on a discriminatory basis to any access operators who sought to compete in the delivery portion of the value chain. The price differential did not involve any lowering of prices.

It is important to stress that this price differential was not to do with compensating Royal Mail because Whistl was 'cherry picking' areas where the delivery costs were lower and so leaving Royal Mail with a higher proportion of mail in more expensive areas to serve. Royal Mail already charged geographically differentiated prices which could have reflected such differences in cost. And Whistl's entry was initially focused on delivering in London, which was the highest cost zone for Royal Mail.

Ofcom undertook an effects analysis which looked at all the circumstances of the case in the round. It found Royal Mail's conduct was not competition on the merits and was abusive. It reached this view without reference to the AECT. Amongst other things, Royal Mail had a near monopoly in the bulk mail delivery market. The delivery market was characterized by high barriers to entry and expansion. Whistl was the first and only prospect of competitive delivery at scale. Moreover, as it was a declining market, entry was becoming increasingly difficult and risky over time.

There was no rationale for the price differential based on cost differences or efficiency. Rather, it was clear from Royal Mail's internal papers that the price notification represented a deliberate strategy by Royal Mail to foreclose Whistl's expansion into delivery and limit it to providing largely retail services. The likely effect of the price differential was to make entry significantly more difficult and less likely to occur. Royal Mail's own modelling when it was designing the changes was that Whistl would be foreclosed from delivery, and that is what actually happened. By harming competition with no offsetting benefits, the price differential was likely to harm consumers.

Royal Mail appealed Ofcom's decision and the case was heard by the UK's Competition Appeal Tribunal (CAT). Whether an AECT was necessary was a key issue in the appeal. Before notifying its price changes, Royal Mail had not undertaken an AECT as a matter of its own self-assessment activities. However, during Ofcom's investigation, Royal Mail did prepare an AECT and submitted evidence that was said to show that a competitor "as efficient" as Royal Mail would be able to profitably compete in mail delivery, even if it had to pay the price differential. Ofcom's position was that an AECT was not necessary or appropriate in the circumstances of this case, and it had demonstrated that Royal Mail's conduct was anti-competitive based on its assessment of the nature of the conduct and all the relevant circumstances.

In November 2019, the CAT handed down its judgment dismissing Royal Mail's appeal on all grounds and upholding Ofcom's decision and penalty. In particular, the CAT decided no AECT was necessary in the circumstances of this case. Royal

Mail has now appealed the CAT's judgment to the Court of Appeal which will hear the case in April 2021. This appeal will focus solely on the question of the role of an AECT.

5 In What Circumstances Is the AECT Not Appropriate for Assessing Pricing Conduct?

5.1 No Role for AECT When No Prices Are Lowered

With this summary of the Royal Mail case, we can consider what it implies more generally for when an AECT is not relevant. Royal Mail's argument boiled down to saying that any behavior that involves prices should be allowed provided an AEC could profitably compete. It therefore envisaged a bright line between all pricing cases, where an AECT is required, and non-pricing cases, where an AECT is not required. This is shown in Fig. 1 below.

The problem with this delineation is that not all pricing cases involve lowering prices. The rationale for the AECT has to do with assessing whether a dominant company is squeezing out rivals by pricing below cost. But the Royal Mail case was not about prices being too low. Rather the price differential involved a price *increase* for rivals that competed with Royal Mail in delivery relative to the charges that would be applied for continuing to operate solely as an access operator. This was clear from Royal Mail's internal papers. At an early stage in Royal Mail's deliberations on how to respond to Whistl's delivery plans, Royal Mail ruled out any price changes that would involve reducing revenues. The question of whether prices were 'too low' was therefore not relevant to assessing Royal Mail's conduct, and hence an AECT was not relevant.

Where the pricing conduct does not involve any lowering of prices, the assessment of the conduct has more in common with non-pricing cases than traditional low pricing cases. Non-pricing abusive conduct might involve, for example, refusal to supply, exclusive dealing or, as in the AstraZeneca case, misusing the patent system to increase rivals' costs.

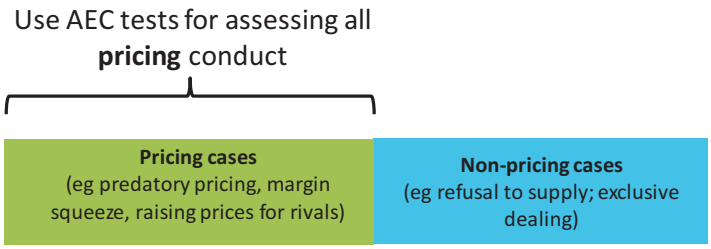

Fig. 1 Royal Mail's position on the use of the AEC test

For such non-pricing cases, all agree that the AECT is irrelevant. This is because it doesn't matter whether the rival is as efficient as the dominant company. Even less efficient companies can benefit consumers if they can offer products or services that attract consumers. Whether or not less efficient rivals are able to profitably survive should be determined by the normal competitive process involving companies vying to attract consumers through what they can offer in terms of price, quality, choice or innovation. It is this competitive process that benefits consumers, regardless of whether all companies are as efficient as the dominant company. What is not allowed is for dominant companies to squeeze out rivals by distorting this competitive process in ways that do not benefit consumers.

As the CAT noted in the Royal Mail case, competition law is not only about protecting as-efficient rivals. It is intended to ensure that dominant companies must not depart from competition on the merits in a way that impairs genuine undistorted competition.[8] This applies whether the rivals who suffer as a result are more or less efficient than the dominant company.

A more nuanced approach to when an AECT might be useful for assessing pricing cases is reflected in Fig. 2 below. This distinguishes between pricing cases that involve the lowering of prices and those that do not. This says that an AECT will not be relevant for pricing cases that do not involve lowering prices. Such cases should be treated the same as non-pricing cases. Where there is low pricing, the AECT is likely to be relevant. However, as discussed in Section 5.2 below, even in those cases there may be some exceptions.

It might be argued that distinguishing between whether or not there is low pricing does not fit with how margin squeeze cases are assessed. Margin squeezes are typically assessed with an AECT without any distinction between whether they arose from an increasing wholesale price or a decreasing retail price. So a margin squeeze can arise from an increase in the wholesale prices with no prices being lowered. But margin squeeze cases are absolutely about whether prices are too low. The question being addressed is whether the retail price is too low for a given wholesale price. That is a low pricing question. The Royal Mail case is different to a margin squeeze. Royal Mail's higher charges were conditional: access operators were charged more if they competed with Royal Mail in its core delivery business.

Fig. 2 More appropriate use of the AEC test for pricing cases

[8] See especially paragraphs 488 to 490 of the CAT's Judgment

In practice, it may often be difficult to determine whether any prices have been lowered. Circumstances may change over time and it may not be obvious what is the relevant counterfactual. In other cases, there may be various changes in the structure of prices, with some prices rising and some falling.

The Royal Mail case is probably unusual in that it was clear that the price differential did not involve any prices being lowered. At least where it is clear that there was no reduction in any price and only raising costs for rivals, then the AECT should have no role. This is because even less efficient rivals can benefit consumers and the AECT is only relevant if there is a need to test if the dominant companies' prices are too low.

5.2 Not Using the AECT for Assessing Pricing Conduct Even Where Some Prices Were Lowered for Consumers

More contentiously, it might sometimes be appropriate not to rely on the AECT *even where some prices have fallen* (or where it is unclear whether prices have fallen). Suppose Royal Mail had combined higher access prices for rivals that compete with it in delivery with a tiny reduction in the average delivery prices that customers face. If the reduction in prices for customers were tiny, the main effect would still be raising prices for rivals.

Given the characteristics of the Royal Mail case, it is hard to see why this should make an AECT relevant. However, the further competition authorities go in not relying on the AECT when some prices are lower, the greater the risk of chilling beneficial competition. One approach would be not to use the AECT only in fairly extreme circumstances, when factors such as the following are present.

First, the case for using the AECT is weaker if the industry would otherwise be a monopoly, rather than merely having a dominant company, and the conduct is likely to result in complete foreclosure, with future entry very unlikely. Second, there is direct evidence of an intention to foreclose. Clear evidence of such an intention can imply the dominant company believes it can increase prices after the entry threat fades, which suggests foreclosure is harmful to consumers. Third, any price reductions are highly targeted at the rival's potential customers rather than being a general reduction that all customers enjoy. The benefit customers have from lower prices is therefore not widespread, reducing the likelihood that this benefit outweighs any longer-term effects from foreclosure. Finally, there could be no reasonable rationale for the pricing based on efficiency.

If these sorts of factors apply, then the presence of less efficient rivals are more likely to benefit consumers. The AECT is therefore likely to be poor at distinguishing whether pricing is beneficial or detrimental for consumers, and there is a strong case for not relying on it.

There may also be a case for not relying on an AECT in less extreme situations, but the more competition authorities do that, the greater the risk of chilling

beneficial competition. The Royal Mail case does not greatly inform where to draw the line in terms of when an AECT is useful because all the facts of the Royal Mail case strong indicated an AECT was not relevant for assessing the conduct.

6 If Competition Authorities Use the AECT for Assessing some Pricing Cases but Not Others, Might Uncertainty Over Its Application Chill Beneficial Competition?

Some people may argue that not relying on the outcome of the AECT in all pricing cases will inevitably result in a lot of uncertainty for dominant companies. This may have a chilling effect on competition as dominant companies set higher prices to accommodate inefficient rivals because they do not know whether the regulatory authority will rely on an AECT or not.

While this argument has some merit, there are three points to make in response. First, the chilling effect may not be large. So long as the AECT is still used in low pricing cases, then the risk of putting dominant companies off competing on prices is low. Dominant companies would know that competing by lowering prices was allowed, subject to prices being above cost.

The less weight that is placed on the AECT despite some prices being lower, the greater the risk of chilling beneficial competition. But if this were only in limited circumstances, such as outlined above, then the extent to which beneficial competition is chilled is likely to be limited. Many dominant companies would be able to predict whether these circumstances applied to them and could expect competition authorities to place weight on the AECT if they did not apply.

Second, the chilling effect is not always bad. While dominant companies setting higher prices than they otherwise would will often be bad for consumers, this is not always the case. It can sometimes be beneficial for consumers if it makes entry easier and this entry results in lower prices in the long term. This is especially so if this chilling effect applies to dominant companies in highly concentrated markets with high barriers to entry.

Third, the degree of certainty offered by the AECT is anyway limited. Exactly how the test is applied, such as the units it is performed over and how different costs are considered, can vary significantly. This means that even if the dominant company believes its pricing passes an AECT, the competition authority may not agree. So beneficial competition can be chilled regardless of whether or not an AECT is used.

7 Conclusions

While the AECT is often important for assessing pricing conduct, it is not always relevant. The Royal Mail case is an example of where it has no role. Royal Mail's price notification involved increasing prices for an essential input if companies

competed with Royal Mail in delivery. The introduction of the price differential did not involve the lowering of any prices for customers. The question of whether prices were 'too low' was therefore simply not relevant to the case.

Other features of the case also suggest that even if some prices had been lowered somewhat, arguments for relying on an AECT could still remain weak. For example, Royal Mail had an effective monopoly on bulk mail delivery, and it was clear from its internal papers that the price notification represented a deliberate strategy by Royal Mail to foreclose its first and only potential rival in delivery.

Given the features of the Royal Mail case strongly indicated that the AECT was not useful for assessing the conduct, the extent to which this case informs the general debate on when an AECT should be used is limited. But it does clearly demonstrate that there are some pricing abuses that should not be assessed with the AECT.

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Data and the Regulation of E-commerce: Data Sharing vs. Dismantling

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1 Introduction

The economic and societal roles of digital platforms are a hotly debated topic. They have been under close scrutiny by European competition authorities for a while and their US counterparts have now followed suit. The subject is also receiving increasing attention in the media and in political circles. Each platform raises specific questions, but the general themes are market power, the collection and (mis)use of personal data and related privacy issues, free speech and for some even their possible interference in the political process. Consequently, the call for regulatory or competition policy intervention has become ever more pressing. Various reforms are being considered, including extreme solutions such a dismantlement of the platform.

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The U.S. House Judiciary Committee's Subcommittee on Antitrust, Commercial, and Administrative Law (2020) recommends in a report published in October 2020 that Congress considers legislation that draws on two mainstay tools of the antimonopoly toolkit: one is structural separation, the other line of business restrictions.[1] In July 2020, the United Kingdom's Competition and Markets Authority (2020) recommended that digital regulatory body have powers to "implement ownership separation or operational separation," concluding that "there could be significant benefits if there were more formal separation between businesses with market power" in digital advertising markets in particular. The 15th December 2020, the European Commission published the Digital Markets Act in which she proposes to have the power to impose when appropriate and proportionate, "structural remedies, such as legal, functional or structural separation, including the divestiture of a business, or parts of it".

The e-commerce sector, which has seen increasing concentration and market power, is no exception. It has witnessed the emergence of marketplaces, which are information technology companies that act as intermediaries by connecting buyers and sellers. By attracting many independent retailers, the marketplace to offer a long tail of products allowing to attract more and more consumers and more and more retailers, increasing market concentration. Moreover, one observes a trend toward vertical integration between the various segment of the distance selling value chain, notably between marketplaces and parcel delivery operators. For instance, in May 2014 Amazon bought a 25% stake in French delivery company Colis Privé.

Part of major e-commerce platforms' market power comes from the data they collect on their users (on both the platforms' sides – independent retailers and consumers). Data provide them with a competitive edge over their competitors on the markets in which they are involved (retail and parcel delivery in the case of a vertical integrated marketplace as considered in this chapter). On the demand side, it allows them to customize their search engines to customer profiles and use sophisticated pricing strategies. On the cost side, superior information allows an integrated marketplace to optimize its logistics and delivery network. This comes on top of traditional market power issues raised by horizontal and vertical integration.

The gathering and use of data is currently at the heart of discussions around the digital "gatekeepers" (those actors which dominate or have a structuring impact on digital markets) and the ways to regulate their dominance, both at the European Union level and in the US.[2] Indeed, data accumulation is one of the elements that

[1] They explained that there are two forms of structural separation: (1) ownership separations, which require divestiture and separate ownership of each business; and (2) functional separations, which permit a single corporate entity to engage in multiple lines of business but prescribe the particular organizational form it must take (p. 379).

[2] See the discussions around the future Digital Market Act at the EU level and the report of the United States Subcommittee on antitrust, commercial and administrative law published in October 2020 among others.

allow these actors to reach a gatekeeper's position. Many experts[3] recommend requiring dominant platforms share their data with third parties, making them portable and interoperable. The current version of the Digital Markets Act proposed by the European Commission prohibits the exclusive use of data generated and collected via the gatekeepers's services for the purpose of its own commercial activites unless they are making this data accessible to business users (seeking to become) active in the same commercial activities.

We focus on the cost advantage associated with data collection. We study the equilibrium that emerges when a vertically integrated marketplace competes downstream with a single retailer and upstream with an independent parcel delivery operator. Because of the information collected by the marketplace on consumers' preferences and habits, the integrated parcel delivery operator has lower delivery costs than its competitor. For instance, it is able to minimize the probability of unsuccessful delivery thanks to data on the moments when people are at home.

In our model, products are differentiated according to the retailer and the parcel operator who delivers them. The representation of product differentiation is inspired by the Anderson, De Palma and Thisse (1992) discrete choice model and its application to the e-commerce sector follows Borsenberger et al. (2019, 2020a, b).

We study three scenarios, each representing a specific policy implemented to regulate the marketplace. The first one is a data sharing policy. The integrated marketplace has to share its information with the other delivery operator, which in turn will lower this operator's cost of delivering the marketplace's products. The second one is vertical separation, under which the operator previously owned and managed by the marketplace becomes independent. Finally we consider a full dismantlement scenario under which there is both vertical and horizontal separation. The retailers which were previously affiliated with the marketplace now become independent.

The main conclusion we obtain is that the optimal policy is either complete dismantlement or data sharing. The relative impacts on consumer surplus and total welfare of these two options involve a tradeoff between the increased competition implied by complete dismantlement and the data related delivery cost advantage achieved under data sharing. When this cost advantage is small, completely dismantling dominates, while data sharing is the best policy when the cost advantage is large. Vertical separation is never optimal. While it may or may not yield a larger welfare than the reference scenario, it is always dominated by the two other policies.

The chapter is organized as follows: Section 2 describes our model; section 3 presernts the three scenarios; section 4 provides numerical results for the three scenarios; and section 5 offers conclusions.

[3] See for instance the Crémer, de Montjoye and Schweitzer (2019) report on *Digital policy for the digital era*; the CMA (2020) study into *Online platforms and the digital advertising market in the UK*; CERRE (2020) report on *Data sharing for digital markets contestability: towards a governance framework.* Jeon and Lefouili (2020) have shown formally in their paper where firms compete downstream and have to share upstream input that, under general conditions, upstream bilateral agreements giving firms access to one another's input, like data for instance lead to industry profit maximization.

2 The Model

We consider an e-commerce sector with three retailers indexed $j = A$, M and B each selling a variant of a product, and two parcel operators $i = 1, 2$ who deliver the goods purchased online to the final consumers. Initially, retailer A sells its "own" product – he is a retailer as M and B. But A is also active as a marketplace. In the reference scenario, retailer M is affiliated to the marketplace, which represents its exclusive way to sell its product (so instance, M has not developped its own website in this scenario). Retailer B is independent (he has developed its own website).

Consequently, in our reference scenario, the marketplace, indexed by A/M, sells two variants (at the same price) – the product sold by A and the product sold by M. Demand for marketplace service is thus the sum of demands for the products sold by retailers A and M. This assumption is the simplest way to represent the superior market position of the marketplace. Most significantly, it implies that when the marketplace is fully dismantled (i.e. when A acts only as a retailer and M remains independent), the total number of variants does not change.[4] Products are differentiated according to the retailer and the mode of delivery. So, there are six variants of the product (of which a total of four is sold by the marketplace).

Product differentiation is represented by the Anderson-De Palma-Thisse (1992) discrete choice model. Differentiated products are sold by downstream sellers A/M and B with marginal cost of k_j. They are shipped via differentiated upstream parcel delivery operators 1 and 2 (indexed by i) with marginal costs of c_{ij}. In the initial scenario, operator 1 is owned and managed by the marketplace A/M. Vertical integration gives the parcel delivery operator integrated with the marketplace superior information which is reflected by a lower marginal cost incurred to deliver products sold on the marketplace than the cost incurred by the independent parcel delivery operator 2 to deliver the same products. Furthermore, we assume that delivery operator 2 incurs the same marginal cost to deliver the products sold on the marketplace as to deliver the product sold by the independent retailer B. Consequently, we have $c_{1A/M} = \gamma^1 < c_{2A/M} = c_{2B} = \gamma^2$. For simplicity we assume $c_{1B} = c_{2B} = \gamma^2$, that is, when it delivers for retailer B, delivery operator 1 does not benefit from superior information. Consequently, there are two relevant levels of marginal costs: a low level, γ^1, which applies when the integrated operator delivers the marketplace's parcels, and a higher level, γ^2, which applies to all other delivery flows.

There is a mass 1 of consumers. Consumer l derives utility

$$U_{ij}^{l} = b - p_{ij} + \varepsilon_{ij}^{l}$$

from consuming good ij where $j = A/M$, B and $i = 1, 2$. The random variables ε_{ij}^{l} are identically and independently distributed across consumers and products with double exponential distribution over R with scale parameter σ and with distribution

[4] Otherwise, there would be a bias in the comparison across scenarios in favor of complete dismantlement.

$$F(x) = \exp\left(-\exp\left(-\frac{x}{\sigma}\right)\right)$$

Consumers also have the option not to participate in the market. To model this we introduce an outside option as a seventh variant, indexed 00 with a given price p_{00}.

The parameter σ reflects the degree of product differentiation. When σ is small, the different variants are close substitutes and competition is intense.[5] When σ is large, each variant has roughly speaking a local monopoly and competition is not very intense.

Consumers buy their preferred variant of the product if any. Consequently consumer l buys product ij when.

$$U_{ij}^{l} \geq \max_{mn \neq ij} \{U_{mn}\}$$

It can be shown that the demand for good sold by the marketplace and delivered by the parcel delivery operator i, iA/M for (i = 1, 2), is then given by

$$D_{iA/M}(\mathbf{p}) = \frac{2\exp\left(-\frac{p_{iA/M}}{\sigma}\right)}{\sum_{i=1,2}\sum_{j=A/M,B}\exp\left(-\frac{p_{ij}}{\sigma}\right)+\exp\left(-\frac{p_{00}}{\sigma}\right)}, \quad (1)$$

while the demand for good sold by the independent retailer B and delivered by the parcel delivery operator i, iB, is.

$$D_{iB}(\mathbf{p}) = \frac{\exp\left(-\frac{p_{iB}}{\sigma}\right)}{\sum_{i=1,2}\sum_{j=A/M,B}\exp\left(-\frac{p_{ij}}{\sigma}\right)+\exp\left(-\frac{p_{00}}{\sigma}\right)}, \quad (2)$$

where $\mathbf{p} = (p_{1A/M}, p_{1B}, p_{2A/M}, p_{2B})$ is the vector of consumer prices.

To understand (1) note that the marketplace sells two products: its own and that of the affiliated seller. We assume that these are sold at the same price. The price may vary according to the mode of delivery, though. One can thus think about the four variants as consisting of two pairs (one for each delivery operator) with the products in a given pair sold at the same price.[6]

[5] When the distribution of x is given by $F(x) = \exp\left(-\exp\left(-\frac{x}{\sigma}\right)\right)$, a smaller σ means that there is a larger probability of x exceeding a given threshold. This can be interpreted as the products supplied being closer substitutes.

[6] Even if they would be allowed to differ, these prices would be equal in equilibrium by symmetry. Consequently, our assumption is not necessary, but it is convenient for it simplifies notation.

In a companion paper, Borsenberger et al. (2020a, b), we provide the expressions showing the impact of prices on demand levels. The expressions show that a variant's market share is, not surprisingly, a decreasing function of its price. Furthermore, demand for any good increases if the price of one of the other variants increases. In other words, the variants are substitutes. The expressions also illustrate the role of the parameter σ. In particular the cross price effect is larger the smaller is σ, which is in line with our discussion above.

We consider four main scenarios. The reference case has already been sketched. The other scenarios study the implication of specific regulatory measures which are effectively discussed in practice. The first of these requires the integrated marketplace/delivery operator to share its data with the other actors. The second one consists in vertical separatism. Finally, the third one considers a more drastic reform where the integrated firm is dismantled both horizontally and vertically.

3 The Scenarios

For each scenario we define the underlying game and specifically its timing. In all scenarios the game is sequential, where delivery rates are set first followed by consumer prices. However, vertical separation or total dismantlement affect the number of players and the strategy space.

We start with the reference scenario, *R*, which is essentially the game already presented in the previous section. We then consider scenario *S*, with data sharing. The structure of the game under data sharing is the same as under the reference scenario but the cost of the independent operator for delivering the marketplace's products is reduced (possibly to the same level as for the integrated operator). Scenario *VS* represents a more drastic departure: there are now two independent delivery operators which has a significant impact on the players' payoffs in Stage 1 and adds a new strategic variable, namely $t_{1A/M}$, the delivery rate set by delivery operator 1 to deliver the marketplace's products. Intuitively, one can expect that vertical separation reduces market power but at the expense of introducing extra double marginalization. In other words, the traditional effects of vertical (dis)integration can be expected to be relevant.

3.1 Reference Scenario: R

We consider a sequential game where delivery rates are set first, followed by retail prices. We determine a subgame perfect equilibrium which means that in Stage 1, delivery operators anticipate the price equilibrium induced in Stage 2. We impose no *a priori* vertical restraints such as bundling and foreclosure. In particular the integrated firm has no systematic policy of exclusive dealing and may deliver the

other retailers product. But in in equilibrium when the demand for the variant may be zero.

Let $\mathbf{t}^R = (t_{1B}, t_{2A/M}, t_{2B})$ denote the vector of the delivery rates relevant in this scenario. The timing of the game is as follow. In Stage 1, the integrated firm chooses t_{1B} to maximize

$$\Pi^R_{1A/M} = \left(p_{1A/M} - c_{1A/M}\right) D_{1A/M}\left(\hat{\mathbf{p}}^R\right) + \left(p_{2A/M} - t_{2A/M}\right) D_{2A/M}\left(\hat{\mathbf{p}}^R\right) + \left(t_{1B} - c_{1B}\right) D_{1B}\left(\hat{\mathbf{p}}^R\right), \tag{3}$$

while delivery operator 2 chooses t_{2B} and $t_{2A/M}$ to maximize

$$\Pi^R_2 = \left(t_{2B} - c_{2B}\right) D_{2B}\left(\hat{\mathbf{p}}^R\right) + \left(t_{2A/M} - c_{2A/M}\right) D_{2A/M}\left(\hat{\mathbf{p}}^R\right). \tag{4}$$

Recall that $c_{1A/M} = \gamma^1 < c_{2A/M} = c_{2B} = c_{1B} = \gamma^2$ so that there are two relevant levels of marginal costs: a low level, γ^1, which applies when the integrated operator delivers the marketplace's parcels, and a higher level, γ^2, which applies to all other delivery flows. Observe that at this stage prices are determined by the induced second stage equilibrium. Consequently, $\hat{\mathbf{p}}^R$ is a function of $\mathbf{t}^R = (t_{1B}, t_{2A/M}, t_{2B})$. In Stage 2, the integrated firm sets $p_{1A/M}$ and $p_{2A/M}$ in order to maximize $\neq^R_{1A/M}$ given by

$$\pi^R_{1A/M} = \left(p_{1A/M} - c_{1A/M}\right) D_{1A/M}\left(\mathbf{p}^R\right) + \left(p_{2A/M} - t_{2A/M}\right) D_{2A/M}\left(\mathbf{p}^R\right) + \left(t_{1B} - c_{1B}\right) D_{1B}\left(\mathbf{p}^R\right), \tag{5}$$

which is the same expression as (3), except that delivery rates are now given. Consumer prices are now decision variables. Retailer B simultaneously sets its prices p_{1B} and p_{2B} to maximize

$$\pi^R_B = \sum_{i=1,2} \left(p_{iB} - t_{iB}\right) D_{iB}\left(\mathbf{p}^R\right).$$

3.2 Data Sharing: S

The marketplace is now required to share its data with the delivery operator 2. Consequently the cost for this operator of delivering variant 2*A*/*M* is now given by $\gamma^{\sim 2}$, with $c_{2B} > \gamma^{\sim 2} \geq c_{1A/M}$. The timing of the game is the same as in scenario *R*, but the profit function of operator 2 changes.

In Stage 1, the integrated firm chooses t_{1B} to maximize

$$\Pi^S_{1A/M} = \left(p_{1A/M} - c_{1A/M}\right) D_{1A/M}\left(\hat{\mathbf{p}}^S\right) + \left(p_{2A/M} - t_{2A/M}\right) D_{2A/M}\left(\hat{\mathbf{p}}^S\right)$$

$$+\left(t_{1B}-c_{1B}\right)D_{1B}\left(\hat{\mathbf{p}}^{S}\right), \tag{6}$$

while delivery operator 2 chooses t_{2B} and $t_{2A/M}$ to maximize

$$\Pi_{2}^{S}=\left(t_{2B}-c_{2B}\right)D_{2B}\left(\hat{\mathbf{p}}^{S}\right)+\left(t_{2A/M}-\gamma^{-2}\right)D_{2A/M}\left(\hat{\mathbf{p}}^{S}\right). \tag{7}$$

At this stage prices are determined by the induced second stage equilibrium. Consequently, $\hat{\mathbf{p}}^{S}$ is a function of $\mathbf{t}^{S}=(t_{1B},t_{2A/M},t_{2B})$.

In Stage 2, the integrated firm sets $p_{1A/M}$ and $p_{2A/M}$ in order to maximize $\neq_{1A/M}^{S}$ given by

$$\pi_{1A/M}^{S}=\left(p_{1A/M}-c_{1A/M}\right)D_{1A/M}\left(\mathbf{p}^{S}\right)+\left(p_{2A/M}-t_{2A/M}\right)D_{2A/M}\left(\mathbf{p}^{S}\right)+\left(t_{1B}-c_{1B}\right)D_{1B}\left(\mathbf{p}^{S}\right), \tag{8}$$

which is the same expression as (6), except that delivery rates are now given. Retailer B simultaneously sets its prices p_{1B} and p_{2B} to maximize

$$\pi_{B}^{S}=\sum_{i=1,2}\left(p_{iB}-t_{iB}\right)D_{iB}\left(\mathbf{p}^{S}\right).$$

Note that since the second stage is the same in scenarios R and S, we have $\hat{\mathbf{p}}^{R}\left(t_{1B},t_{2A/M},t_{2B}\right)=\hat{\mathbf{p}}^{S}\left(t_{1B},t_{2A/M},t_{2B}\right)$. However, the first stage objectives for operator 2, (6) and (7) differ. Consequently the solutions will differ unless $D_{2A/M}=0$ in both scenarios.

3.3 *Vertical Separation:* VS

This scenario is similar, except for the asymmetry it involves, to the reference scenario considered by Borsenberger et al. (2020a, b). It differs from scenario R in two ways. First, there is no longer vertical integration between A/M and operator 1. Second, the separation removes the cost advantage of operator 1 when delivering product variant 1A/M.

The timing of the game is as follows. In a first stage delivery operators $i=1,2$ simultaneously set rates prices $t_{iA/M}$ and t_{iB} for retailers A/M and B respectively. Their profit are given by

$$\Pi_{i}^{VS}=\sum_{j}\left(t_{ij}-\gamma^{2}\right)D_{ij}\left(\hat{\mathbf{p}}^{VS}\right),i=1,2. \tag{9}$$

Note that the vector of delivery rates now has four arguments $\mathbf{t}^{VS}=(t_{1A/M},t_{1B},t_{2A/M},t_{2B})$. In stage 2, retailers $j=A/M$, B simultaneously set their prices p_{1j} and p_{2j} by taking as given the delivery rates. Their profit are given by

$$\pi_j^{VS} = \sum_i \left(p_{ij} - t_{ij}\right) D_{ij}\left(\mathbf{p}^{VS}\right), j = 1,2. \tag{10}$$

3.4 *Complete Dismantling:* CD

Now the activities of retailers *A* and *M* (previously grouped into the marketplace) are separated. As the result there are now three independent retailers *A*, *M* and *B*. This does not affect the total number of variants but both the consumer price vector and the delivery rate vector now have six dimensions: $\mathbf{t}^{VS} = (t_{1A}, t_{1M}, t_{1B}, t_{2A}, t_{2M}, t_{2B})$ and $\mathbf{p}^{VS} = (p_{1A}, p_{1M}, p_{1B}, p_{2A}, p_{2M}, p_{2B})$. This is because retailers *A* and *M* can charge different prices and may have to pay different delivery charges.

In a first stage delivery operators $i = 1, 2$ simultaneously set rates t_{iA}, t_{iM} and t_{iB} for retailers *A*, *M* and *B* respectively. Their profit are given by

$$\Pi_i^{CD} = \sum_j \left(t_{ij} - \gamma^2\right) D_{ij}\left(\hat{\mathbf{p}}^{CD}\right), i = 1,2. \tag{11}$$

Compared to expression (9) the sum now has an extra term. Furthermore the induced second stage prices $\hat{\mathbf{p}}^{VS}$ have different expressions.

In stage 2, retailers $j = A, M, B$ simultaneously set their prices p_{1j} and p_{2j} by taking as given the delivery rates. Their profit are given by

$$\pi_j^{VS} = \sum_i \left(p_{ij} - t_{ij}\right) D_{ij}\left(\mathbf{p}^{VS}\right), j = 1,2. \tag{12}$$

4 Numerical Results

When a scenario implies symmetric retailers and operators, the model can be solved analytically but even then the expressions are not very telling; see Anderson et al. (1992). Among the scenarios defined in the previous section the only symmetric one is *CD*. All others involve some asymmetry and in these cases, obtaining analytical closed form solutions would be at best very tedious.

However, the model has only few parameters so that numerical solutions are very informative. Note that the constant *b* has no impact on the results and can be fixed arbitrarily.[7] We set $b = 15$ in all our scenarios. Furthermore the absolute levels of

[7] Setting *b* sufficiently large ensures that utilities are positive. However when the outside option is introduced via an extra variant with a given price rather than a constant utility level, this is of no relevance.

costs are not relevant; one of the cost levels can be normalized at one without loss of generality. Consequently we set $\gamma^2 = 1$. This leaves us with four relevant parameters, σ, γ^1, $\gamma^{\sim 2}$ and p_{00}. Recall that σ reflects the degree of product differentiation; when it is small, the different variants are close substitutes and competition is intense. With γ^2 normalized at one, the parameter γ^1 measures the cost of the integrated delivery operator as a proportion of the independent delivery operator's cost. The lower is γ^1 the larger is the cost advantage implied by the data available to the integrated delivery operator. Similarly $\gamma^{\sim 2}$ measures the independent delivery operator's cost of delivering a variant sold by the marketplace under data sharing and relative to its original cost (absent of data sharing). Finally p_{00} is the price of the outside option relative to the cost of an independent delivery operator (which we have normalized at 1).

In our setting, it turns out that the crucial parameter is γ^1, that is, the cost advantage that data provides to the integrated delivery operator. Depending on the level of γ^1, two patterns of results emerge in particular concerning the most appropriate regulatory policy, which either involves data sharing or total dismantling We show this by considering two baseline scenarios: one with a relatively large level of γ^1 (small cost advantage) and one with a smaller level of γ^1 (large cost advantage). These scenarios reveal our main results and illustrate the underlying intuition. They are followed by a number of variants with different levels of the crucial parameters which show that the results are robust.

4.1 Baseline Scenarios

In both of these scenarios we set $\sigma = 1$ and $p_{00} = 6 = 6\gamma^2$. As will become clear from the results these values ensure that competition intensity is rather large (relatively low σ) and the outside option sufficiently expensive (making it less attractive) so that a large share of the market is covered. In both cases in the reference scenario more than 95% of consumers buy one of the 6 variants.

4.1.1 Small Cost Advantage: $\gamma^1 = 0.9$

Recall that the independent delivery operator's cost is normalized at $\gamma^2 = 1$. We consider two possible scenarios under data sharing. In scenario S_1 we have $\gamma^{\sim 2} = 0.9$ so that the independent delivery operator's cost when delivering a product sold by the marketplace become equal to that of the integrated delivery operator. In scenario S_2 it remains larger with $\gamma^{\sim 2} = 0.95$.

Table 1 Baseline scenario with small cost advantage

Scenario	R	S_1	S_2	VS	CD
$p_{1A/M}$	3.78	3.78	3.78	5.05	4.41
$p_{2A/M}$	4.40	4.35	4.37	5.05	4.41
p_{1B}	5.37	5.37	5.37	4.61	4.41
p_{2B}	4.20	4.21	4.21	4.61	4.41
p_{1M}	∗	∗	∗	∗	4.41
p_{2M}	∗	∗	∗	∗	4.41
t_{1A}	∗	∗	∗	2.91	2.94
$t_{2A/M}$	3.24	3.19	3.22	2.91	2.94
t_{1B}	4.10	4.10	4.10	2.90	2.94
t_{2B}	2.93	2.95	2.94	2.90	2.94
t_{1M}	∗	∗	∗	∗	2.94
t_{2M}	∗	∗	∗	∗	2.94
$\pi_{1A/M}$	1.88	1.88	1.88	0.90	0.93
π_2	0.91	0.94	0.92	0.90	0.93
π_A	∗	∗	∗	1.14	0.47
π_B	0.27	0.26	0.26	0.71	0.47
π_M	∗	∗	∗	∗	0.47
$d_{1A/M}$	0.49	0.48	0.49	0.26	0.16
$d_{2A/M}$	0.26	0.27	0.27	0.26	0.16
d_{1B}	0.05	0.05	0.05	0.20	0.16
d_{2B}	0.16	0.15	0.16	0.20	0.16
d_{1M}	∗	∗	∗	∗	0.16
d_{2M}	∗	∗	∗	∗	0.16
CS	12.17	12.17	12.17	11.64	12.41
TS	15.24	15.27	15.25	15.31	15.71

The equilibria obtained in the different scenarios are presented in Table 1.[8] The results show that data sharing under the two considered assumptions regarding its impact on cost (S_1 and S_2) has no significant impact on consumer surplus but increases total welfare.[9] Not surprisingly, those effects are more significant when data sharing results in full cost matching than when the cost of the independent delivery operator remains larger than that of the integrated delivery operator. The independent delivery operator benefits while the profit of the independent retailer decreases. Vertical separation decreases consumer surplus because double marginalization leads to a price increase of the marketplace's variants. This also allows retailer B to increase its prices and to realize a larger profit. Total surplus, on the other hand, increases compared to the previous scenarios. The examples below,

[8] A ∗ in a cell means that the variable is not relevant in that scenario.

[9] Consumer surplus increases slightly but this is not apparent in the table where only two digits are displayed for the sake of readability.

however, demonstrate that this is not a robust result, as total surplus under vertical separation may even be lower than in the reference scenario.

Finally, completely dismantling dominates all other scenarios both from the perspective of consumers and that of total welfare. The fact that this policy performs better than *VS* does not come as a surprise because costs are not affected while competition becomes more intense. One can expect that this is a robust result and this is confirmed in all the examples presented below. The comparison with *S* on the other hand is less trivial. Increased competition now comes at the expense of and increase in delivery costs because delivery operators no longer benefit from the data advantage (directly or via data sharing). In this scenario the cost advantage is rather small which explains that the competition effect dominates. These conflicting effects are illustrated by the following scenario.

4.1.2 Large Cost Advantage: $\gamma^1 = 0.5$

We now consider the case where the data related delivery cost advantage is more significant by assuming that $\gamma^1 = 0.5$. Once again two possible scenarios for data sharing are considered. In S_1 we have $\tilde{\gamma}^2 = 0.5$ so that the cost advantage is fully matched by the independent delivery operator. In S_2 we have $\tilde{\gamma}_2 = 0.75$ so that its cost decreases but remains larger than that of the integrated delivery operator. The results are shown in Table 2.

One notices that data sharing now has a more significant (though still small) impact on consumer surplus. However, the main interest of this example lies in the comparison between *S* and *CD*. The delivery cost advantage implied by the data (whether direct or shared) is now so significant that it outweighs the increased competition intensity brought about by total dismantling. In this case data sharing is the best policy.

4.2 Robustness Checks

We now present a number of examples with other values of the relevant parameters. They show that while some of the observed effects on prices, delivery rates or profits are specific to the considered examples, the main conclusions appear to be robust. To be precise, vertical separation is never the optimal policy in any of our numerical scenarios. A regulating authority concerned with either consumer or total welfare should implement either data sharing or full dismantling. Which of these policies is determined by a tradeoff between delivery costs and competition intensity.

Table 2 Baseline scenario with large cost advantage

Scenario	R	S_1	S_2	VS	CD
$p_{1A/M}$	3.33	3.29	3.31	5.05	4.41
$p_{2A/M}$	3.97	3.75	3.86	5.05	4.41
p_{1B}	5.40	5.38	5.39	4.61	4.41
p_{2B}	4.04	4.15	4.09	4.61	4.41
p_{1M}	*	*	*	*	4.41
p_{2M}	*	*	*	*	4.41
t_{1A}	*	*	*	2.91	2.93
$t_{2A/M}$	3.24	2.98	3.10	2.91	2.93
t_{1B}	4.20	4.22	4.21	2.90	2.93
t_{2B}	2.85	2.98	2.91	2.90	2.93
t_{1M}	*	*	*	*	2.93
t_{2M}	*	*	*	*	2.93
$\pi_{1A/M}$	1.83	1.79	1.81	0.90	0.93
π_2	0.87	1.02	0.94	0.90	0.93
π_A	*	*	*	1.14	0.47
π_B	0.19	0.16	0.18	0.70	0.47
π_M	*	*	*	*	0.47
$d_{1A/M}$	0.53	0.51	0.52	0.26	0.16
$d_{2A/M}$	0.28	0.32	0.30	0.26	0.16
d_{1B}	0.03	0.03	0.03	0.20	0.16
d_{2B}	0.13	0.10	0.12	0.20	0.16
d_{1M}	*	*	*	*	0.16
d_{2M}	*	*	*	*	0.16
CS	12.92	12.96	12.94	11.64	12.41
TS	15.83	15.95	15.88	15.31	15.71

4.3 Larger Scale Factor, Implying Lower Competition Intensity

Tables 3 and 4 illustrate the two relevant cases when $\sigma = 1.5$. The other parameters are the same as before and so are the two scenarios regarding the data related delivery cost advantage.

Specifically, in Table 3 we have $\gamma^1 = 0.9$ and with two data sharing scenarios obtained for $\gamma^{-2} = 0.9$ in scenario S_1 and $\gamma^{-2} = 0.95$ in scenario S_2. This is the case where the cost advantage is small so that the competition effect dominates and implies that completely dismantling the platform is the best policy. This shows that the main conclusion obtained from Table 1 remains valid even when competition intensity is smaller - a fact which can be expected to mitigate the positive competition effect associated with complete dismantling.

In Table 4 we have $\gamma^1 = 0.5$ along with $\gamma^{-2} = 0.5$ in scenario S_1 and $\gamma^{-2} = 0.75$ in scenario S_2. Now the cost effect is again dominating and data sharing is best policy.

Table 3 Lower competition intensity and small cost advantage: $\gamma^1 = 0.9$ with $\gamma^{-2} = 0.9$ in scenario S_1 and $\gamma^{-2} = 0.95$ in scenario S_2

Scenario	R	S_1	S_2	VS	CD
$p_{1A/M}$	4.87	4.88	4.87	6.52	5.79
$p_{2A/M}$	5.86	5.82	5.84	6.52	5.79
p_{1B}	6.92	6.92	6.92	5.93	5.79
p_{2B}	5.54	5.55	5.55	5.93	5.79
p_{1M}	*	*	*	*	5.79
p_{2M}	*	*	*	*	5.79
t_{1A}	*	*	*	3.65	3.68
$t_{2A/M}$	4.00	3.94	3.97	3.65	3.68
t_{1B}	5.04	5.04	5.04	3.61	3.68
t_{2B}	3.66	3.68	3.67	3.61	3.68
t_{1M}	*	*	*	*	3.68
t_{2M}	*	*	*	*	3.68
π_1	2.47	2.48	2.47	1.09	1.17
π_2	1.09	1.11	1.10	1.09	1.17
π_A	*	*	*	1.36	0.61
π_B	0.38	0.37	0.38	0.82	0.61
π_M	*	*	*	*	0.61
$d_{1A/M}$	0.45	0.45	0.45	0.23	0.14
$d_{2A/M}$	0.23	0.24	0.23	0.23	0.14
d_{1B}	0.05	0.05	0.05	0.17	0.14
d_{2B}	0.14	0.14	0.14	0.17	0.14
d_{1M}	*	*	*	*	0.14
d_{2M}	*	*	*	*	0.14
CS	11.82	11.83	11.83	11.25	12.09
TS	15.78	15.80	15.79	15.63	16.28

In all scenarios presented in these two tables, vertical separation is the worst policy option and it even reduces social and consumer surplus compared to the reference scenario. Compared to the scenarios presented in Table 1, vertical separation thus performs worse here. This is in line with intuition: as product differentiation becomes more significant, the benefits of increased competition are small and do not outweigh negative impact of double marginalization together with the loss of the data related cost advantage.

Table 4 Lower competition intensity and large cost advantage: $\gamma^1 = 0.5$ with $\gamma^{-2} = 0.5$ in scenario S_1 and $\gamma^{-2} = 0.75$ in scenario S_2

Scenario	R	S_1	S_2	VS	CD
$p_{1A/M}$	5.04	5.10	5.07	6.52	5.79
$p_{2A/M}$	7.20	6.86	7.02	6.52	5.79
p_{1B}	7.23	7.28	7.25	5.93	5.79
p_{2B}	5.40	5.43	5.42	5.93	5.79
p_{1M}	*	*	*	*	5.79
p_{2M}	*	*	*	*	5.79
t_{1A}	*	*	*	3.65	3.68
t_{2A}	2.66	2.25	2.45	3.65	3.68
t_{1B}	5.22	5.29	5.25	3.61	3.68
t_{2B}	3.40	3.44	3.42	3.61	3.68
t_{1M}	*	*	*	*	3.68
t_{2M}	*	*	*	*	3.68
$\pi_{1A/M}$	3.04	3.10	3.07	1.09	1.17
π_2	0.66	0.72	0.69	1.09	1.17
π_A	*	*	*	1.36	0.61
π_B	0.50	0.49	0.49	0.82	0.61
π_M	*	*	*	*	0.61
$d_{1A/M}$	0.49	0.47	0.48	0.23	0.14
$d_{2A/M}$	0.11	0.14	0.13	0.23	0.14
d_{1B}	0.05	0.05	0.05	0.17	0.14
d_{2B}	0.19	0.19	0.19	0.17	0.14
d_{1M}	*	*	*	*	0.14
d_{2M}	*	*	*	*	0.14
CS	12.68	12.68	12.68	11.25	12.09
TS	16.89	17.00	16.94	15.63	16.28

4.3.1 Large Scale Factor and More Attractive Outside Option

We now consider an even larger level of $\sigma = 2.5$ together with a smaller level of the price of the outside option $p_{00} = 4 = 4\gamma^2$. Table 5 presents the results for the case where the cost advantage is small, while Table 6 is obtained for the larger cost advantage.

Not surprisingly, the large degree of product differentiation and the increased attractiveness of the outside option concur to bring about a significant drop in market coverage. Interestingly, this does not affect our main conclusions: complete dismantling is the best option with a small cost advantage while data sharing dominates when the cost advantage is more significant.

Table 5 Low competition intensity, small cost advantage and lower price of the outside option: $\sigma = 2.5$, $p_{00} = 4$, $\gamma^1 = 0.9$ with $\gamma^{-2} = 0.9$ in scenario S_1 and $\gamma^{-2} = 0.95$ in scenario S_2

Scenario	*R*	*S*	*VS*	*CD*
$p_{1A/M}$	5.97	5.98	8.38	7.72
$p_{2A/M}$	9.06	8.98	8.38	7.72
p_{1B}	8.93	8.94	7.73	7.72
p_{2B}	7.33	7.33	7.73	7.72
p_{1M}	*	*	*	7.72
p_{2M}	*	*	*	7.72
t_1	*	*	4.69	4.62
$t_{2A/M}$	3.98	3.90	4.69	4.62
t_{1B}	5.97	5.98	4.57	4.62
t_{2B}	4.37	4.37	4.57	4.62
t_{1M}	*	*	*	4.62
t_{2M}	*	*	*	4.62
$\pi_{1A/M}$	2.57	2.58	0.97	1.04
π_2	0.65	0.66	0.97	1.04
π_A	*	*	1.19	0.59
π_B	0.46	0.46	0.66	0.59
π_M	*	*	*	0.59
$d_{1A/M}$	0.35	0.35	0.16	0.09
$d_{2A/M}$	0.10	0.10	0.16	0.09
d_{1B}	0.05	0.05	0.10	0.09
d_{2B}	0.10	0.10	0.10	0.09
d_{1M}	*	*	*	0.09
d_{2M}	*	*	*	0.09
CS	12.92	12.92	12.46	13.14
TS	16.62	16.63	16.26	17.00

5 Conclusion

In this paper, we study several ways to regulate a vertically integrated marketplace operating in the parcel delivery sector, that benefits from a cost advantage in delivery due to data collected on consumers' habits and preferences through its retail activity. In particular, we compare three regulatory schemes: *(i)* imposing the integrated marketplace to share its information with the other delivery operator which in turn will lower this operator's cost of delivering the marketplace's products; *(ii)* imposing a vertical separation under which the delivery operator previously owned and managed by the marketplace becomes independent and no longer benefits from a cost advantage over its competitor; *(iii)* imposing a full dismantlement of the marketplace under which there is both vertical and horizontal separations (all retailers and delivery operators, now independent, compete on their market segment). The

Table 6 Low competition intensity, large cost advantage and lower price of the outside option: $\sigma = 2.5$, $p_{00} = 4$, $\gamma^1 = 0.5$ with $\gamma^{-2} = 0.5$ in scenario S_1 and $\gamma^{-2} = 0.75$ in scenario S_2

Scenario	*R*	*S*	*VS*	*CD*
$p_{1A/M}$	6.47	6.52	9.65	8.90
$p_{2A/M}$	10.50	10.12	9.65	8.90
p_{1B}	10.36	10.39	8.92	8.90
p_{2B}	8.43	8.46	8.92	8.90
p_{1M}	*	*	*	8.90
p_{2M}	*	*	*	8.90
t_{1A}	*	*	5.33	5.25
$t_{2A/M}$	4.52	4.10	5.33	5.25
t_{1B}	6.86	6.91	5.19	5.25
t_{2B}	4.93	4.97	5.19	5.25
t_{1M}	*	*	*	5.25
t_{2M}	*	*	*	5.25
$\pi_{1A/M}$	2.97	3.02	1.06	1.14
π_2	0.69	0.74	1.06	1.14
π_A	*	*	1.31	0.65
π_B	0.49	0.48	0.72	0.65
π_M	*	*	*	0.65
$d_{1A/M}$	0.35	0.34	0.15	0.08
$d_{2A/M}$	0.09	0.10	0.15	0.08
d_{1B}	0.04	0.04	0.09	0.08
d_{2B}	0.09	0.09	0.09	0.08
d_{1M}	*	*	*	0.08
d_{2M}	*	*	*	0.08
CS	14.13	14.14	12.57	13.32
TS	18.30	18.39	16.75	17.58

main robust conclusion we obtain is that the optimal policy is either complete dismantlement or data sharing. The relative impacts on consumer surplus and total welfare of these two options involve a tradeoff between the increased competition implied by complete dismantling and the data related delivery cost advantage achieved under data sharing. When this cost advantage is small, completely dismantling dominates, while data sharing is the best policy when the cost advantage is large. Vertical separation is never optimal.

Our results are obtained in a simple and stylized model and have to be qualified accordingly. In particular we neglect incentives to employ data to reduce costs if those cost savings are shared with rivals. Most significantly, we concentrate on delivery costs while in reality the data collected by marketplaces also provides them with superior information on consumers' tastes, spending patterns and their willingness to pay. This enhances their abilities to practice sophisticated pricing schemes. One can expect that this makes data sharing an even more powerful regulatory tool. We have also neglected the possible "quality" advantage associated with

marketplaces. As an intermediary platform, the marketplace provides tools to the different parties (producers/retailers and consumers/buyers) which simplify trading: online payment system, inventory management, authenticated information about the seller and/or the buyer, various warranties and more and more often integrated delivery services. Taking this effect into account when comparing data sharing and total dismantlement is likely to increase the number of cases in which data sharing is the best policy.

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An Assessment of USPS' Negotiated Service Agreements and Platforms' Direct Entry in Delivery

Victor Glass, Antonio Nicita, and Stefano Gori

This paper starts from USPS's Negotiated Settlement Agreements (NSAs) to understand the evolution of the postal sector in the US linked to the growth of e-commerce. It goes on to explore reasons for platforms' entry into last-mile delivery and its likely consequences. As a backdrop, the United States Postal Service (USPS) is under financial pressure. Over the period FY 2006 through FY 2016, the Commission noted that the Postal Service suffered a cumulative net loss of $59.1 billion (PRC, 2019a, p. 6). On 6 April 2018, President Trump stated on Twitter, "Only fools, or worse, are saying that our money losing Post Office makes money with Amazon," Trump tweeted. "THEY LOSE A FORTUNE, and this will be changed." The president's broadside launched a full-scale news media debate that produced mainly opposing opinions (see for example, Banker, 2017 and Segarra, 2018).

Amazon has a competitive Negotiated Settlement Agreement (NSA) with USPS. Whether Trumps' statement is true or not is not readily verifiable because the details of the agreement are confidential. Only oversight agencies such as the Postal Regulatory Commission (PRC) and the Office of Inspector General (OIG) can review them. However, using secondary sources of information, this chapter will explore several related issues associated with Amazon's and other NSAs by trying to clarify their strategic importance for USPS. We will also examine reasons why

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Amazon may have entered the last-mile delivery market despite having an NSA with the Postal Service.

Section 1 explores whether NSA's are profitable. Section 2 considers whether NSAs improve or impair parcel delivery market performance. Section 3 investigates whether Platform entry into last-mile delivery has improved the parcel market's performance. Section 4 considers the future of USPS and concludes with summaries of results, offers an answer to President Trump's assertion, and raises topics for future research.

1 Are NSAs Profitable?

Before tackling this question, some background is necessary that describes NSAs, the screens used by the PRC to evaluate the profitability of an NSA, and finally the types of audits conducted by the PRC to determine, in fact, whether an NSA is profitable.[1] An NSA is a customized contract between the USPS and a customer. The NSA offers customized pricing, with terms and conditions that may differ from mailing standards and postal requirements. According to the PRC (Cigno, 2014), the contract must be financially beneficial to the Postal Service (USPS Postal Explorer). NSAs fall into two categories: market dominant (MDNSA) ones and competitive ones (CNSA).

MDNSAs focus on first class mail. According to the PRC, these types of NSAs must improve the financial position of the Postal Service, must improve the operational efficiency of the Postal Service, must be functionally equivalent to similarly situated mailers, and cannot cause unreasonable harm to the marketplace. In comparison, a CNSA has far fewer lower hurdles to overcome. They must recover attributable costs to the agreement and collectively contribute to more than set contribution to institutional costs, which stands now at 8.8% (OIG, 2019). Amazon's NSA falls into the CNSA because it is based on the Parcel Select service, which is a competitive offering (Save the Post Office, 2013).

The PRC has two screens for evaluating whether a CNSA contributes to the financial health of the Postal Service. The first screen is whether the costing methodology is reasonable that underlies NSA prices. The PRC's costing methodology allocates costs into four categories: accrued costs, attributable costs, institutional costs, and worksharing. The focus here is on attributable costs, that is, costs related to a mail product. Attributable costs include costs incurred by a single product drawn from the PRC's accounting system. Attributable costs also include relationships between mail volumes, operations, and costs typically estimated using econometric techniques.

[1] The OIG does evaluate the accuracy of the PRC's published compliance reports, although not discussed in this paper are the OIG's procedures,

Table 1 PRC Cost Rulings since the Postal Accountability and Enhancement Act was enacted in 2006

Year	Count of dockets	Count of costing dockets	Costing docket numbers
2020 Q1	3	2	RM2020-1, RM2020-2
2019	15	8	RM2019-1, RM2019-4, RM2019-6, RM2019-8,RM2019-9, RM2019-10, RM2019-12, RM2019-14
2018	12	5	RM2018-4, RM2018-6, RM2018-8, RM2018-9, RM2018-10
2017	13	6	RM2017-6, RM2017-8, RM2017-9, RM2017-10, RM2017-11, RM2017-13
2016	13	5	RM2016-2, RM2016-10, RM2016-11, RM2016-12, RM2016-13
2015	20	13	RM2015-1-5, RM2015-7, RM2015-10, RM2015-12, RM2015-13, RM2015-16-19
2014	6	3	RM2014-1, RM2014-2, RM2014-6
2013	6	2	RM2013-6, RM2016-3
2012	8	8	RM2012-1, RM2012-2, RM2012-3, RM2012-5, RM2012-6, RM2012-8
2011	14	5	RM2011-5, RM2011-6, RM2011-8, RM2011-9, RM2011-12
2010	14	5	RM2010-1, RM2010-4, RM2010-6, RM2010-8, RM2010-12
2009	12	5	RM2009-1, RM2009-2, RM2009-3, RM2009-10
2008	6	4	RM2008-2, RM2008-4, RM2008-5, RM2008-6
2007	2	1	RM2007-1
Total 13	144	67	

Source: SLS Consulting

According to the PRC, the cost estimates are close to marginal cost and leave an audit trail that identifies specific functions or labor groups (Cigno, Costing, 2009). As a backdrop, it is important to realize that the PRC is an independent regulator whose basic objective is to ensure transparency and accountability of the USPS. Its costing methods have been reviewed and litigated for more than 40 years. Sixty-seven cost rulings have occurred since the PAEA was enacted in 2006 (Table 1). Anyone can request a cost rulemaking, even competitors – and they do. Anyone can appeal the PRC Decision to the DC Circuit – and higher.

The PRC must approve each NSA, and it evaluates each one in an Annual Compliance Determination (ACD) (Cigno, NSAs, 2014). The Office of Inspector General reviews NSA contracts. In 2019, the OIG approved the PRC's ACD and concluded NSAs are solidly profitable because they allow USPS to win or retain valuable customers (OIG, 2019, p. 18).[2] The competitive service category must

[2] CNBC reported that the Postal Service proposed a 9–12% increase in fees for the shipping service used by Amazon, just months after President Donald Trump criticized the current agreement.

cover attributable costs and contribute to overhead (institutional) costs set now at 8.8% (PRC, 2019b, Order 4963). This sets a price floor on CNSAs.

United Parcel Service (UPS) challenged the appropriate share of institutional costs attributed to competitive services in a series of filings and lawsuits claiming that it is too low, which leads to underpricing NSAs (PRC, 2015). The claim was that Postal Service set rates that did not include costs shared by multiple products but do not vary with any individual product (PRC, 2016, p. 7). Related arguments included that to prevent cross-subsidies, parcels should not be only service category to which the price floor methodology should apply (PRC, 2016, p. 18).

The PRC rejected these arguments and accepted the Postal Service estimates of attributable costs based on cost savings from not offering a service class (PRC, 2016, p. 13). These costs were accurate and prices based on them would reduce the institutional costs that market dominated services such as first-class mail would have to absorb (PRC, 2016, p. 2). UPS challenged this conclusion in court. In 2018, the DC Circuit Court of Appeals upheld the PRC's decision.

2 Do NSAs Improve or Impair Market Performance?

The details of CNSAs are confidential. However, when similar agreements were introduced in the telecom industry, they were vetted extensively. It is useful to review the debate in the telecom industry because the issues are similar to those debated today about CNSAs.

In general, in the telecom industry in the US dominant carrier customized agreements produced economic efficiency. They met special needs of large customers, generated cash flows that benefit all customers and made price collusion more difficult because their terms were secret.

For example, in 1988, AT&T introduced negotiated customized rates for large customers, even though AT&T was the market dominant company at the time. It faced fierce competition for large customers from new competitors such as MCI and Sprint that were vying to capture them. In response AT&T filed under its Tariff 12, Virtual Telecommunications Network Services (VTNS). According to Tariff 12, VTNS was a set of generally available services customized to particular customers. As with NSAs, the customer and AT&T developed demand forecasts jointly. Unlike CNSAs, AT&T said no cross-elastic demands existed between VTNS and other tariff services because the customer would be lost. Cost estimates had to show a positive impact on earnings, again similar to an NSA.

Naturally, MCI, Sprint, and other competitors filed petitions with the FCC to either reject or investigate the new tariff. They claimed there was no need for a "customized tariff." Instead, the elements of VTNS tariffs should be part of a

Whether this was a politically motivated price increase or a relatively large annual adjustment in cost estimation is unclear (Colville, 2018).

general tariff opened to all customers. A feature of a VTNS was a 3–5-year commitment that effectively locked in customers, according to the interveners. One of the interveners, Independent Data Communications Manufacturers Association, Inc. (IDCMA), which represented companies that market their equipment to customers for use on AT&T transmission systems, complained that non-carrier systems integrators could not market their services or equipment on the VTNS network because only AT&T knew what constituted a VTNS. The interveners also questioned whether the offerings covered costs. They claimed average rates kept decreasing in successive offerings. And to call it a tariff was an oxymoron because Tariff 12 was not a general offering but was customized to the needs of specific customers. They also said the general terms of the contract hid a novel pricing structure. They also claimed that AT&T should base its net revenue test on competitive costs, not on AT&T's internal cost allocations. Finally, interveners said VTNS contracts had unreasonable restrictions on resale (Tariff 12, 1989).

The FCC found no compelling arguments that the tariff was unlawful, but certain issues such as geographic restrictions warranted investigation. Interveners appealed the FCC's ruling to the DC Court of Appeals, which ruled that Tariff 12 did not violate section 202(a)'s prohibition against unreasonable discrimination because individual VTNS offerings are not alike and not like an aggregation of tariffed services. Each customer has a unique set of requirements that it cannot build from individual items in a tariff. The Court did not rely on network monitoring, volume discounts, or turnkey services as the FCC did to justify its judgment that Tariff 12 was a nondiscriminatory service offering in the sense that price discounts and bonus service offerings were cost justified. Rather, the Court ruled that Tariff 12 gave AT&T provisioning flexibility. This was the key cost saver. The Court also said VTNS agreements were alike in a different sense. They catered to a specific class of customers with special needs (D.C. Cir., 1993).

In effect, Tariff 12, much like NSAs, helped the large incumbent, in this case AT&T, keep and add to its large business client customer base. These clients were net contributors to AT&T's bottom line. Interestingly, the Court recognized that customized agreements were more than the agglomeration of tariff elements. AT&T met the special needs of each customer. In other words, tariffs that list prices, terms, and conditions, open to all for specific service offerings have limitations similar to off-the-shelf suits compared to custom suits.

The discussion so far supports the observations by Klein et al. (1978) that fear of opportunistic behavior under incomplete contracts will lead to long-term contracts with verifiable reciprocal commitments, when a buyer can hold up a supplier to reduce price once the supplier has invested in specific assets to provide service. In this case, the Postal Service would invest in trucks and other parcel sorting equipment to handle large volumes of parcels to accommodate large B2C customers. Another benefit is that they make price collusion more difficult because their terms are secret. In the telecommunications industry, Consumer Action noted that AT&T and its major competitors adopted a follow-the-leader pricing strategy to government policy changes (Consumer Action, 2001). The New York Times ran an article

Table 2 Average annual price increases CY 2008–CY 2019

Calendar year	Average USPS price increase (%)	Average UPS price increase (%)	Average FedEX price increase (%)
2008	5.79	5.81	5.81
2009	5.00	6.38	6.38
2010	3.30	5.81	5.38
2011	3.60	6.38	5.90
2012	4.60	6.38	5.90
2013	8.10	6.19	5.90
2014	2.40	4.90	4.37
2015	3.50	4.90	4.90
2016	9.50	5.05	4.90
2017	3.90	4.90	4.37
2018	4.10	4.90	4.90
2019	7.40	4.90	4.90

Table 3 Cumulative price increases CY 2008–CY 2013 and CY2014–CY 2019

Calendar years	Postal service cumulative increase (%)	UPS cumulative increase (%)	FedEx cumulative increase (%)
2008–2013	34.42	43.14	40.88
2014–2019	34.81	33.43	31.91

showing that AT&T was a price leader for standard, undiscounted services (Robinson, 1994).

Returning to NSAs, the price change tables displayed in the PRC's 2019 Cost Contribution filing show a similar "follow-the-leader" price change pattern, but this pattern is not as clear as it seems at first glance. The PRC compared USPS, UPS, and FedEx annual price changes for the period 2008–2019. It is clear that UPS's and FedEx's percent price changes are almost in lock step (Table 2). There is a 93% correlation between their annual price movements.

USPS's annual price movements show much less correlation with those of UPS and FedEx. The correlation with UPS is only 2% and 16% with FedEx's price changes. However, annual correlations can also be deceptive. Comparing cumulative price changes for the three carriers between 2014 and 2019 shows that all three carriers have raised prices by almost the same amount (Table 3).

The similarity in price movements is obvious but does not indicate price collusion. The three carriers focus on different market segments. USPS focuses on C2C while UPS and FedEx focus on B2B and B2C. USPS rates for packages weighing less than 65 pounds are significantly cheaper than posted by FedEx and UPS. The comparison, however, is not clear-cut, because FedEx and UPS focus mainly on delivering time-sensitive, small packages, which would have a high list price (Aron and Lenzo, fn. 66, 2020). The rates for all three carriers are almost identical for packages weighing 65 pounds or more (Schwartz, 2018). In addition, published rates and the costs incurred for single parcel differs from single consignments,

Table 4 Market share by revenue FY 2007–FY 2017

Fiscal year	Postal service market share (%)	Competitor market share (%)
2007	9.22	90.78
2008	9.92	90.08
2009	11.18	88.82
2010	12.05	87.95
2011	11.85	88.15
2012	14.16	85.84
2013	16.22	83.78
2014	17.24	82.76
2015	17.41	82.59
2016	18.49	81.51
2017	19.36	80.64

Table 5 NSA growth

Calendar year	Count of new NSAs
2012	12
2013	29
2014	33
2015	72
2016	382
2017	294
2018	416

Source: OIG NSA Report May 3, 2019

which tend to be made up of more than one parcel. The trend of platforms to consolidate deliveries and increase the number of parcels per consignment. Because USPS's price level for small packages is much lower than UPS's and FedEx's, the gap between the different players for small packages has been growing dramatically.

A cartel would also display little changes in market share (Stigler, 1964). Constancy in market share is not apparent. USPS's market share is growing, despite its large price increase in 2016 (Table 4).

CNSAs could be a factor in the growth of USPS's market share. Table 5 suggests this may be an important factor limiting cartel-like behavior.

Importantly, OIG reported that, "of the more than 1,400 NSA package product agreements submitted to the PRC since the program's inception, those agreements account … for 40 percent of USPS's revenues."

Table 6 Competitive product contribution to institutional costs

Competitive products ($ in billions)	2015	2016	2017	2018	2019
Attributable cost	$11.9	$12.5	$13.9	$15.5	$16.0
Revenue	$16.4	$18.5	$20.7	$23.1	$24.2
Contribution	$4.5	$6.0	$6.8	$7.6	$8.2
Total USPS institutional cost	$33.8	$36.4	$29.7	$30.7	$35.2
Competitive product contribution (as % of total institutional cost)	13.3%	16.5%	22.9%	24.7%	23.4%
Competitive product cost coverage	137.9%	148.0%	149.0%	149.0%	151.7%

Source: SLS Consulting

Are NSAs reducing competitive product contributions to institutional costs? Just the opposite seems to be the case. The contribution has grown from 137.9% in 2015 to 151.7% in 2019, measured as the ratio of revenue to attributable cost (Table 6).

It appears that NSAs improve the Postal Service's market performance. Yet, platforms such as Amazon are entering the last-mile delivery market. As we show in the next sections, their entry is likely improving market performance.

3 Platform Entry into Last-Mile Delivery

3.1 Parcel Market Performance

In his tweet, President Trump did not explicitly ask whether Amazon is using market power to obtain anti-competitively low prices, which is another issue associated with the suggestion that NSAs are unprofitable. The inference is there, however, so we explore whether Platform entry into last mile delivery improves or impairs parcel market performance using price change comparisons and service changes, and parcel volume trends.

The PRC reports more than 30% cumulative price increases for all three carriers between 2014 and 2019 (Table 3). By contrast, the Federal Reserve of St. Louis reports its transportation price index rose roughly 12% using 2007 as the base year, from 123.7 in January 2014 to 135.7 as of December 2019 (Transport Index). If the Transportation Index is representative of cost increases for trucking, then it is not surprising that Platforms might determine that entering the last-mile parcel delivery market is a good way to cut costs.

Besides price increases, service quality was a motivation for Amazon's entry into the parcel delivery market. Amazon wanted reliable same day delivery, even on Sundays. It had recently blocked sellers from using FedEx. According to Forbes, Amazon's rationale pointed to drops in delivery reliability by FedEx and UPS. The 2019 article reported that FedEx's on-time delivery performance dropped to 68.3% from 77.5% in the same period in 2018. And FedEx is not alone. The same analysis shows UPS's on-time stats are down too, from 86% to 80% (Kastenbaum, 2019).

Because of their growing commitments to last-mile delivery, Platforms are credible competitive threats to the three major carriers. This may already be showing up in parcel volumes. The Postal Service reported a third quarter 2019 "volume decline of 47 million pieces, or 3.2 percent, compared to the same quarter last year" (USPS National News, 2019). By comparison, parcel volumes grew each year between 2010 and 2018, doubling during that period from 3.1 billon packages to 6.2 billion packages. The ubiquity of Amazon Prime trucks in urban areas is the likely factor for the decline (USPS Facts). Galloway (2019) predicted the decline in USPS's parcel delivery in 2017 because Jeff Bezos said at that time that overnight delivery is a huge opportunity. Galloway also predicts that Walmart may swallow FedEx in its bid to match Amazon's delivery performance.

The circumstantial evidence suggests that in the long-term Platforms will force carriers to curb price increase and improve reliability performance. However, in the short-term, loss of parcel volumes led USPS to increase parcel prices to offset the volume loss. Shipping and package revenue rose 4.8% despite the volume loss (Forde, 2019). This is not a sustainable strategy.[3] As recently stated by Aron and Lenzo (2020),

> There is only one constituency that would benefit from an increase in Postal Service prices for package delivery of the magnitudes proposed—the private carrier competitors to the Postal Service and their shareholders. The President's proposed price increases, or even above-market increases at significantly lower levels, would divert most or all of the entire package delivery business from the Postal Service to its competitors, who would be able to substantially increase their own prices and still retain the entire market. Businesses of all sizes engaged in e-commerce would suffer the consequences of higher package delivery prices. Those consequences include reduced volume of sales of e-commerce products and consequently lower profits to e-commerce businesses. (Aron and Lenzo, 2020, at 7)

3.2 Retail Goods Market Performance

Amazon's insourcing is pushing UPS, FedEx and USPS to develop more delivery options (Forde, 2019). It is also stimulating the bricks-and-mortar retail industry to adapt quickly to the online economy. Walmart is expanding same day shipping and expects to the service to 75% of the population in the top 50 metro areas. Services already include curbside grocery pickup (Bose, 2019). Walmart and Target stores are becoming distribution centers offering customers a variety of shipping options (Sozzi, 2020).

[3] A waterbed effect is where pressing down prices in one part of firms' operations causes another set of prices to rise. Here, USPS would seek to make up discounts given to platforms or through access to large customers by raising rates to smaller companies distorting furthermore the competitive environment. It would be speculative to say that USPS has economies of scope for the regulated and competitive services, and that a cutback in demand raises the marginal cost of delivering parcels, and therefore, produces a price increase.

The focus on Walmart and Target does not mean that the online retail market is going to become a battle of the giants. Canada Goose, for example, is reinventing retail shopping by only showing off styles in its store. The stores carry no inventory. Instead, the company guarantees same-day delivery (Sozzi, 2020).

Eliminating the "flea market of fakes" that exists on Amazon's platform is also an excellent opportunity for competitors. Although Amazon spends hundreds of millions on eliminating fake sales, its effort is not very effective (Greene, 2019). Large Platforms are focusing mainly on a broad range of products at cheap prices. Potential competitors could assure product authenticity. In sum, retail is evolving quickly to meet the challenges being raised by Platforms. This is good for consumers looking for more convenience and reliability for purchasing online.

3.3 Other Social Costs

It is clear that Platforms are taking back shipping in densely populated areas. Other companies such as Walmart, perhaps by purchasing FedEx, will follow suit. These are shipments lost to USPS, profitable shipments, that formerly reduced institutional costs. Because of its universal service obligation (USO), USPS will still stand ready to deliver packages, so the share of its deliveries that are in rural, high-cost areas will rise. Without regulatory relief, the eroding delivery base will put the Postal Service under increasing pressure to reduce service quality and cut other vital expenses.

The growing entry of Platforms' into shipping may be raising other social costs. For example, Amazon Prime boxes keep piling up in New York City. Thirty percent of e-commerce purchases are returned compared to 8.9% for bricks-and-mortar store (Saleh) adds to traffic congestion. Same day delivery of individual items instead of going to a physical store to purchase many items in one trip adds to traffic congestion. Larry Buc of SLS Consulting countered during the discussion at the Postal and Delivery Conference 2020 that we have to take into account that people traveling to physical shops create traffic congestion and pollute. Furthermore, packaging of goods in brick and mortar shops also has an environmental impact. There is a need for further studies to compare the carbon footprint of physical shopping versus online shopping.

Another concern is that Platform parcel deliveries are encouraging thefts estimated at 23 million Americans have had packages stolen (Parcel Pending, n.d.). Easily availability encourages crime. A 2019 U.S. survey showed that 36% of shoppers had experienced at least one stolen package, with 56% reporting that they knew someone who had a package stolen (CR Research, 2019).

Looking ahead, the Covid-19 pandemic has accelerated package delivery. Even if B2B volumes have decreased, the overall volume of packages being delivered at home has increased rapidly also due to the growth of smart working solutions. Many people are avoiding or reducing in-person shopping impacting many brick and

mortar shops (Aron and Lenzo, 2020). The social costs of this shift in behavior needs to be evaluated.

4 Conclusions: The Future of USPS and an Answer to President Trump

New entrants such as Platforms into last-mile delivery call into question USPS's basic business model. It will surely change, but how? One possible scenario is that USPS becomes the "deliverer of last resort" in areas where there is market failure and private operators and platforms cherry pick the market. This outcome comes with two risks. The first is a "waterbed effect" (Khan, 2016, p. 775; Schiff, 2008). This is where USPS would seek to make up discounts given to platforms or through access to large customers by raising rates to smaller companies distorting furthermore the competitive environment. The second is to subsidize the Postal Service by subsidizing, it through state funds for losses it incurs because of private operators and large platforms.

The second possible outcome is a new regulatory framework that determines under what conditions competitive delivery improves market efficiency in the delivery market, as opposed to encouraging cream skimming, if the social objective is uniform rates as opposed to cost-causative rates. This framework would likely allow USPS to play an active role in the new dynamic landscape without worsening its bottom line. This type of regulatory strategy would require coordination among the PRC, FTC and the DOJ to monitor market performance both domestically and internationally.

The third scenario is the privatization of USPS. This strategy comes with the risks of USPS potentially large-scale layoffs and the possibly the disappearance of Universal Service as we know it now. Probably the second scenario is the most feasible and with limited social and financial impact.

The evidence presented here suggest that NSAs including Amazon's are profitable. They recover their direct costs and contribute to institutional overhead costs. They are likely to improve market performance because CNSAs allow USPS to offer customized service that target the special needs of large customers. They also limit cartel-like behavior among parcel delivery companies.

Despite the value of NSAs, entry of platforms' last-mile delivery will likely improve parcel market performance because parcel delivery rates were increasing faster than other shipping costs and the Postal Service, FedEx, and UPS were not meeting customer quality-of-delivery standards. Insourcing is a credible threat that will prevent parcel delivery companies from raising prices above competitive levels, force them to improve delivery reliability, and to expand delivery options.

Platform entry into parcel delivery likely increases other social costs. Circumstantial evidence suggests that same-day delivery is raising congestion and

pollution costs (discarded boxes at the very least). The vulnerability of packages also encourages theft has a corrosive effect on lawful behavior.

Finally, we return to President Trump's tweet that the Amazon was a bad deal for USPS and the taxpayer? From the perspective of direct costs to USPS, the answer is no. From a competitive standpoint, the answer is also no.

It will be interesting for future research to understand if NSAs and/or market entry will continue to be main features of the evolving parcel industry. A big question is whether Covid 19 will have a permanent effect on different stakeholders. Politically, since Biden has won the presidential election, will the government's recommendations for USPS reform change. International comparisons will be useful to understand domestic market trends. For example, how have last mile strategy of Platforms in the US differed from those in Europe; and whether Platforms are considered as full-fledged postal operators as they are in parts of Europe, and therefore regulated by the PRC.

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Separate or Integrated? Least-Cost Parcel Delivery Methods in a Flexible Delivery Environment

Michael D. Bradley, Jeff Colvin, and Mary K. Perkins

1 Introduction

The recent fall in letter demand, along with the dramatic growth in the demand for parcel delivery, has opened the question as to whether posts should rely upon an integrated network (letters and parcels delivered together) or create a system of dedicated (parcels only) routes. As a result, there is ongoing research/debate on the topic of efficient last mile delivery. This is more than an academic question. Winkenbach et al. (2016) note that posts have taken quite different paths toward achieving efficiency in delivery, with some posts retaining their traditional integrated networks (Royal Mail, Deutsche Post) and others turning to dedicated parcel delivery (PostNL, Bpost). Still others choose integrated delivery in the city, while switching to separate routes in rural areas (La Poste).

From an efficiency perspective, this choice depends upon the degree of scope economies between parcel and non-parcel volumes in an integrated network, the productivity (in terms of pieces delivered per hour) in a separate network, and the existence of capacity constraints for parcel delivery in an integrated network. The *a*

The views presented in this paper are those of the authors, and do not necessarily represent those of the Office of the Inspector General, the US Postal Service, the Postal Regulatory Commission, or any other organization.

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priori case for scope economies is strong. It is undeniably inefficient for two separate carriers to depart a facility and each deliver, separately, a parcel and a non-parcel to the same address. A single carrier delivering both incurs a far smaller resource cost and society is better off. Further, Roy (1999), Bradley et al. (2006), and Farsi et al. (2006) have all adduced empirical data to verify this intuition.

However, parcel-only productivity is a function of volume, since added volume will reduce driving time between delivery points. At sufficiently high parcel volumes, the productivity of a parcel-only network could rise by enough to offset the scope economies of integrated delivery. In addition, an integrated network could face capacity constraints that lead to supplemental, and potentially costly, parcel delivery. Bender et al. (2016) highlight this last point, and we build on this important point in this chapter.

To that end, we build a model that facilitates comparison of the costs of integrated parcel/letter delivery with the costs of separate parcel delivery. We calibrate the model using recent empirical results from studies of city carriers for the United States Postal Service (USPS). Our model does not replicate the Postal Service delivery network, but it does provide useful insights about the tradeoffs between the two types of delivery systems using recent empirical results.

Section 2 describes the model we use to compare the costs of integrated versus separate delivery of parcels. Section 3 outlines the steps we take to calibrate that model with information from recent USPS delivery cost studies. The results are discussed in Sects. 4 and 5 is by way of conclusions.

2 The Model

This section details the model we build to compare the costs of the two competing delivery structures. Because our focus is on parcel delivery, we separate delivered volumes into two vectors, one for parcels and one for non-parcels. The non-parcel vector includes letters, flats, and "small" parcels. This latter group of volume is defined by parcels that are small enough to fit into the recipient's receptacle without requiring a separate action by the carrier. For example, on a motorized route, a small parcel would fit into the recipient's mailbox without causing carriers to dismount their vehicle.

We express delivery costs as a quadratic function of parcel and non-parcel volumes. We employ this functional form because it is widely used in empirical studies of carrier delivery and is the form used in the USPS studies from which we draw the inputs to our model.[1] In separate networks, each of the networks incurs its own set of (fixed) network costs and its own volume-related costs. Network costs include the costs, like driving to and from the delivery area, that are not related to the

[1] For examples of the application of the quadratic form in empirical studies, see Farsi, et al. (2006), Bradley, et al. (2006), United State Postal Service (2014), or Bradley (2019).

volume of mail delivered. The total cost for two separate networks is the combination of two equations, one for non-parcels (which, for convenience, we call "letters") and one for parcels:

$$C_S = \Gamma_N + \beta_N N + \beta_{NN} N^2 + \Gamma_P + \lambda_P P + \lambda_{PP} P^2, \tag{1}$$

where:

N = Non-parcel volume
P = Parcel volume
Γ_N = Non-parcel network costs
Γ_P = Parcel network costs, and
β_N, β_{NN}, λ_P, λ_{PP} are volume-related cost parameters.

In the integrated network, "letters" and parcels are delivered simultaneously, so only one set of network costs is incurred. This common network cost is the source of economies of scope in our model, as we do not include an additional cross-product term between "letters" and parcels. We model the integrated network in this way because it captures the essences of scope economies between "letters" and parcels, which occurs primarily along the route, rather than at the point of delivery.

Recall that we are defining parcels as those parcels which do not fit into the delivery receptacle with "letters," and thus require a separate access. In addition, we allow for the possibility that, because of its shared function, parcel delivery on an integrated network may have limited capacity. The configuration of integrated delivery routes may be such that there is a limit on the number of parcels that can be delivered in the regular course of delivery and supplemental delivery methods must be employed for the extra parcels. To incorporate this possibility, the integrated model has the following form:

$$C_I = \begin{cases} \Gamma_I + \beta_N N + \beta_{NN} N^2 + \beta_P P + \beta_{PP} P^2 \; if \; P \le P^* \\ \Gamma_I + \beta_N N + \beta_{NN} N^2 + \beta_P P^* + \beta_{PP} P^{*2} + \delta_P \left(\boldsymbol{P} > P^* \right) + \delta_{PP} \left(P > P^* \right)^2 \; if \; P > P^* \end{cases} \tag{2}$$

where:

Γ_I= Network cost of an integrated network
P^*= The parcel capacity constraint on the integrated network, and
β_N, β_{NN}, β_P, β_{PP}, δ_P, δ_{PP} are volume-related cost parameters.

When capacity on the integrated network reaches its limit, parcels are shifted to supplemental runs. Such runs are typically more expensive than integrated parcel delivery because they do not share costs with "letters," but rather provide residual delivery of parcels. Consequently, they incur relatively high travel time per parcel

and have higher marginal delivery times that does integrated delivery. Note that we specify the same "letter" volume-related cost parameters in both the separate and integrated networks. This reflects our approach of limiting scope economies between "letters" and parcels to be arising from common network costs. In addition, the relatively small volume of parcels relative to "letters" suggests that the latter's technology of delivery is not materially affected by the absence of parcels.

3 Calibration

The Postal Service currently employs a mix of parcel delivery methods across its carrier delivery network.[2] In most areas, parcel delivery is integrated with the delivery of letters and flats. However, in some high-volume areas, integrated parcel delivery is augmented by supplemental parcel delivery on parcel-only delivery runs. At the same time, in urban areas, the Postal Service delivers letters and flats on foot routes and delivers parcels on separate parcel-only runs. Finally, the Postal Service performs separate delivery of parcels on Sunday using parcel-only runs.

Recent studies have measured costs for these different parts of the Postal Service's network, and we use the results of these studies to calibrate our model. Our model is necessarily simplified and does not replicate the actual complete structure of the Postal Service's network. It should not be construed as a representation of that network, but it does provide the ability to examine empirically the tradeoffs among different types of parcel delivery structures for posts.

To calibrate our various models and compare the costs of integrated and separate parcel networks, we need to find the values for three network cost parameters ("letter" separate, parcel separate, and integrated) and five sets of volume-related cost parameters ("letter," parcel separate, parcel integrated, parcel supplemental, and parcel high-productivity).[3] We use two studies of Postal Service delivery costs to calibrate our model. USPS (2017) estimates cost measures for both "letters" and parcels in integrated delivery. Bradley (2019) estimates cost measures for separate parcel delivery for the different types of parcel delivery in the Postal Service network. This includes producing cost estimates for separate parcel delivery, supplemental parcel delivery, and two measures of high productivity separate parcel

[2] Our analysis focuses on parcel delivery over urban and suburban areas in which there is the possibility of gaining sufficient parcel delivery to consider a separate parcel network. Parcel delivery in rural areas is currently done in an integrated rural delivery network. Given the low parcel density in rural areas, this method will likely continue.

[3] We include the high-productivity case to allow for the possibility that higher volume parcel only networks may achieve higher productivity than the Postal Service's current parcel only networks. We do this for two reasons. First, the Postal Service's current parcel-only networks are in densely populated urban areas which might affect their productivity and second extensive parcel-only networks could lead to improved methods and techniques which increase parcel-only productivities.

delivery: Sunday parcel-only delivery and separate parcel delivery during the seasonal volume peak.

The studies give us four pieces of information that are critical: (1) the total time (measured in seconds) of delivery via integrated and separate networks, (2) the volume variable times for the various shapes delivered, (3) the institutional times for integrated and separate networks, and (4) the volumes at which the various cost measures are estimated. We use these pieces of information, the mathematical relationship among them, and the mathematical relationship between them and more traditional costing concepts to calculate the parameters for our delivery models. Accurate calibration requires finding the values for the Γ, β, δ,and λ parameters that are consistent with actual USPS operating practice. But as the critical information list above reveals, Postal Service cost studies employ a related, but somewhat different set of cost concepts. A careful translation is required to convert the estimated empirical cost measures into the parameters of the model.

The first postal cost concept is known as volume variable cost. This cost measure can be calculated by multiplying the marginal delivery time for the volume being studied by the amount of volume at which the marginal time is calculated. The second cost concept is known as institutional cost, and it is calculated as the difference between total cost and volume variable cost.

To understand the mathematical relationship between these empirical cost measures and our theoretical model parameters, consider a representative equation from our models in which the subscript "i" identifies the type of delivery, either integrated or separate, and the variable "X" represents a type of volume, either "letters" or parcels. The equation then has the following form:

$$C_i = \Gamma_i + \beta_X X + \beta_{XX} X^2, \tag{3}$$

In this type of delivery, the volume variable delivery cost is given by the product of marginal cost (measured in time) and volume:

$$\Omega_i = \left(\frac{\partial C_i}{\partial X} \right) X. \tag{4}$$

From the theoretical model, the associated marginal cost (in terms of time) is given by:

$$\frac{\partial C_i}{\partial X} = \beta_X + 2\beta_{XX} X \tag{5}$$

Substitution of the explicit form for marginal cost gives us one of the equations used for calibration:

$$\Omega_i = \left(\beta_X + 2\beta_{XX} X \right) X. \tag{6}$$

In this equation, both Ω_i and X are known empirical values and the β parameters are the unknowns to be calculated.Institutional cost (ψ_i) is defined as total cost minus volume variable delivery cost:

$$\psi_i = C_i - \Omega_i \tag{7}$$

Substitution again permits derivation of the explicit form for institutional costs providing a method of obtaining the Γ coefficients:

$$\psi_i = \Gamma_i - \beta_{ii} X_i^2. \tag{8}$$

Using these equations, we can calculate a set of beta, lambda, and gamma coefficients for each of our model equations that replicates, by delivery type, the recorded total cost and the estimated marginal costs for each type of mail delivered at the mean volumes. One last translation is required. The study that produced the volume variable times for "letters," estimated volume variable times for separate shapes like automated letters, flats and small parcels, not a single overall volume time. To calibrate our model, we must combine those individual marginal times in order to calculate the overall marginal time for non-parcel mail. We do so by making use of the fact that volume variable time per piece is a measure of marginal time.[4] Thus, the overall marginal time for "letters" is equal to the total volume variable cost for "letters" divided by total "letter" volume.

Using the above equation for individual volume variable times, we can express the total volume variable time as:

$$\Omega_i = \sum_{j=1}^{k} \left(\frac{\partial C_i}{\partial X_j} \right) X_j \tag{9}$$

Dividing by overall volume produces the overall volume variable time per piece:

$$\omega_i = \left(\sum_{j=1}^{K} \frac{\partial C_i}{\partial X_j} X_j \right) \Big/ \sum_{j=1}^{K} X_j \tag{10}$$

Due to the equivalence between volume variable time per piece and marginal time, this equation produces the required overall marginal time. Furthermore, it can be shown that this measure is equivalent to the volume-weighted marginal times for each shape:

[4] Bradley et al. (1993, 1999) present a mathematical demonstration of this point.

$$\omega_i = \sum_{j=1}^{K} \frac{\partial C_i}{\partial X_j} \left(\frac{X_j}{\sum_{j=1}^{K} X_j} \right) \tag{11}$$

The individual volumes, volume variable times, associated marginal times and overall marginal time for "letters" are given in Table 1.The parcel marginal times do not require averaging and can be taken directly from the studies. They are presented in Table 2.

The marginal time for parcel delivery is lowest for integrated delivery because the additional delivery time is primarily limited to the additional time at the delivery point. Because the carrier is covering the route for all products, little additional driving or walking time is required for parcel delivery. In contrast, under separate parcel delivery, the marginal time is much higher, reflecting the fact that a substantial amount of additional driving time is added for each parcel delivery. The Sunday Only and Seasonal Peak marginal times are lower because higher parcel volumes translate into higher delivery density and less additional driving time per additional delivery.

Finally, the set of calibrated parameters are calculated by inserting these empirical measures, along with recorded delivery times, into the equations discussed above and solving. We present the calibrated values for all parameters in Table 3.

To highlight the correspondence between the values used to calibrate the model's parameters and the empirically estimated values for the various delivery times, we present the correspondence between the two in Table 4. The initial column presents the marginal times estimated in previous econometric studies. The next two columns present the calibrated parameters from the models, followed by the mean volumes used to calibrate the model. The final column presents the *calculated* model marginal times using the model's parameters. The close correspondence between the first column and the last column demonstrates the model does a good job replicating estimated delivery times.

Table 1 Empirically estimated non-parcel marginal times

	Volume	Volume variable time (seconds)	Marginal time (seconds)
Automated letters	28,140	61,908	2.2
Manual letters and flats	8320	51,584	6.2
Mailer-sorted flats	3480	12,180	3.5
Automated flats	1700	8840	5.2
In-receptacle parcels	860	14,964	17.4
Overall non-parcel	42,500	149,476	3.5

Table 2 Empirically estimated parcel marginal times

	Volume	Volume variable time (seconds)	Marginal time (seconds)
Integrated regular	560	28,280	50.5
Integrated supplemental	25	5928	240
Separate regular	398	114,624	288
Separate Sunday only	642	156,841	244.2
Separate seasonal peak	723	158,771	219.6

Table 3 Model calibration values

Integrated			Separate		
Parameter	Value	Units	Parameter	Value	Units
Γ_I	86.67	Hours	Γ_N	80.4	Hours
β_N	4.58	Seconds	β_N	4.58	Seconds
β_{NN}	−0.00025	Seconds	β_{NN}	−0.00025	Seconds
β_P	50.8	Seconds	Γ_N	18.6	Hours
β_{PP}	−0.01	Seconds	λ_P	327.8	Seconds
δ_P	252.5	Seconds	λ_{PP}	−0.05	Seconds
δ_{PP}	−0.25	Seconds			
P^*	800	Pieces			

Table 4 Correspondence between estimated values and model parameters

Parameter Set	Empirically estimated marginal time	First order parameter	Second order parameter	Mean volume	Model marginal time
Non parcel	3.5	4.58	−0.00025	2125	3.5
Integrated parcel	50.5	50.8	−0.01	28	50.2
Separate parcel	288	327.8	−0.05	398	288
Separate parcel high productivity	219	364	−0.1	725	219

4 Results

With our calibrated model, we can now compare the marginal and total costs across integrated and separate delivery structures. We do so over a wide range of large parcel volumes. The average daily number of parcels in a delivery area is 560 and we examine the relative costs from delivery areas with as few as 110 parcels per day to as many as 1010 parcels per day.[5] Because high parcel volumes are positively correlated with non-parcel volumes, we also allow non-parcel volumes to increase

[5] Bradley (2019) shows on average, 20 routes per delivery area. That implies an average daily volume of 28 large parcels on each delivery route.

as parcel volumes increase. Non-parcel volumes range from a low of 24,500 pieces delivered per day to a high of 60,500 pieces.

We first compare marginal parcel delivery volumes. At low volume, the economies of scope greatly favor the integrated delivery network. Because the carrier is already approaching nearly all addresses on each delivery route, the additional time to deliver a parcel includes minimal additional driving time and is determined primarily by the additional handing time at the address. Thus, the marginal time for a parcel is under 1 min. In comparison, on a parcel only route, low volumes will mean significant driving time per parcel, leading to marginal times of over 5 min.

As volume rises, the marginal time on parcel only routes declines fairly rapidly as the additional volume increases delivery density and the driving time between addresses falls. At mean volumes, the marginal parcel delivery time is closer to 4 min and falls to nearly 3.5 min at high volumes. Within integrated delivery the marginal parcel delivery times falls, but at a relatively modest rate, so the gap between the two marginal times falls as volume rises.

Once integrated delivery hits its capacity constraint, delivery is done by supplemental parcel delivery runs, which have a marginal time of over 4 min a piece. At very high volumes, this marginal time exceeds that of the parcel-only runs, as shown in Fig. 1. In other words, for most ranges of volume, the marginal parcel delivery time is lower on integrated routes due to scope economies. But if parcel volume exceeds capacity on integrated routes, it is possible for the supplemental delivery marginal time to exceed that for separate delivery. The result occurs because the higher volumes on supplemental delivery reduces its marginal time due to rising economies of density.[6]

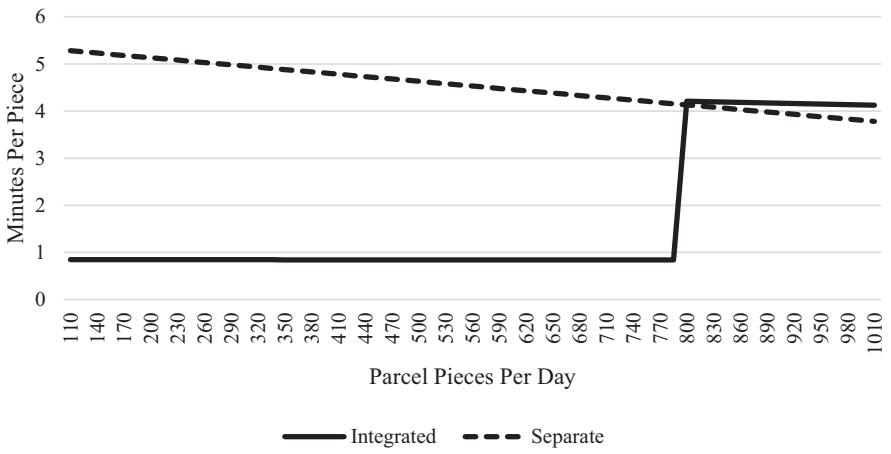

Fig. 1 Marginal parcel delivery times

[6] In theory, the marginal delivery cost for supplemental runs (in an integrated network) at low volumes could be equal to, or less than, the marginal delivery cost, at low volumes, for separate parcel runs. The fact that the marginal costs at low volumes for separate runs is higher than for low volumes for supplemental runs in Figure 1 reflects the results of empirical estimation of delivery costs based upon Postal Service data. The estimated cost function for separate runs exhibits relatively

The analysis thus far indicates that although the marginal delivery time in integrated delivery networks is generally lower than on separate networks, it is possible for that condition to be reversed. Such a possibility raises the question as to whether the *total* delivery time on separate networks could be less.

Figure 2 presents the results of that analysis. To make the comparison, we calculate the total delivery time, including both parcel and "letter" times, across two types of delivery networks for a large range of volume. The resulting total delivery times for the two types of network are presented in Fig. 2, along with the associated parcel volumes.

Figure 2 shows that throughout the entire range of volumes, the total time for the separate network is higher, reflecting the fact that the lower marginal times for parcels occurs only for a relatively small range of volume. In other words, the cost advantage for the integrated network at lower volume levels is more than enough to offset the cost advantage for the separate network at high volumes. The "kink" in the integrated total cost curve reflects the shift from parcel delivery by the regular carrier to parcel delivery by the supplemental carriers.

The relationship between the two cost structures is further illustrated in Fig. 3, where we compare the ratio of total costs. As parcel volume grows, the ratio of separate delivery cost to integrated delivery cost rises as the delivery time gap between the two types of parcel delivery is multiplied by a larger number of parcels delivered. Once the integrated delivery structure hits its capacity constraint, however, the

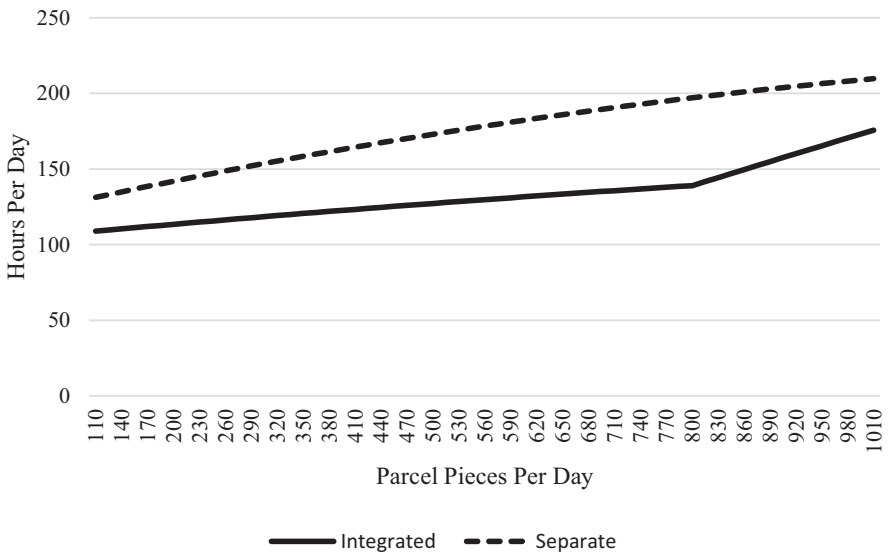

Fig. 2 Total street hours per day

high marginal cost at low volume levels but relatively strong density economies, hence its relatively steep downward slope. Supplemental runs tend to start with lower marginal cost but have smaller density economies.

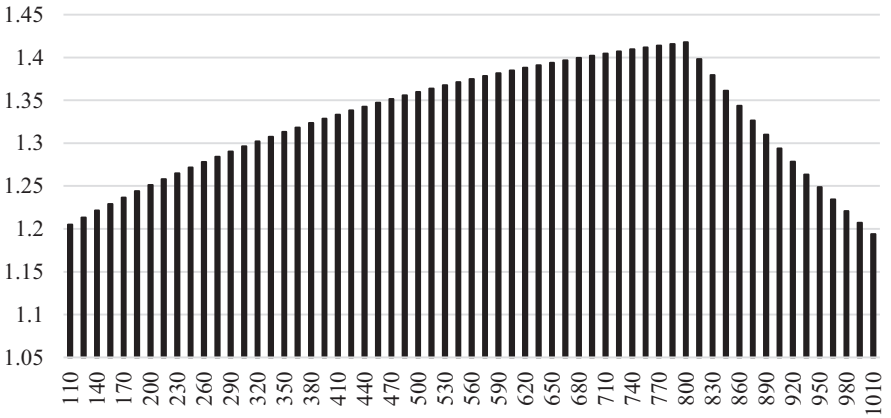

Fig. 3 Ratio of separate delivery cost to integrated delivery cost

percentage gap falls and at very high volumes the percentage gap is similar to its value at very low volumes.

To consider the possible impact of productivity gains from having a parcel-only network, we recalculated the total time for the separate network using a hypothetical high-productivity version of parcel delivery. During the winter holiday season, parcel volumes grow dramatically and parcel delivery productivity, in terms of pieces delivered per house, spikes upward. This creates a lower marginal cost of parcel delivery for the separate delivery structure. As explained above, Bradley (2019) studied parcel delivery costs during the seasonal peak and we use those results to calibrate a high-productivity separate parcel delivery model.

In our counterfactual simulation, we let these high productivity rates be achieved even at lower volume, reflecting a scenario in which parcel productivity rises due to efficiency gains, not just higher volumes. We examine a scenario in which a post can replicate its high-volume productivities across its entire range of volumes, perhaps as a result of improved delivery technology such as dynamic routing. This allows us to expand our analysis beyond what is currently achievable to examine future scenarios in which separate networks could be more efficient. Moreover, this analysis provides a metric for how high additional productivity would have to reach before it provided a reduced total delivery time.

Figure 4 presents the results of this additional analysis.[7] The figure repeats the results for the integrated network and the standard supplemental network, but adds the results for the high-productivity separate parcel delivery network. As expected, the high productivity separate time lies always below the standard separate delivery time but the relationship between the two is not constant. At low volumes, the higher productivity provides relatively little cost saving as the marginal times in the two

[7] We also performed the analysis using the Sunday Only marginal times. At all volume levels, the Sunday only parameters produced higher total times than the Seasonal Peak parameters and thus added nothing to the results.

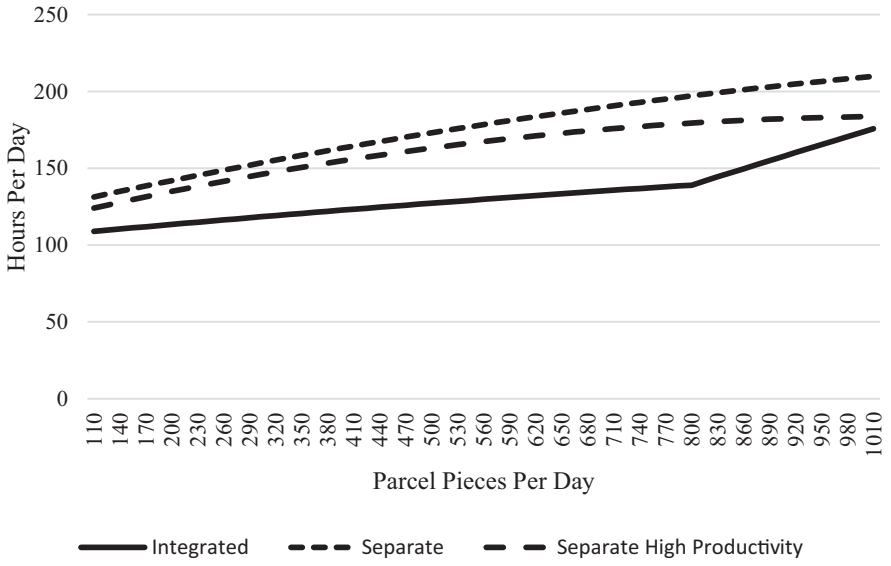

Fig. 4 Total street hour per day

networks diverge by only a small amount. As volume rises however, the higher productivity is reinforced by density economies and the high productivity separate delivery network begins to exhibit material cost savings.

Comparing the high productivity separate network results with the integrated network results shows that while the integrated network is again more efficient, the gap is smaller than in previous analyses. In fact, at the highest parcel volume levels, the two networks are generating approximately the same total times. Because the high productivity parameters are based upon current operating procedures, albeit at higher-than-normal volumes, this result suggests that if technologies are developed that would increase the productivity of separate parcel delivery, then the issue of network structure should be reexamined.

5 Conclusion

As parcel volumes grow, postal operators face an important decision as whether to continue to rely upon parcel delivery in combination with letters or turn to establish dedicated parcel delivery. We show that, theoretically, this choice depends upon the degree of scope economies between parcel and non-parcel volumes in an integrated network, the parcel delivery productivity in a separate network, and the presence of capacity constraints for parcel delivery in an integrated network.

However, we go beyond theory and construct a set of empirical models reflecting current postal practice that allows us to calculate the relative time costs of integrated

parcel separate parcel delivery networks. We calibrate the model with the results from recent USPS studies of parcel and "letter" delivery costs and examine the time costs of the two types of networks over a range of possible volumes. Although our results are based upon empirical analyses from a single postal operator, we believe it is reasonable to apply them cautiously to postal services in general. The estimated relationships reflect the physical characteristics for letter and parcel delivery and we suggest these structural characteristics are likely to be common across posts.

At current volumes, the case for integrated delivery is strong. However, at sufficiently high parcel volumes it is possible that the productivity of a parcel-only network could rise by enough to offset the scope economies enjoyed by the integrated delivery. This would require a dramatic increase in parcel volume, approximately doubling current parcels per day. Finally, we find that possible future efficiency gains in separate parcel delivery could lead to lower costs in separate networks, especially if they are combined with substantially greater parcel volumes.

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Assessing Diversification in the Postal Sector

Timothy J. Brennan

1 Introduction and Summary

A widespread business strategy for national postal operators (NPOs) around the world is diversification into competitive sectors other than postal delivery. Concern with diversification by regulated firms into apparently competitive markets underpinned the 1984 breakup of the monopoly telephone company into separate regulated monopoly and competitive service components (Brennan, 1987). Policies to open entry into wholesale electricity markets were accompanied by regulations separating control of regulated monopoly transmission lines from ownership of competitive generation (Brennan et al., 2002).

One concern with diversification is excessive transfer pricing, that is, overcharging itself for an input. A second is non-price discrimination against rivals in access to its regulated service (Crew et al., 2005). A third concern, cross-subsidization, involves charging cost associated with the production of an unregulated service and charging it to the ratepayers of the regulated service (Brennan, 1990).[1]

[1] In Brennan (1987), I somewhat conflated the excessive transfer pricing and cross-subsidization. They are similar in that they both involve cost misallocation to increase the price of the regulated service. However, they differ in that the former is about paying too much for an input while the latter is about potentially charging too little for a separate product that shares inputs with the regulated service.

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Do these concerns apply to the postal sector? Section 2 sets the context by first providing examples of postal diversification in the EU, and criticism of much more limited diversification in the US. Section 3 describes US legal and regulatory precedents based on concern with provision of competitive services by regulated firms. Section 4 describes three concerns in detail with examples of how they could apply to regulated national postal operators (NPOs). Section 5 discusses an issue more prominent in the EU than (so far) in the US, regarding vertical integration. Section 6 describes potential mitigating factors of price-cap regulation of NPOs, whether NPOs still have market power as electronic communications has displaced use of postal services, and whether NPOs as state-owned enterprises maximize profits. Section 7 assesses potential justifications for NPO provision of competitive services based on economies of scope (that underly arguments for diversification in order to increase profits NPOs can use to meet universal service obligations), in general and perhaps following from excess capacity created by a USO. Section 8 summarizes and concludes.

2 Postal Diversification

2.1 Postal Diversification in the EU

Many of the NPO diversification examples, particularly in the EU, involve businesses that seem quite distant from postal service. La Poste, the French NPO, may have the most diverse portfolio of such offerings. Its website (https://www.laposte.fr) includes a wide range of non-postal services: elderly visits and assistance, including meals; home maintenance and gardening; energy efficiency renovations; mobile telephony; insurance and banking; driver exams and registration; and sporting event and concert tickets.

La Poste is not alone among EU NPOs in branching beyond postal services. Poste Italiane, Italy's NPO, provides an extensive range of banking, investment and retirement services (https://www.poste.it/). An Post, the Irish NPO, provides a host of government services, mobile telephony and loans to promote "green" homes and cars (https://www.anpost.com/). ELTA (ΕΛΤΑ), Greece's NPO, in addition to financial services like those provided by Poste Italiane, La Poste, and other EU NPOs, has been a licensed provider of electricity since 2016 (https://www.elta.gr/en-us/company/history.aspx). This is surely an incomplete list.

2.2 The Different U.S. Perspective

Almost any of these items would astonish someone familiar with only the US Postal Service (USPS), the US NPO. In the early 1980s, USPS attempted to enter the nascent electronic communication business through delivery of hard-copy mail

transmitted electronically to and printed at selected post offices. The US Department of Justice's Antitrust Division opposed this as unjustified entry by USPS into a competitive business—others could provide this electronic transmission service—and USPS abandoned the effort.[2]

The USPS faces questions regarding its provision of involvement in competitive businesses closely related to postal service—express mail and bulk (as opposed to single piece) parcel delivery. Those services in the US are designated by statute[3] as "competitive," and not subject to regulation other than a legal prohibition against being subsidized by revenues from competitive products—a subject to which I return below. Kamarck (2015) questioned whether USPS has the managerial acumen to compete against private providers of competitive services without such subsidies. She concluded that:

> [USPS's] future should begin with a decision to break the organization into two separate entities. One organization should be a public sector organization with the sole mission of delivering on the universal mandate – defined in a way that meets the reality of the information age. The other organization should be privatized so that it is out from under the laws and regulations that make innovation and flexibility all but impossible. This new organization should be allowed to compete with similar organizations in the private sector if and only if the subsidy issue can be worked out so that the new competitor does not have an enormous and distorting market advantage and if it is managed by people with private sector experience. (Kamarck, 2015 at 14)[4]

Her view suggests that asking the benefits and costs of postal diversification applies inside as well as outside the set of services that fall under the general heading of hard copy delivery.

3 US Precedents from Other Sectors

In the US, concern regarding the role of regulated services in competitive markets has played a role in major government interventions in critical sectors.

3.1 Breaking up the Phone Company

In 1982, the US Department of Justice's Antitrust Division (DOJ) and AT&T, then the nation's dominant telephone company, settled an antitrust case filed in 1974. That case resulted in AT&T divesting in 1984 its 23 regulated monopoly local

[2] https://about.usps.com/who-we-are/postal-history/ecom.pdf. I was the staff economist for the Antitrust Division on this matter.

[3] Postal Accountability and Enhancement Act (PAEA), Public Law 109-435 (Dec. 20, 2006).

[4] Kamarck (2015) also provided political explanations the withdrawal of USPS from banking and, unlike almost every other NPO, its lack of presence in telecommunications.

telephone operations. The divested companies were prohibited from providing competitive long-distance service, information services (at the time, largely remote computing), and production of telecommunications equipment.[5]

DOJ's antitrust case against AT&T had two fundamental pillars (Brennan, 1987). The first involved AT&T's provision of inferior access, or refusal to provide access altogether, to rivals in affiliated markets. One such set of competitors were those who wanted to offer telephones and other equipment that customers would use at their locations to communicate. A second set of disadvantaged competitors were new providers of long-distance service. Long-distance service entrants were first refused interconnection and then forced to require their customers to make a separate (local) call to the long-distance carriers switch on top of the ten-digit long distance number, which the carrier would then use to complete the call.

The second pillar was known in the case as "pricing without regard to cost". DOJ alleged that when confronted with a new telecommunication service offering from a rival, such as bulk private lines, AT&T would respond by undercutting the price offered by the rival regardless of what it might cost AT&T to provide the service. The premise was that cost did not matter since AT&T could cover losses with revenues from its regulated telephone monopolies. AT&T's arguments, essentially that these restrictions were necessary to maintain the integrity of its network and approved by its regulators, did not persuade the judge, leading to the 1984 divestiture.[6]

3.2 Restructuring the Electricity Sector

Prior to the 1970s, electricity in the US was provided primarily by vertically integrated utilities, including generation of electricity, long distance transmission, local distribution, and then sold to eventual users. Following legislation that required utilities to open the grid to unaffiliated "qualified" generators,[7] and analyses that scale economies did not preclude competition among generators to sell electricity at wholesale (Joskow & Schmalensee, 1983), the US Federal Energy Regulatory Commission (FERC) opened access to all generators. FERC separated control of the still monopoly transmission grid from generators still affiliated with companies owning transmission.[8] In 1996, it vested control over transmission in "independent

[5] United States v. American Tel. and Tel. Co., 552 F. Supp. 131 (D.D.C. 1983).

[6] A combination of legal appeals and legislative changes led to the elimination of these restrictions by around 2000. The explosive growth in mobile and Internet-based telephony to a large degree eliminated market power held by wires-based local telephone companies.

[7] Public Utility Regulatory Policies Act (PURPA), Public Law 95-617 (November 9, 1978).

[8] Federal Energy Regulatory Commission, Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, Order No. 888 (Apr. 24, 1996); Federal Energy Regulatory Commission, Regional Transmission Organizations, Order No. 2000 (Dec. 20, 1999).

system operators" (ISOs) later renamed "regional transmission organizations" (RTOs) in 2000.[9]

FERC's regulations did not go as far as the AT&T divestiture. Generation utilities retained ownership of transmission; they only could not control ISOs or RTOs. Generation access was open and ISOs were required to provide real-time information on transmission system availability. Moreover—and this is a quirk of how regulatory authority over the electricity sector is divided between states and the central government—FERC did not mandate ISOs or RTOs throughout the US; some states, nearly a quarter century after FERC's initial order in this area, retain the vertical integrated utility structure. Nevertheless, separation of generation ownership from transmission control was so important in opening wholesale electricity markets that the term "restructuring" rather than "deregulation" became the term used to describe this initiative.

4 Concerns with Regulated Firms in Competitive Markets, with NPO Applications

4.1 The Role of Regulation

An important distinction is between diversification by regulated firms and diversification by firms with market power that are not regulated. While the latter is receiving more attention recently, particularly in "high tech" platform sectors with leading firms,[10] the former was the basis for the US interventions in telecommunications and electricity and provides the framework for analyzing NPO diversification. Regulation creates a gap between the profits the regulated firm is allowed to make and the profits it could earn, were it free to set the price of its regulated service. Diversification, followed by the tactics below, becomes an indirect method of exercising the power. Were the firm not regulated, this motivation for diversification would disappear.

Diversification that allows a regulated firm to evade price constraints has two potential harms. The first is that some or all customers of the regulated service, in this case the NPO, would directly or indirectly pay higher prices.[11] The second is

[9] *Id.* RTOs also manage markets for wholesale electricity and, in many but not all cases, separate markets for capacity to produce electricity.

[10] Along with numerous competition law cases and investigations in the US and EU, a leading recent statement of interest in this issue is report from the majority (Democratic) staff of the US House of Representatives Subcommittee on Antitrust, Commercial and Administrative Law, *Investigation of Competition in Digital Markets* (2020), available at https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf. Section 6 below very briefly discusses the relevance of these concerns to NPO diversification.

[11] As discussed in Sect. 6.2, price-cap regulation, by separating prices from reported costs, eliminates the incentive to engage in cross-subsidization and excessive transfer pricing. That separation

that competition in the markets which the NPO enters may be distorted, as described below, giving its unregulated affiliate a larger share of the unregulated market than it would obtain on the basis of competitive merit.[12]

4.2 Excessive Transfer Pricing

A first concern is excessive transfer pricing. Suppose a regulated firm enters a market for an input it needs to produce its service. It might purchase that input from its affiliate at an above-market price. A regulator basing price on the cost of inputs would then allow the regulated firm to raise its rates to reflect this higher price, raising the price of the regulated service closer to its unregulated monopoly level. This may also displace lower cost or higher quality rival producers of that input.

A hypothetical example for a regulated NPO would be becoming a truck manufacturer and then selling trucks to itself at a premium. This seems fanciful; in general, excessive transfer pricing does not seem relevant to most of the diversification examples at hand. One potential exception is banking. If the NPO bank would lend to the NPO at above market rates, which would then be passed on to its customers in the form of higher mail product prices. However, I believe postal banking is provided to individuals and households rather than as commercial lending to businesses. Accordingly, this concern does not seem great.

4.3 Discrimination

The primary concern in both the telecommunications and electricity examples above was that regulated firms would discriminate against rivals by providing inferior or delayed connection compared to what they give themselves. For telephones, the relevant access was to the local telephone network; in electricity, it was to the transmission grid. When the difference in price is between a regulated price and a monopoly price, the economic harm is clear.

For many of the services in question, discrimination seems unlikely. For example, an NPO involved in banking is perhaps not likely to be able to delay mail delivery to or from rival banks. Even if it could do so, this is not likely to create a meaningful competitive advantage that the NPO's bank could exploit through higher account fees or interest rates on loans. This seems likely to be the case with the other non-postal services that NPOs have described.

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eliminates profits from inflating costs either by overcharging itself for inputs or misallocating costs of competitive products to the regulated service.

[12] State-owned regulated firms in general and NPOs in particular present separate but related concerns, discussed below in Sects. 4.4 and 6.4.

Competitive postal services present a different story. An NPO might give priority to bulk mail it gathered and sorted over that delivered to it from firms that provide worksharing services. One could also imagine that an NPO might be faster at delivering parcels shipped through it than parcels shipped through other firms that might use the NPO for last mile delivery. Perhaps an NPO should be restricted to last-mile delivery services, with long-distance parcel shipment and bulk sorting left to competitors in separate markets, akin to the line-of-business restrictions placed on in the AT&T antirust case. (Opposing considerations are in Sect. 7.)

4.4 Cross Subsidization

Cross-subsidization is another way of misallocating costs to the regulated services customers, but with different tactics and potential effects from excessive transfer pricing. The regulated firm diversifies into a business that uses similar inputs as used to provide the regulated service. It then charges some of those inputs used to provide the unregulated service to the regulated account—the "cross-subsidization". These extra charges show up on the books of the regulated service. Profits from the increase in the regulated service price appear on the books of the unregulated service. The cross-subsidized affiliate of the regulated firm may displace marginal production from more efficient rivals, and the prospect of competing against a cross-subsidized affiliate could constitute a credible predatory threat (Brennan, 1990). These similar inputs can be quite general. One possibility is that the regulated firm backs loans to the unregulated side, essentially increasing the cost of capital covered by its ratepayers.

Many of the services outside the postal core, and competitive postal services such as parcel delivery and express mail, use labor, trucks, and offices similar to those used for letter delivery. Parcel services competitors have a long-standing complaint against alleged USPS underpricing of parcel delivery, funded by cross-subsidization.[13] As noted, PAEA in the US includes specific prohibitions against cross-subsidization, but that in and of itself need not guarantee that it does not take place.[14] In the EU context, in Member States where NPOs remain largely or

[13] United Parcel Service, Inc. v. Postal Regulatory Commission, Petition for a Writ of Certiorari, Supreme Court of the United States (Dec. 26, 2018), available at https://www.supremecourt.gov/DocketPDF/18/18-853/77552/20181226122249306_UPS%20Petition%20for%20Cert.pdf. Brennan (2020a) discussed optimal pricing of competitive services provided by a regulated firm, with implications for cost allocation.

[14] The cross-subsidization claims against USPS largely concern disputes about how common fixed costs, called "institutional" costs, are allocated between competitive and regulated ("market-dominant") services. In principle, entry by a regulated firm into an unregulated market may be efficient as long as the revenues from that service cover the variable (called "attributable" in the US context) costs. Complications to that principle are discussed in Brennan (1990, 2020a).

exclusively state-owned, the potential for cross-subsidization raises the legal issue of inappropriate state aid.[15]

5 Vertical Integration by Platforms

It is beyond the scope of this paper to address the more general and complex concerns raised when firms with market power enter other markets (Baker et al., 2019). I will mention a few to discuss their relevance of lack thereof:

Potential competition. One concern about a firm with market power providing a related service and discriminating against rivals would be if those rivals are potential entrants into that business. Potential competition may be a particular concern with mergers between firms in related markets, where one or both have market power they might want to preserve. Here, the concern is not likely for NPO efforts in non-postal services. It may be more relevant if a parcel carrier or worksharing services provider were to contend that an NPO was discriminating against them in order to prevent them from becoming likely competitors in the NPO's regulated markets.

Facilitating collusion. The theory here is that firms at one level may want to collude, but it takes vertical integration and exclusive dealing with those vertical affiliates to produce observable prices and sales necessary to make deviations from a collusive agreement enforceable. An example would be manufacturers of a product who would want to collude on wholesale prices, but such prices cannot be observed, hence cheating on the agreement could not be detected. However, if retail prices can be observed, the manufacturers could decide to integrate downstream into retailing as a collusive device. I am unaware of examples of this behavior, but it does not seem pertinent to NPOs, which by hypothesis lack competitors in their regulated markets.

Exploiting information. In their recently issued Vertical Merger Guidelines, the US Department of Justice and Federal Trade Commission (2020) raise the concern that a firm with a monopoly platform used by affiliates and rivals could use information obtained by rivals to give affiliates an undue competitive advantage. This theory is the foundation for the European Commission's current abuse of dominance complaint against Amazon.[16] Outside postal services such as parcel delivery and bulk sorting, it does not seem that NPO involvement in other services could raise this concern. One could imagine, however, that an NPO handling last mile delivery for parcel delivery or worksharing companies could learn something from new delivery patterns that might help their affiliated operations in those areas.

[15] Treaty on the Functioning of the European Union (TFEU), Article 107. Participants in prior Postal Conferences have written extensively on state aid law as it may apply to NPOs in the EU.

[16] https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2077

Input foreclosure. Two concerns here need to be distinguished. To the extent that a firm's practice extends its control over a related market, through vertical integration, exclusive dealing contracts, or other arrangements, it could be creating and exploiting power over price created in that regulated market (Brennan, 2008). On the other hand, if the vertical arrangement does not create new market power, then it is problematic only if the firm is unable to exploit the market power it already has (Brennan, 2020b). For an NPO, that inability would be the result of price regulation, and the above arguments apply.

6 Countering Questions

6.1 Can Regulators Prevent These Harms Without Separation or Divestiture?

All of the potential tactics for evading regulation depend on a perhaps delicate balance, pointed out by Faulhaber (1987) in the telecommunications context. On the one hand, regulators have to be unaware that these tactics are being employed, that is, that the regulated firm is being overcharged for inputs sold to itself, covering costs of inputs used by affiliates, or engaging in non-price discrimination against rivals in unregulated markets. On the other hand, rivals or customers in regulated markets are assumed able to detect the cost or competitive advantages that result from such conduct. Regulators then have to attribute such advantages to genuine cost or quality advantages of the regulated firm's unregulated offerings, rather than favoritism of one sort or another.

This difficulty of that attribution creates the space for regulatory evasion using these tactics. It is important to note such an argument does not depend on the regulatory being captured by the regulated firm (Stigler, 1971). If the regulator has been captured, there may not be a meaningful constraint to evade through diversification. Regulation has to matter.

6.2 Do Concerns Apply with Price Cap Regulation?

Two of the three concerns mentioned here, excessive transfer pricing and cross-subsidization, require regulation that sets prices on the basis of average cost (including allowance for an appropriate rate of return). A problem with cost-of-service regulation was that by tying prices to cost, the regulated firm's incentive to control cost was eliminated. Starting in the 1980s, Littlechild (1983) proposed a form of incentive regulation where prices, rather than be based on costs, would be set in 1 year and then adjusted upward solely on the basis of inflation (changes in the consumer price index or CPI) and downward on the basis of an "X" factor so

consumers could share in the expected productivity created by these incentives. This form of regulation came to be known as "price caps" or "CPI-X" regulation. USPS's rates, following the enactment of PAEA in 2006, are regulated by a form of price caps, with no downward productivity adjustment.

In analyzing price caps, Brennan (1989, 1990) noted that because they divorce rates from costs, a regulated firm has no incentive to cross-subsidize. Price caps also eliminate the incentive to charge excessive transfer prices. If prices are not based on costs, there is no incentive to exaggerate them either by charging too much for inputs or by charging for inputs to other services to the regulated account.

This benefit, however, is limited. The initially chosen X factor is unlikely to be exactly right. Over time, if X is too high, allowed rates fall too quickly. The regulated firm will be losing money and will likely be able to persuade a regulator to allow it to raise its charges for its regulated service. If X turns out too low and rates do not fall as much as costs, the regulated firm will earn unexpectedly large profits, creating political pressure to reduce its rates. Thus, in practice price-caps will be like cost-of-service regulation, albeit with a lag reflecting how long it may take for one or the other divergence to appear.[17] For that reason, there will remain an incentive to exaggerate costs through excessive transfer pricing or cross-subsidization.

Moreover, even if price caps work perfectly, the incentive to discriminate remains. That incentive relies solely on a gap between the regulated and monopoly rate. Because profits from discrimination are reaped by the unregulated affiliate as a result of the competitive disadvantage its rivals face, cost-of-service regulation is not a prerequisite.

6.3 Do NPOs Retain Market Power Following e-Substitution?

For diversification to be a problem, the regulated NPO must have market power. It is well known that, around the world, demand for NPOs' core monopoly service, letter mail, has plunged, partly from disruption to normal economic activity—the 2008–09 credit crisis. The main cause, however, has been the use of Internet-based communications to send messages and pay bills—e-substitution.

That demand for NPO services has declined may suggest that NPOs no longer have market power. This is possible, but it ought not be a foregone conclusion. Brennan and Crew (2014) distinguished gross substitutes—when one good reduces demand for another—and marginal substitutes—where that substitution significantly is sensitive to the relative prices of the goods. If goods are marginal substitutes, then the presence of one would limit the ability of a monopoly over the other

[17] The US Postal Regulatory Commission proposed reviews of rates every 3 years. Postal Regulatory Commission, *Notice of Proposed Rulemaking for the System for Regulating Rates and Classes for Market Dominant Services*, Order No. 4258, Docket No. RM2017-3 (Dec. 1, 2017), hereafter "Order No. 4258" at 101.

to raise price.[18] But if they are only gross substitutes, then the existence of the first may not affect the ability of a monopoly over the other to raise price, despite having reduced demand for the monopoly's product.

Electronic communication is likely to be a gross but not marginal substitute for NPO services. If so, the NPO could retain market power over the smaller business left to it after it faces e-substitution. The key consideration is that its remaining demand may be less elastic or price-sensitive. This will take place if those who still use NPO services to mail letters or pay bills may be willing to keep doing even after a large increase in postage; those with greater sensitivity to price may be the ones who have switched to the Internet. The issue is ultimately empirical, but it is not theoretical. E-substitution does not imply that an NPO has lost all its market power and may well imply that its monopoly price has increased.

6.4 What If the NPO Does Not Maximize Profits?

Borsenberger et al. (2015) posited that the postal operator acts to maximize overall economic welfare rather than profit, perhaps because the NPO is to a substantial degree a state-owned enterprise (SOE). If an NPO is not maximizing profits, concerns from diversification may dissipate. The motive for diversification is obtaining profit otherwise constrained by regulation. Without that motivation, that framework becomes irrelevant.

However, Sappington and Sidak (2003) pointed out that SOEs may not face the same profitability constraints as private companies. If an SOE is driven by bureaucratic incentives rather than welfare or profit maximization, it may still have incentives to expand its presence by entering markets beyond its initial specific purview. In the extreme, rather than cross-subsidizing from regulated enterprises, it might be able to cross-subsidize from the state treasury—why state aid has been a prominent concern for this sector.[19]

7 Economies of Scope and Other Potential Benefits

Before concluding that diversification imposes costs, one has to look at potential benefits.

[18] In an antitrust merger context, they'd be defined as being in the same market.

[19] Even absent competitive concerns, the absence of a profit motive may lead to inefficient pricing, cost control, and failure to pursue innovations (Crew & Brennan, 2015).

7.1 Increased Competition

If the unregulated service an NPO provides is not supplied competitively, the addition of a competitor may lead to a reduction in price. This can increase consumer welfare and, if the NPO's fixed costs associated with this new product are not too high, increase overall economic welfare.[20] A regulator deciding whether to permit an NPO to offer a particular service can decide whether these benefits exist and are worth it. The size of the benefits depends on the characteristics of the firms, the nature of the competition (quantity or price), and the degree to which the products are differentiated. The businesses in which NPOs participate by and large seem reasonably competitive, but this is of course an empirical question with potential exceptions.

7.2 NPO Scope Economies in General

An argument for NPO involvement in other markets is the flip side of the cross-subsidization coin—an NPO already has the labor, vehicles, buildings and other facilities to provide competitive postal and non-postal services. This would be an example of economies of scope—that one firm can provide two or more services at lower cost than having those services provided by separate firms. This claim likely underlies the belief that diversification creates profits needed by an NPO can use to meet its universal service obligations. One example would be if fixed costs incurred to provide one service could be used to provide a second service, but would be duplicated by a separate firm providing that second service. The widespread category of "institutional cost" in USPS accounting suggests that, at least within the universe of mail products, such fixed costs and hence economies of scope may be pervasive.

This possibility may be more apparent than real. The more stops postal carriers make to check on the elderly, the slower they will be at delivering mail.[21] Tellers in post offices handling banking are not available to handle postal services at the same time. Similar observations apply to vehicles and office space. Unless there is excess capacity, that is, inputs procured for postal service but are not used for those services, there will not be scope economies. Such excess capacity would be a sign of cross-subsidization or operational inefficiency, not economies of scope.[22]

[20] Mankiw and Whinston (1986) showed that oligopolistic markets will have too much entry, as the profits to the marginal entrant come in part from reallocating business from incumbent rivals rather than from net output added to the market.

[21] Brennan and Palmer (1994) examined the tradeoffs between cross-subsidization and scope economies.

[22] One can have excess capacity with declining demand, at least for inputs that are relatively fixed. This seemingly would not apply to tellers, trucks, and office space, but if, for example, there are

One potential exception is reputation. An NPO might offer non-postal services, perhaps banking, to take advantage of the trust the NPO has built up over decades of public service. This, too, should be carefully considered. It is not clear that a reputation for reliability and trust would extend to other services. If it did, that reputation did not come for free, but is the result of decades of customer and public support that paid for the reliability that engendered that trust. If an NPO is to enter another market to exploit that reputation, perhaps the benefits should go to those customers and the public treasury. Otherwise, rivals could claim cross-subsidization.

7.3 Potential Excess Capacity Resulting from the USO

Doubts regarding economies of scope have an important qualification. NPOs do not just operate under regulatory price constraints. They also have universal service obligations involving nationwide coverage, often at the same rates. Nationwide delivery entails having the personnel, trucks, offices, and other equipment necessary to meet demand everywhere.

In rural areas with low population density, NPO operations set up to meet USO requirements may well have excess capacity. To meet these obligations may entail having a minimum efficient scale of office size, employees, and other facilities, creating excess capacity. This excess capacity could be used efficiently to provide other services. NPO diversification may be most warranted in areas where postal service would be limited but for the USO.

7.4 Are Cross-Subsidies Politically Preferred?

A final rationale for NPO diversification begins with arguments largely outside economics, that a variety of services should be more widely provided to meets social policy objectives. For example, low-income elderly may be in need of more care than they can afford, even with other social supports. A postal operator may be a useful agent for providing services that competitive markets will not provide, perhaps most notably, banking to low-income areas.

An NPO may be an attractive vehicle for providing such services, for a reason in addition to potential economies of scope in rural or low volume areas where the USO leads to excess capacity. If these services were provided by the government, paying for them would require taxes, which may be overt and unpopular. Folding them into the NPO means that any rate increases necessary to cover them—which

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legal barriers to reducing the size of the postal workforce, there may be excess labor capacity when demand falls.

would ordinarily be cross-subsidies—would be a matter for the postal regulator. This would be less visible, and legislators would not be vulnerable to accusations that they raised taxes.[23] If one thinks that these programs are good and reduced visibility would make their implementation more likely, having them carried out by the NPO would be attractive. If one thinks that the costs of programs should be made explicit to help the public at large decide if they are worthwhile, perhaps this is not so attractive.

8 Conclusion

This chapter addresses whether NPOs should be limited in their unregulated offerings. While discrimination against unaffiliated rivals in postal services—parcel delivery and worksharing agreements—may be a problem, the most serious concern is cross-subsidization—allocating costs of unregulated offerings to the regulated side, so they are covered by higher prices by cost-based regulated postal service rates. Price-cap regulation in principle could limit incentives to cross-subsidize, but periodic rate adjustments reduce the force of that limitation. E-substitution does not eliminate the problem, as NPOs may also retain market power over core services despite it.

Economies of scope contentions, be they based on shared inputs (labor, buildings) or reputation, should be viewed with skepticism. The strongest case for NPO provision of unregulated services is in rural areas where fulfilling USO requirements leads to excess capacity that could usefully be deployed to provide unregulated postal and non-postal services. Having the costs of providing these services beyond what the market would do less transparent, as a justification for raising NPO rates, may be politically attractive compared to covering those costs through taxes, depending on how one balances the need for these services against the value of budgetary transparency.

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[23] Posner (1971) called this phenomenon "taxation by regulation". A recent example in the US is having regulated electric utilities manage programs to subsidize purchases of lighting, air conditioners, and other appliances that use less energy (Palmer et al., 2013).

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The Historical Contribution of Postal Service to Social Welfare in the United States

Edward S. Pearsall

1 Introduction

The research performed for this paper employed historical data to estimate the contribution to social welfare from domestic postal service in the U.S. since 1790. The goal was to discover how this contribution was determined by economic and demographic conditions, by postal pricing, by technology, by regulation and by various initiatives undertaken to alter and extend national service. The method was to fit an econometric model to time series constructed from U.S. historical statistics, and then to use the fitted model to make comparative calculations of welfare, defined as the sum of consumers' and producers' surpluses, under selected counter-factual scenarios.

The model consists of five equations describing annual demand volume (pieces of mail per capita), real average revenue per piece (ARP), real operating expenditures (cost), the number of post offices (NPOs), and an index of the level of real postal prices. The equations were specified and estimated in various ways employing different forms, variables, definitions and econometric methods to find fits that were acceptable over the entire span from 1790 to 2019. The experimentation was necessary to aggregate and extend a fairly conventional model of U.S. postal markets (see Pearsall, 2005, 2011), to accommodate a list of 20 historical effects, to treat the postal network and postal prices as endogenous, and to deal with serially correlated equation errors. Comparative calculations of welfare were made with the fitted version of the model that was the most robust of those tested. Welfare comparisons with and without specific effects were mostly made by calculating differences in surpluses using predictions made by inserting assumed counter-factual

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values for one or another of the represented effects. Findings were reached primarily by examining graphs of the surplus differences over time.

In its early years, the U.S. derived relatively little economic benefit directly from postal service because the mail was not essential to commerce. The total welfare from postal service never exceeded about 0.4% of GDP prior to about 1870. However, the contribution to welfare after 1870 grew substantially. At its peak, around 1980, the contribution was over 1.1% of GDP. Since then, the contribution has fallen and is now back below 0.4%.

Not unexpectedly, many of the significant effects identified by the research lie beyond the direct control of the post. These include the growth of real GDP per capita, the population and its distribution, the speed of inter-city transportation, the real prices of postal inputs, the size of the commercial banking sector, electronic substitution, and the technology available for mail processing and delivery.

The evidence that the demand for postal service is dependent upon commercial activity is particularly clear. The level of deposits in the banking sector is the variable that most strongly affects welfare through its effect on consumers' surplus.

Among the effects within the control of the post, those that define the reach of the delivery network and the quality of service are especially important. These include the density of post offices and whether or not there was delivery service to city and rural residences and places of business.

Welfare was not much affected by the price level for postal services. Demand has been price inelastic and stable over time throughout U.S. history; therefore, changes in the real price of mail caused changes in demand and ARP that were largely offsetting. Price changes mostly just redistributed the surpluses.

Indirect competition appears to have had mixed effects on welfare. The recent growth of the Internet and smartphone penetration reduced welfare by reducing demand; however, the much earlier spread of telegraph and telephone service did the opposite by raising ARP.

Among the quality-of-service choices made over the years by the post, those that affected user costs had the most pronounced effects on welfare. These choices include the Roland Hill reforms (adhesive stamps, the sender pays, and a nationally uniform letter rate), the extensions of delivery service to urban and then rural residents, and the imposition of Zip code addressing.

Decisions that were strongly positive in their effects on welfare sometimes involved the introduction of new forms of mail. These included the introduction of postal cards and parcel post service, but not the introduction of bulk work-shared mail. The increased demand and cost saving from work-sharing were mostly offset by reduced ARP.

The U.S. post appears to have had difficulty benefiting from technological change. Several historical changes that should have reduced the cost of operations instead accompanied declines in producers' surplus. A possible explanation in each case seems to be that the supplanted technology either ceased to be available or became prohibitively expensive, while the new technology was not necessarily cheaper or better.

Several administrative and regulatory changes had surprisingly little direct impact. Chronologically, these are the startup of federal postal service, the Postal Savings System while it existed, and the regulatory regimes that Congress enacted with the Postal Reorganization Act of 1970 and the Postal Accountability and Enhancement Act of 2006.

The assembly of data is discussed in Sect. 2. The model is presented in Sect. 3. Coefficient estimates, t-values and goodness-of -fit are discussed in Sect. 4. The welfare calculations are described in Sect. 5. Welfare results for various pricing regimes are compared in Sect. 6. The evidence supporting the conclusions with respect to various effects is described in Sect. 7. This evidence is mostly found in a separate Appendix.[1] The paper concludes in Sect. 8.

2 Using the Historical Data

The welfare calculations depend upon a close fit of the model to time series consisting of annual observations assembled from U.S. historical statistics. Historical data from the sources listed in the References (see HSUS, 2020, FRED, 2020, USPS, 2020a, b; TFP, 2018) and elsewhere have been used to construct annual time series that extend from 1790 to 2019. Only a few of the variables found in the model are available as continuous series over this span. In order to assemble a complete series of observations for a variable it was often necessary to estimate early values using a related series and/or to interpolate or extrapolate for observations that were missing. How this was done depended largely upon what data was available from the historical record. The methods that were used to assemble the sample are exemplified by the construction of the time series described in this section for the quantity and price variables of the model. Many other examples for variables selected to measure specific effects may be found described in Sect. 7 and, in greater detail, in the Appendix.

The dependent variable for the demand equation is the annual average number of pieces of mail per capita, i.e., pieces handled divided by the resident population. Total pieces are unknown prior to 1886 (except for the single year 1847) but are known incompletely by government fiscal year (GFY) from postal records after 1885 (see USPS, 2020a and HSUS, 2020). Gaps in the GFY records from 1914 to 1922 and from 1924 to 1925 were filled by linear interpolation using reported volumes for the GFY bordering the gaps. The reported and interpolated volumes were then allocated to calendar years. Between 1862 and 1885 the number of pieces was estimated by assuming that pieces were proportional to the total number of issued stamps, stamped envelopes and stamped cards (HSUS, 2020). The estimates were joined by choosing the proportion so that the number of pieces matched for the year 1887. Prior to 1862 the number of pieces was estimated by assuming that pieces were proportional to postal income (USPS, 2020a) divided by an estimate of ARP

[1] The Appendix is available on request from the author at espearsall@verizon.net

obtained by regressing average revenue on a nominal price index and other variables representing the effects of the introduction of postal cards, a trend and the startup of postal service. The estimates were joined by choosing the proportion so that the number of pieces matched the number derived from stamp sales in 1862 when stamp sales locally peaked. A complete series for resident population was obtained by joining the annual values for the years 1790 to 2001 from HSUS (2020) with estimates as of Jan. 1 from FRED (2020).[2]

The dependent variable for the Pricing equation is a Tornqvist price index of postage rates deflated using the implicit deflator for Gross Domestic Product (GDP). The index is also an explanatory variable in the Demand and ARP equations. The nominal Tornqvist price index in year t is derived from the formula $P_t = 100\sum_i \ln\left(R_{it} / R_{i0}\right)\left(S_{it} + S_{i0}\right)$. R_{it} is the rate for a representative piece for mail class i in year t; S_{it} is the revenue share for the class. The subscript "0" designates the base year, chosen as 2015. The formula gives the value 100 to the nominal Tornqvist index in the base year. The price variable is obtained by dividing the nominal Tornqvist index by the GDP deflator also based to 2015.[3]

The price index is calculated using revenue shares and representative rates for ten aggregate classes of mail: First-Class letters, First-Class Cards, Air Mail, Priority Mail, Express Mail (and mailgrams), Periodicals (2nd Cls), Standard Mail (3rd Cls), Parcel Services (4th Cls), International Mail and Special Services. Fiscal year revenues by mail class have been reported by USPS to the PRC in periodic Revenue, Pieces and Weight (RPW) reports from 1971 to 2020. Revenues for First-Class, Second-Class, Third-Class and Fourth-Class from 1926 to 1999 and for domestic Airmail from 1930 to 1977 are found in HSUS (2020). For the years prior to 1926 U.S. postal revenues are only known in the aggregate. For these years, revenue shares were estimated by extrapolating back from the last years for which there existed data, and revenue shares for 1st Cls stamps and cards were estimated back to 1872 using volumes. Prior to 1872 the mail was assumed to be composed entirely of 1st-Cls and 2nd-Cls.

Rates for representative pieces were taken from the postal tariff in effect in each year of the sample. Historical rates for "single letters" (1st Cls) starting in 1792 can be found in USPS (2020a)[4]; rates for surface letters (1st Cls), surface postcards (1st Cls), Airmail letters, Airmail postcards and Express mail from 1861 to 2001 are found in HSUS (2020); rates for Periodicals, Standard and Parcels from 1845 to 1955 may be found in Kennedy (1957). Price indices for First-Class, Standard,

[2] Fits of the model were made with two alternative estimates of the quantity of mail. Volume was estimated for all years by dividing postal revenue by the estimate of ARP, and volume was estimated as the equivalent number of First-Class letters using billing determinants from 2015.

[3] Fits of the model were made with other indices of real postal prices. These were created in two ways. First, a nominal index was constructed by averaging together rates for representative First-Class letters weighing ½ and 1 oz., and travelling 30 and 50 miles. Second, a different deflator, the consumer price index (CPI) was used to calculate real prices.

[4] The rates for 1790 and 1791 were assumed to be the same as the rate for 1792.

Periodicals, Parcels, Priority Mail and Special Services since 1972 are available from FRED (2020). Finally, fixed-weight price indices for finely-divided categories of domestic mail and complete domestic rate schedules for recent postal tariffs can be extracted from various USPS filings with the Postal Regulatory Commission (PRC). The rates R_{it} were derived by calculating the average tariff of the representative pieces over the year. Rates for Airmail after 1976 were set equal to the rate for 1st Cls letters. Rates taken from different sources were joined to be equal at a common year.

The time series for representative rates and revenue shares exhibit major breaks in continuity occurring in the years 1863, 1913, 1927, 1962 and 1971 when changes were made either in the definitions of the mail classes or in the level of revenue reporting. Nominal Tornqvist sub-indices were calculated using the same base year 2015 for the six sub-intervals defined by the breaks. These sub-indices were then joined by proportionally adjusting the earlier sub-indices to match the later indices in the transition years. The match was made so that the earlier index, when calculated using the base year prices and revenue shares from the previous year, would equal the later index in the transition year.

3 An Econometric Model of Postal Service

The principal technical challenge presented by the less-than-ideal sample was to formulate a model that could be fit by standard econometric methods with adequate precision over the entire period from 1790 to 2019. It was also necessary that the model structurally conform to economic theory so that welfare could be calculated in the usual way as a sum of measurable surpluses.

Experimentation with variable definitions and equation forms resulted in the five-equation model shown in Table 1. The dependent variables of the five equations of the model are listed at the top of each table with the explanatory variables, parameter estimates and t-values listed vertically below. Selected goodness-of-fit statistics are at the bottom.

The model constitutes a simultaneous system of five equations; three of the explanatory variables are also dependent variables of other equations. However, the system is specified to be recursive so there are no causal feedback loops.[5] A recursive system can be solved by evaluating the equations sequentially.[6] The recursive

[5] A conventional model of the postal sector will normally be recursive because both postal prices and the postal network are taken as predetermined in the short run. This recursiveness has been retained by specifying the equations for Pricing and NPOs with explanatory variables that are all predetermined. Notably the model uses lagged rather than current average cost per piece in the Pricing equation.

[6] A sequence that works for the equations of Table 1 is to evaluate, first, the equations for NPOs and Price (using the previous year's cost per piece). Next, ln Price and ln NPOs are used to evaluate the

Table 1 AR-1 parameter estimates

	Ln per capita pieces	Ln real average rev. per Pc		Ln real expenditures	Ln number of post offices		Ln Postal Price Index
	Volume	ARP		Cost	NPO		Price
Explanatory variable	Coefficient (t-value)	Coefficient (t-value)	Explanatory variable	Coefficient (t-value)	Coefficient (t-value)	Explanatory variable	Coefficient (t-value)
Intercept	−0.316	−0.124	Intercept	0.739*	4.263**	Intercept	1.848**
	(−0.668)	(−0.237)		(2.296)	(5.634)		(8.859)
Ln Price Index	−0.303**	0.849**	Ln number of pieces	0.663**		Ln average cost/Pc Lag-1	0.498**
	(−4.852)	(31.117)		(6.168)			(8.715)
(Ln Price Index − Ln Price 2015)^2	−0.012	0.004	(Ln number of pieces − Ln pieces 2015)^2	−0.012		(Ln ACP Lag-1 − Ln ACP 2015)^2	−0.049
	(−0.339)	(0.283)		(−1.619)			(−0.803)
Ln real GDP per capita	0.372**	0.032	Ln number of places		0.597**	Ln real GDP per capita	−0.197**
	(3.687)	(0.609)			(3.281)		(−2.736)
Ln population per H'hold	−0.550	−0.330	(Ln number of places − Ln Places 2015)^2		−0.194**		
	(−1.304)	(−1.751)			(−7.630)		
			Ln Price of Inputs Index	0.288**	0.077		
				(2.419)	(0.817)		
Ln no of offices per 1000	0.458**	−0.042	Ln no of offices per 1000	0.220**		Ln no of offices per 1000	0.019
	(8.477)	(−1.831)		(3.197)			(0.409)
Ln city dlvry pts per 1000	0.110**	−0.051**	Ln city dlvry pts per 1000	0.100**		Ln city dlvry pts per 1000	0.061

	Ln per capita pieces	Ln real average rev. per Pc		Ln real expenditures	Ln number of post offices		Ln Postal Price Index
	Volume	ARP		Cost	NPO		Price
Explanatory variable	Coefficient (t-value)	Coefficient (t-value)	Explanatory variable	Coefficient (t-value)	Coefficient (t-value)	Explanatory variable	Coefficient (t-value)
	(2.868)	(−3.421)		(2.385)			(1.655)
Ln rural dlvry pts per 1000	0.235**	−0.039**	Ln rural dlvry pts per 1000	0.042	−0.111**	Ln rural dlvry pts per 1000	−0.009
	(8.965)	(−4.153)		(1.058)	(−5.226)		(−0.324)
Ln 1 + telecomm msgs per cap	−0.103	0.375**			−0.112**	Ln 1 + telecomm msgs per cap	−0.418*
	(−0.575)	(5.051)			(−4.470)		(−2.235)
			Postal savings system	0.071	−0.566**	Postal savings system	0.399
				(0.211)	(−2.472)		(1.145)
Home internet coverage	−0.048	−0.090	Mechanization/ automation	0.285	−0.359**	Mechanization/ automation	0.264
	(−0.291)	(−1.470)		(1.304)	(−3.762)		(1.182)
Ln active duty mil per 1000	−0.020	−0.015**	Ln active duty mil per 1000	−0.040**	−0.026**		
	(−1.626)	(−2.438)		(−3.311)	(−3.142)		
U.S. postal cards issued	0.381**	0.051	U.S. postal cards issued	−0.142	0.178**	U.S. postal cards issued	0.252*
	(3.389)	(1.146)		(−1.149)	(2.551)		(2.160)
Smartphone penetration	−0.779**	0.187**	Air transport	0.487**		Air transport	0.245
	(−3.821)	(2.538)		(2.759)			(1.933)

(continued)

Table 1 (continued)

	Ln per capita pieces	Ln real average rev. per Pc		Ln real expenditures	Ln number of post offices		Ln Postal Price Index
	Volume	ARP		Cost	NPO		Price
Explanatory variable	Coefficient (t-value)	Coefficient (t-value)	Explanatory variable	Coefficient (t-value)	Coefficient (t-value)	Explanatory variable	Coefficient (t-value)
Ln real deposits per capita	0.155**	0.042	Motor vehicles	0.673**	−0.264**	Postal Reorg. Act (1970)	0.149
	(3.549)	(1.912)		(4.279)	(−3.534)		(1.126)
Ln 2-day service range	0.384**	−0.047**	Ln 2-day service range		−0.289**	PAEA (2006)	0.001
	(10.066)	(−3.098)			(−8.574)		(0.007)
Startup of U.S. post	0.799	0.192	Startup of U.S. post	4.936**	−3.594**	Startup of U.S. post	−0.719
	(0.490)	(1.184)		(4.116)	(−12.897)		(−0.622)
Parcel post service	−0.077	0.243**	Parcel post service	−0.144	−0.008	Parcel post service	−0.319**
	(−0.780)	(7.031)		(−0.954)	(−0.102)		(−3.385)
Worksharing discounts	0.535**	−0.380**	Worksharing discounts	−0.190	−0.120	Worksharing discounts	0.147
	(4.215)	(−8.075)		(−1.137)	(−1.557)		(1.107)
Roland Hill reforms	0.093	−0.114	Roland Hill reforms	−0.493**	−0.107	Roland Hill reforms	−0.840**
	(0.794)	(−2.491)		(−3.671)	(−1.702)		(−8.386)
Zip code & zip + 4 addressing	−0.522**	0.160**	Zip code & zip + 4 addressing	0.054	0.123		
	(−3.038)	(2.453)		(0.191)	(0.902)		
Goodness-of-fit statistics			*Goodness-of-fit statistics*			*Goodness-of-fit statistics*	
Equation R-square (adjusted)	0.9917	0.9867	Equation R-square (adjusted)	0.9900	0.9937	Equation R-square (adjusted)	0.9249

	Ln per capita pieces	Ln real average rev. per Pc		Ln real expenditures	Ln number of post offices		Ln Postal Price Index
	Volume	ARP		Cost	NPO		Price
Explanatory variable	Coefficient (t-value)	Coefficient (t-value)	Explanatory variable	Coefficient (t-value)	Coefficient (t-value)	Explanatory variable	Coefficient (t-value)
Equation standard error	0.0621	0.0384	Equation standard error	0.0645	0.0557	Equation standard error	0.0711
Degrees of freedom	208	208	Degrees of freedom	210	211	Degrees of freedom	210
Predicted/observed comxrrel'n	0.9985	0.9933	Predicted/observed Correl'n	0.9989	0.9980	Predicted/observed Correl'n	0.9814
Prediction standard error	0.0848	0.0380	Prediction standard error	0.1074	0.0594	Prediction standard error	0.0956

*The coefficient is unequal to zero with statistical significance greater than 95%
**The coefficient is unequal to zero with statistical significance greater than 99%

structure may be exploited during estimation to eliminate errors in variables where dependent variables appear as explanatory variables in other equations.

Although the model is conventional in its representation of Demand and Cost, the model differs in important respects from a model (such as Pearsall, 2005, 2011) that one might fit to a sample composed of recent data. First, the model is specified at a greater level of aggregation with respect to the mail stream, the components of postal cost and the explanatory economic variables. Second, it is fit to annual rather than to quarterly or monthly observations. Third, the model is formulated on the assumption that both postal prices and the postal network are endogenous in the long run, hence the presence in the model of the unusual equations for NPOs and Price. And, fourth, the model includes a separate equation relating ARP to the price level. The ARP equation is needed to calculate consumers' surplus since the price variable is an index and not an actual unit value.

The equations are all specified in log form with respect to the dependent variable and many of the explanatory variables. This has the desirable effect of transforming the equations so that the errors are far less likely to be heteroskedastic. It also simplifies the economic interpretation of the coefficients. The coefficient of a logged explanatory variables is an elasticity that takes a fixed value over the sample period. The coefficient of an unlogged explanatory variable defines an elasticity that is an homogenous linear function of the explanatory variable.[7]

Each equation includes the square of the natural log (ln) of the principal explanatory economic variable in the equation centered on its value in 2015. For example, the demand (Volume) equation includes the term $\left(lnP - \ln \overline{P}\right)^2$. P is the deflated postal price index and $\overline{P}$ is the value of the price index in 2015. With this squared term in the equation, the price elasticity becomes a linear function of $\left(lnP - \ln \overline{P}\right)$ and the coefficient of lnP is the price elasticity of demand in 2015.[8] The presence of the squared terms allows the estimated elasticities, with respect to the principal economic variable in each equation, to vary over time.

The explanatory variables in the equations fall into three broad categories. First, the equations contain the variables that they require as theoretical constructs from economics. Second, variables have been included as needed to control for general economic and demographic conditions. And, third, the equations include variables that are designed to capture particular effects that are believed to be historically important. Many of these variables are suggested by a list of significant dates found in USPS (2020b).

Volume equation and the equation for ARP. Finally, NPOs and ln Volume may be inserted in the Cost equation to obtain ln Cost.

[7] Let $lnY = \alpha + \beta lnX + \gamma Z + \ldots$, the elasticities of Y with respect to the explanatory variables X and Z are $\partial lnY/\partial lnX = \beta$ and $\partial lnY/\partial lnZ = \gamma Z$, respectively.

[8] In general, let $lnY = \alpha + \beta lnX + \gamma\left(lnX - \ln \overline{X}\right)^2 + \ldots$, the elasticity of Y with respect to the explanatory variable X is $\partial lnY / \partial lnX = \beta + 2\gamma\left(lnX - \ln \overline{X}\right)$ which is just β when $lnX = \ln \overline{X}$.

The variables in the first category are listed and briefly defined as follows:

Ln Price Index – the natural logarithm (ln) of the deflated Tornqvist index of U.S. postal prices.
Ln Real GDP per Capita – the ln of the constant-dollar Gross Domestic Product (GDP) divided by the resident population.
Ln Number of Pieces per Capita – the ln of the annual number of pieces of mail divided by the resident population.
Ln Real Price of Postal Inputs Index – the ln of an index of postal input prices composed by joining price and wage indices for postal inputs from TFP (2018), postal and federal government employees from HSUS (2020).

The variables in the second category are:

Ln Population per Household – the ln of the resident population divided by the number of households.
Ln Number of Post Offices per 1000 – the ln of the number of post offices divided by the resident population.
Ln Number of Places – the ln of the number of places in the domestic U.S. with population exceeding 2500.
Ln Average Cost per Piece Lag 1 – the ln of the annual total postal expenditures divided by the number of pieces lagged 1 year.

Historically, the welfare derived from postal service has depended upon a collection of specific causes that are particularly relevant economic, geographic and technological conditions under which the postal system has operated, or are the result of various decisions regarding the scope and quality of service. The econometric model employs 20 measures of such effects winnowed from a somewhat longer list of possibilities.[9] Chronologically, with approximate initial dates, the effects are: Postal Service Startup (1789), Active Duty Military (1790), Second-Day Service Range (1790), Commercial Banking (1790), Roland Hill Reforms (1847), Telegraph (1850) and Landline Phones (1880), City Deliveries (1863), U.S. Postal Cards (1873), Rural Deliveries (1896), Motor Vehicles (1904), Postal Savings System (1910–1966), Parcel Post Service (1913), Air Transport (1931), Zip Code (1963) and Zip+4 Addressing (1983), Mechanization/Automation (1964), Postal Reorganization Act (1970–2006), Work-sharing Discounts (1976), Home Internet Coverage (1994), Smartphone Penetration (2005), and Postal Accountability and Enhancement Act (2007).[10]

For each effect, it was necessary to either find or construct a time series that would measure the impact of the effect over time. It was not satisfactory to simply define discrete (0,1) dummy variables using dates. In order to correctly represent the

[9] An example of an effect that was considered but not included in the final model is the reduction of residential deliveries from twice to once a day in 1950. When a suitable variable for this effect was included in the equations, the estimated coefficients were all statistically insignificant.

[10] Descriptions of the effects along with the definitions of the variables selected to represent them are given in the Appendix.

impact of any effect within the model it was necessary to describe the effect during a transition period following the initial date, and, where appropriate, following a termination date. Finding a suitable time series usually meant finding an historical series that could be expected to mirror the transition. Constructing a time series usually meant constructing an exponential path variable as described in Pearsall (2005).

How the effects variables were constructed is illustrated by the time series used to measure the impact of the Rowland Hill reforms and the Postal Reorganization Act of 1970. Around 1840 the Royal Mail adopted a set of three basic reforms proposed by Roland Hill. These reforms were: adhesive stamps would be sold to customers to be affixed to mailed items as payment; a single rate would apply for a standard letter to any domestic destination; and postage would always be paid by the sender. Congress adopted these British reforms sequentially beginning in 1847. The last reform was adopted in 1855. The variable that tracks these reforms is shown in the upper half of Fig. 1. Prior to 1847 the variable is assigned the value of zero indicating no effect. In the interval from 1847 to 1862 the variable is derived from U.S. postal records of the sale of stamps and stamped envelopes. After 1862 stamp sales declined so the variable is assigned the value of one on the assumption that the reforms by then were fully effective.

The regulatory regime introduced by the Postal Reorganization Act was in force from 1970 to 2006. Two exponential paths are joined to represent the effects of the Act. Following Pearsall (2005) the paths are constructed to represent a continuous proportional adjustment over time at a fixed annual rate. The first path begins at zero with the passage of the Act in 1970 and grows exponentially towards a limiting value of one. The second path begins in 2007 and declines from a value that has almost reached one back down toward zero. Both paths are parameterized by an annual rate of adjustment of 0.313. This rate maximizes the combined likelihood of the five AR-1 estimates and is used to construct exponential paths for several of the other effects listed above.

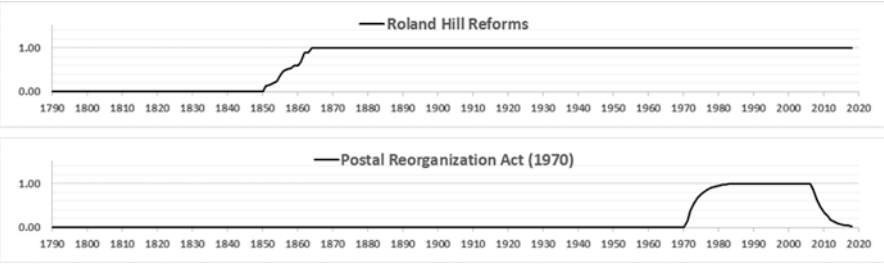

Fig. 1 Illustrative Postal Effects Variables

4 The Estimates

Three methods were used to estimate each of the equations shown in Table 1.[11] The methods correspond to different ways of dealing with serial correlation of errors and non-stationarity of time series. The alternative methods are: Ordinary Least Squares (OLS), the Cochrane-Orcutt method with OLS residuals used to fit the auto-regressive process (AR-1), and the Vector Error Correction model for non-stationary time series. With the OLS estimates used as the cointegration equations (VEC). The estimated coefficients, t-values and selected goodness-of-fit statistics are shown for each equation in Table 1.

The OLS estimates are consistent, however, the Durbin-Watson d-statistics indicated that all of the OLS equations had positive serially correlated errors. This means that the t-values and goodness-of-fit statistics would tend to overstate statistical accuracy. Both AR-1 and VEC estimates correct this flaw, but they do so in very different ways.

All three sets of estimates fit the time series for all five dependent variables quite well. The OLS and AR-1 estimates are quite similar. The VEC estimates are somewhat different in that they describe short-run movements toward a long-run equilibrium presumed to be described by the OLS equations. On purely statistical grounds, the AR-1 estimates are uniformly superior to the VEC estimates. Therefore, the graphs and discussion of results in the remainder of the paper are derived from the AR-1 estimates. None of the general findings would have been substantially changed by relying instead on the OLS and/or VEC estimates. Only the AR-1 estimates are shown in Table 1.

The estimates paint a picture of economic behavior that is remarkably stable over a period of 230 years. This can be seen by plotting the time paths of the principal behavioral parameters as is done in Fig. 2. Only two of these paths display any significant variation over time. The volume variability[12] from the estimates descends from a value close to one to a value (approx. 0.63) that is not significantly different from the average (approx. 0.59) seen in current USPS cost accounting. The elasticity of NPOs with respect to the number of places with more than 2500 residents decreased over time as the U.S post steadily increased the population served by individual offices. Otherwise, the values of the parameter estimates displayed in Fig. 2 are surprisingly similar to values that are used by the PRC and USPS to characterize modern postal operations. Aggregate postal demand is inelastic with respect to postal prices (approx. −0.30), and ARP is somewhat less than unit elastic with respect to postal prices (approx. 0.85). Therefore, demand is inelastic with respect

[11] All of the estimates were made within an Excel workbook. The workbook is documented and is designed to be used interactively to explore the consequences of different choices of variable definitions, estimation methods and treatments of observation errors. A copy of the workbook may be obtained on request.

[12] Volume variability is defined as the elasticity of variable cost with respect to volume. The model treats all costs as variable as is appropriate in the long run.

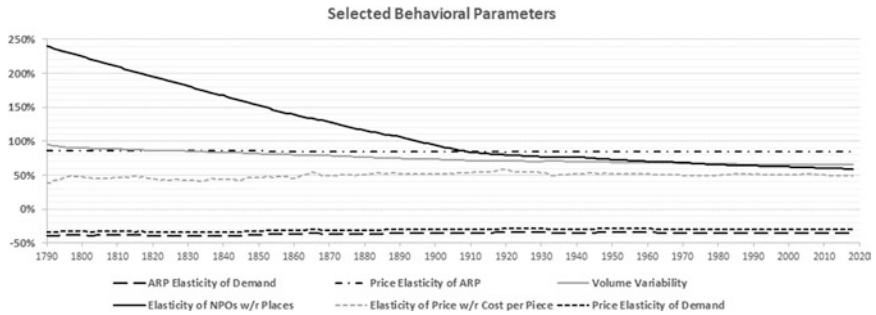

Fig. 2 Time Paths of the Basic Parameters

to ARP (approx. −0.35). Finally, it is no surprise that postal prices respond only partially to changes in postal costs. The elasticity of the price index with respect to lagged unit cost is quite low (approx. 0.46), showing that the postal price level has not been very responsive historically to changes in cost.[13]

The coefficient estimates of the variables shown in Table 1 are the estimated values of the behavioral parameters as of 2015. These estimates all have very high t-values. The coefficients of the corresponding squared terms determine the changes these elasticities undergo over time. Only one of these coefficients, the coefficient of (ln number of places – ln places 2015)^2 in the NPOs equation, is significantly different from zero. The ARP elasticity of demand is the Price elasticity of demand divided by the Price elasticity of ARP.

5 Estimating Social Welfare

The components of social welfare are consumers' surplus and producers' surplus. Each is measured at a point corresponding to a set of specific values for the variables of the model, for example, a point derived from historical data for a particular year. Producers' surplus at such a point is just the excess of postal revenue over cost, i.e., the net gain (or minus the net loss) from providing postal service. Consumers' surplus is the net value of postal service to consumers. It is obtained by positioning and integrating the inverse demand equation and then subtracting postal revenue. Geometrically, it is calculated as the area under the demand curve lying between the vertical axis and the number of pieces minus postal revenue. This calculation was made using a linearization of the demand function at a point corresponding to the price level and predicted demand.

The calculation of welfare may be shown using a simplified version of the model consisting of just the equations for Demand, ARP and Cost. The postal price level, P, and the number of post offices may be treated as predetermined due to the

[13] This result reinforces a conclusion reached by Kennedy (1957).

recursive structure of the model. The equations are fit to a specific solution at a point "0" for which the price level, P_0, the number of pieces, Q_0, the ARP, R_0, and Cost, C_0, are all determined. The equations are represented as log linear with fixed elasticities as follows:

Demand: $Q = Q_0(P/P_0)^{\alpha}$, α=elasticity of demand w/r price.
ARP: $R = R_0(P/P_0)^{\beta}$, β=elasticity of ARP w/r price.
Cost: $C = C_0(Q/Q_0)^{\gamma}$, γ=volume variability of cost (elasticity of cost w/r quantity).

The producers' surplus is $RQ - C$. The values for R, Q and C are obtained from the three equations given P. Calculating the consumers' surplus requires some additional manipulation.

We solve the ARP equation for $P/P_0 = (R/R_0)^{1/\beta}$ and substitute in the demand equation to get $Q = Q_0(R/R_0)^{\alpha/\beta}$, with α/β= elasticity of demand with respect to ARP. Next, we solve the demand equation for R to obtain the inverse demand equation, $R = R_0(Q/Q_0)^{\beta/\alpha}$. Finally, we linearize the inverse demand equation as follows: $R = (Q - a)/b$ with $a = (1 - \alpha/\beta)Q_0$ and $b = (\alpha/\beta)Q_0/R_0$. Consumers' surplus is $\int_0^Q \left[\left(X - a\right)/b\right]dX - RQ = Q^2/2b - aQ/b - RQ$. Social welfare is the sum of the two surpluses: $Q^2/2b - aQ/b - C$.

Figure 3 displays the results of making the welfare calculations above using the historical record. For any given year the elasticity estimates, the level of postal rates and the values of all other variables are taken directly from the data series used to fit the model. The annual surpluses and welfare are calculated in constant (2015) dollars and divided by the resident population.

The predominant component of welfare has always been consumers' surplus. In contrast, producers' surplus is much smaller in magnitude and frequently negative. We see that the welfare contribution of the U.S. post was quite small prior to about 1870. This does not mean that postal service was unimportant. However, one must look beyond the economics in those years to the essential political and governmental contributions of the U.S. post. Welfare per capita grew gradually but steadily

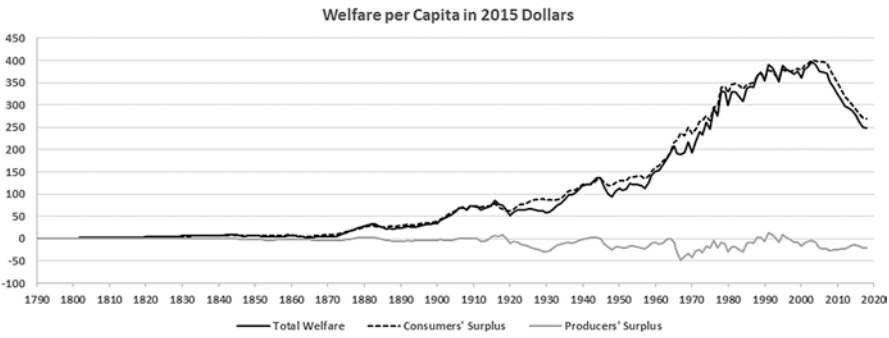

Fig. 3 Time Paths of Welfare and Its Components

between 1870 and about 1955, reaching a level of around $100. Welfare per capita grew rapidly from about 1955 to around 1975 and gradually thereafter reaching a peak of about $400 in 2005. Welfare per capita has been declining rapidly since 2005. So postal service in the U.S. is an industry currently in historical decline, although it still makes a substantial contribution of around $250 per capita.

The graphs in Fig. 3 exhibit the cumulative results of many different effects captured by the explanatory variables of the model. The Rowland Hill reforms described in Sect. 3 are an example of a single effect that is represented by a variable (shown in Fig. 1) that is included in all five equations. The procedure for estimating the welfare contribution of a single effect is to hypothesize counter-factual values for the effect's variable, estimate social welfare as described above using the counter-factual values, and then calculate the differences in welfare from the historical time path exhibited in Fig. 3. This comparison can be made individually for producers' and consumers' surplus. It is also possible to make the comparison with and without the postal price reaction described by the Price equation.

Figure 4 exhibits the differences in welfare and its components for the Rowland Hill reforms. The counter-factual value for the effect variable in all years is zero. The differences are traced over time and expressed as percentages of GDP. The graphs labelled "Producers' Surplus Difference" and "Consumers' Surplus Difference" are differences in surpluses calculated for all years using the observed level of the postal price index. "Welfare Difference" is the sum of these two surpluses. The differences labelled "Producers' Surplus from Prices" and "Consumers' Surplus from Prices" are the additional surpluses that are generated when the price level predicted by the Pricing equation for the counter-factual effect variable is used to calculate the surpluses. "Surplus from Pricing Effect" is the sum of these two additions. The total difference in welfare from all sources is the graph labelled "Combined Surplus".

We can see that the Roland Hill reforms had complex and lasting effects that mostly increased the total welfare derived from postal service. First, the reforms moderately reduced postal demand at historic prices. This resulted in a moderate loss of consumers' surplus in all years after the reforms took effect. Second, the reforms greatly reduced postal costs while not seriously reducing revenue.

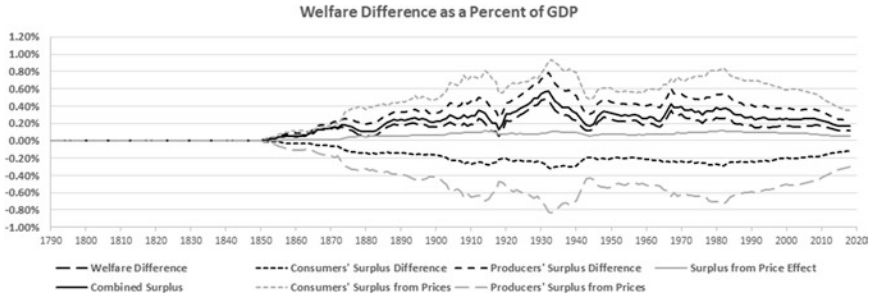

Fig. 4 Welfare Effects of the Rowland Hill Reforms

Consequently, the reforms caused a large increase in producers' surplus at historic prices. The result of these changes was a large contribution to welfare in the form of producers' surplus offset by a much smaller decrease in consumers' surplus. According to the Pricing equation the Rowland Hill reforms also caused a reduction in the level of postal prices. This price decrease produced large-but-offsetting changes in producers' and consumers' surpluses, so the net result was only a small contribution to welfare from pricing changes. Altogether the combined surplus difference is only slightly larger than the welfare difference calculated with prices fixed.

6 Alternative Pricing Strategies

The method for estimating welfare differences was applied to several alternative strategies for setting postal rates within a regulatory setting. The alternatives correspond to setting ARP equal to the historical real ARP, to marginal cost, to average cost, to ARP as predicted by inserting the historical price in the ARP equation and to 1.5 times the predicted ARP. The price index corresponding to the assumed ARP was then found by solving the ARP equation.

The resultant prices are graphed as time series in Fig. 5. The price index for "Predicted ARP" is just the observed postal price index and corresponds to whatever strategy was actually followed. "Observed ARP" is a price set to recover the historically observed ARP. These prices differ very little from the observed price index because of the excellent fit of the ARP equation. The "Marginal Cost" prices are the prices that would have maximized the social welfare derived from postal service in each year. With these prices, there is a revenue shortfall that would have required a government subsidy for postal service. The "Average Cost" prices are breakeven prices that would have equated annual costs to revenues as is done with Ramsey/Boiteux pricing. The prices labelled "Predicted ARP + 50%" are prices that are hypothesized for a strategy that treats the postal monopoly as a source of government revenue. These prices would have exploited the postal monopoly to yield a net surplus in all years.

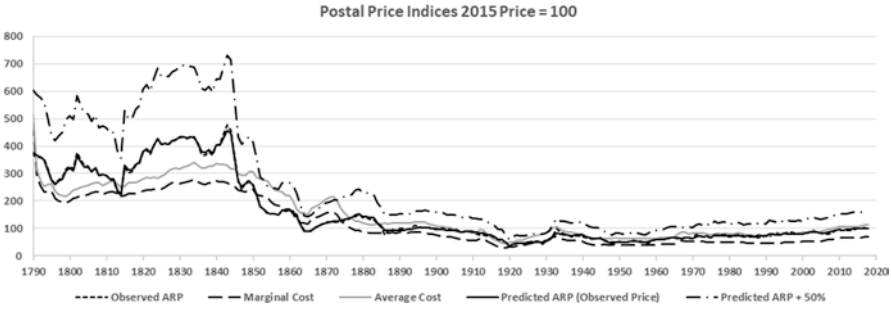

Fig. 5 Time Paths for Pricing Strategies

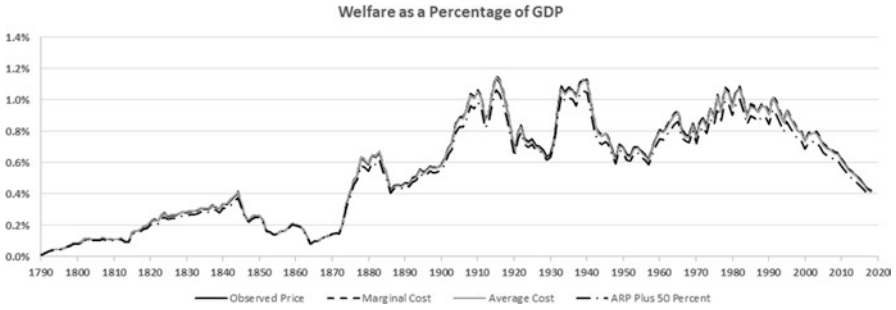

Fig. 6 Welfare for Pricing Strategies

Social welfare for the several pricing strategies is tracked in Fig. 6. Note: the tracks for "Observed ARP" and "Predicted ARP" are indistinguishable. The major lesson to be learned from the near-coincidence of the tracks is quite simple – pricing has little effect on total welfare. The "Marginal Cost" strategy maximizes welfare in all years but is not appreciably better than the "Average Cost" strategy or whatever strategy was followed to set historical rates. Even a strategy designed to yield a surplus does not produce much of a sacrifice in welfare.

The reason for the evident unimportance of pricing is the inelasticity of postal demand. If demand had been perfectly inelastic with respect to ARP, then the effects of a price change would have been entirely compensatory. Increases in producers' surplus would have been exactly matched by decreases in consumers' surplus and vice versa. As it is, with an ARP elasticity around −0.35, the magnitude of the changes in consumers' surplus is only slightly larger than the magnitude of corresponding changes in producers' surplus.

7 The Evidence for the Findings

The equations of the model include explanatory variables intended to represent both general economic conditions and postal-specific effects. The variables of the first kind are GDP per capita, the price index for postal inputs, the average population per household and the number of places. There is virtually nothing unexpected about the estimated coefficients of these variables in Table 1.

The findings with respect to the specific effects were reached somewhat subjectively by examining graphs. These graphs included figures (found in the Appendix) similar to Figs. 1 and 4 for each of the 20 effects listed in Sect. 3, and comparisons of total surplus differences as percentages of GDP.

Commercial banking as measured by deposits per capita appears to be the most important of several general conditions under which the U.S. post has historically operated. The role of the postal service in supporting billing and payment may explain large welfare differences associated with commercial banking activity.

Welfare also appears to be strongly dependent upon the speed at which mail can be moved. The measure of speed is the maximum distance that a piece of first Class mail may be transported between cites and be delivered on the second business day. This distance is determined by the fastest mode of intercity passenger transportation (ship, overland road, rail, interstate highway and/or air) available at the time.[14] The third effect is associated with military activity and is represented by the share of the population in military service. Small downward dips in welfare occur during the nation's major wars. In wartime one would expect an increase in postal volume as service men and women use the mail to communicate with family and friends. However, military service also depresses volume by substituting public for private consumption. The evidence from the model is that the net effect on welfare is mildly negative.

User costs are the value to postal customers of the time and effort it takes to use the mail. These costs act on demand like additions to postal prices but do not contribute to postal revenue. Three of the effects (city delivery, rural delivery and the Rowland Hill reforms) reduced user costs; adding the Zip code and Zip+4 addressing requirements raised user costs. Two effects, city and rural deliveries, also track major extensions of the postal network. City deliveries began in 1863 and are tracked using possible city delivery points (after 1952) and estimates derived from the number or urban residents (before 1953). Rural free deliveries began in 1896 and are tracked using rural delivery points (after 1915) and estimates derived from the number of rural residents (before 1916).

For all of the effects the equation fits indicate that the direct impact on demand was more-or-less offset by secondary changes in the number of post offices (NPOs). Reducing NPOs decreases postal demand because it increases user costs. There were also important impacts on ARP, postal cost and pricing. As a result of these many conflicting influences there is little consistency among the welfare changes for the effects. As noted in Sect. 4, the Roland Hill reforms appear to have substantially raised total surplus. So too did the extension of delivery service to rural addresses. However, the earlier extension of delivery service to city addresses apparently had a negative impact on welfare. The difference can be explained partly by a difference in user costs. The rural extension probably saved rural customers far more time and effort per piece than the city extension saved urban customers who mostly resided close to their local office. It also may be that the extensions to both urban and rural customers were less costly than might have been expected because the service simultaneously reduced the number of post offices. Finally, the various impacts on welfare of Zip code and Zip+4 addressing derived from the model are almost a wash leaving little net change in welfare.

Since 1790 there have been many postal product introductions to the original categories of (1st-Cls) letters and periodicals (2nd-Cls). Two of these introductions, post cards (and 3rd-Cls) in 1873 and Parcel Post in 1913, produced almost identical

[14] This variable was the end result of an extensive exploration of passenger travel speeds from New York City to various national destinations by different modes of travel in selected years spaced approximately 20 years apart.

strong increases in estimated total surplus. However, the composition of the surpluses is somewhat different in each case. With post cards, the larger contribution was from consumers' surplus because of an increase in demand. With Parcel Post, the larger contribution was from producers' surplus because of an increase in ARP. Work-sharing discounts created new postal products by unbundling component services for processing and transportation beginning in 1976. These unbundlings appear to have had little effect on any of the surpluses composing welfare.

Since 1790 mail service in the U.S. has operated as a near-monopoly against a background of gradually encroaching indirect competition. This competition has taken a number of forms associated with different communications technologies including the telegraph, landline telephones, the Internet and smart phones. The Demand equation estimates show that the appearance of all of these competitors decreased postal volume. However, the effects on welfare were varied. The negative impact on welfare of smart phones was somewhat larger in magnitude than the negative impact of the Internet. And the impact of the telegraph and landline phone service was to increase welfare despite the negative impact on demand. A possible explanation for this counter-intuitive result is that the spread of telecom service increased ARP by selectively diverting short messages over short distances. This selective diversion would have left the postal service with a mail stream that was heavier per piece and transported longer distances, thus raising the APR without having much effect on postal cost.

There have been many technological changes over the years in the ways that the postal service processes, transports and delivers the mail. Three such changes are associated with motor vehicles, air transport and automated/mechanized mail handling equipment. Each of these technological changes presented the U.S. post with an opportunity to increase producers' surplus by reducing postal costs. However, it is likely that they reduced welfare. A possible explanation for this perverse result is that the new technologies proved to be expensive replacements for older-but-cheaper technologies that had become unavailable. Motor vehicles travelling paved roads replaced horse drawn wagons on unpaved roads. The motor vehicles were owned, maintained and fueled by the postal service while the horses were typically owned and kept by the carriers themselves. Air transport eventually replaced rail transport for most expedited mail over distances beyond about 600 miles. Rail service using passenger trains may have remained cheaper and better for distances under 1000 miles but gradually became unavailable as passenger rail succumbed to competition from the airlines. Mechanization and automation required expensive investments in equipment in order to replace manual mail processing labor which may have become relatively expensive as real wages rose.

Postal service in the U.S. has undergone many organizational changes since 1790. Initially, the national postal service was created by federalizing a collection of local and regional posts. The U.S. post was not made a government department until 1875. It was reorganized as a government-owned corporation by the Postal Reorganization Act of 1970. The Act's principal effect was to transfer authority for postal pricing from Congress to the newly-created PRC. Most recently, the regulatory system was revised by the Postal Accountability and Enhancement Act (PAEA)

of 2006. PAEA's main feature is a set of price caps that effectively prevent rates for "market-dominant" categories of mail from increasing more rapidly than the CPI. Between 1910 and 1966 the postal service operated the Postal Savings System, a limited-service bank which used selected post offices to transact with the public. The effect on welfare of all of these changes was found to be negligible. Furthermore, the positive effect of the Postal Savings System on postal prices suggests that the system was cross-subsidized.

8 Conclusion

The research reported in this paper applied a mundane method of economic analysis to a problematic sample. The method of analysis was to fit a conventional econometric model of the U.S. postal sector, and then to use the model to make comparative calculations of welfare for counter-factual scenarios. The sample consisted of annual observations of postal and related variables spanning the 230 years from 1790 to 2019. The time series were cobbled together from U.S. historical statistics that are typically inaccurate, sometimes inconsistent, and rarely complete. The scenarios were selected to explore the effects on welfare of changing economic and demographic conditions, postal pricing strategies, the available technology, regulation and various historical initiatives undertaken to alter and extend service.

Perhaps the most interesting question addressed and answered by the research is whether a suitable structural model could even be specified and fit using a sample derived from the available data. The answer appears to be "yes", U.S. historical data can be used to fit a statistically robust structural model. The goodness-of-fit statistics confirm that all five of the model's equations fit the sample quite closely. The coefficient estimates lie well within the ranges prescribed by economic theory and roughly agree with prior expectations. Most of the estimates are statistically significant or nearly so. And, the choices made regarding the forms of the equations, the variable definitions and the assumed properties of the errors are not in serious conflict with the results.

Nevertheless, the estimates and findings should be regarded with more-than-usual caution because of the many liberties that have been taken with the data. To join incomplete series, unverifiable assumptions have been made about how the series relate and match in overlapping years. To fill gaps in the series, spans as long as 15 years and, frequently, spans of 2–5 years have been linearly interpolated. To obtain variables to represent effects, the record has been mined heroically and many alternatives explored. And, it has been assumed that several of the effects took hold over time along exponential paths parameterized by a common fixed rate of adjustment. All of this and more contributes to errors of observation and specification that the econometrics mostly ignores.

Unfortunately, there is no way to turn back the clock to redefine, recollect and reassemble the data as we would like it to be. We must take and use the historical record as we find it. Nevertheless, the research may serve as a useful template for

applying econometrics to historical statistics. The specific findings with respect to the welfare contribution of the U.S. post far exceed anything that can be learned just from casual inspection of the record. Furthermore, the research scarcely begins to exploit the potential for discovery that apparently lies buried within the historical statistics of the U.S.

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The Risks of Customer Data Processing Under the GDPR: The Austria Post Case

Alessandra Fratini

1 Introduction

On 23 October 2019,[1] the Austrian data protection authority (Datenschutzbehörde, "DSB") imposed a fine of €18 million on Österreichische Post AG ("Austria Post") for various violations of the EU General Data Protection Regulation ("GDPR").[2] The DSB established that Austria Post had unlawfully processed customers' data to extrapolate "political affinity" (i.e., presumed voting behavior), which was then sold to political parties for targeted advertising. In addition, according to the DSB, Austria Post had further processed data on package frequency and frequency of relocations for the purpose of direct marketing in the absence of a legal basis. The fine, which is not final as Austria Post has challenged the DSB's decision ("Decision") before the Federal Administrative Court (Bundesverwaltungsgericht),[3] was at the time of issuance the largest ever imposed in Austria for GDPR infringements.

[1] European Data Protection Board, "Administrative criminal proceedings of the Austrian data protection authority against Österreichische Post AG", 23 October 2019, available at: https://edpb.europa.eu/news/national-news/2019/administrative-criminal-proceedings-austrian-data--protection-authority_en. The decision is not published; a copy was obtained, upon request, by the DSB in the original language; an unofficial translation was used for the purposes of this paper.

[2] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation), OJ L 119, 4.5.2016, p. 1

[3] Following the discussion of the paper, the Federal Administrative Court (BVwG) released a press release on its judgments on the case (https://www.bvwg.gv.at/presse/Datenschutzverfahren_Oesterreichische_Post.htm). On one hand, the BVwG confirmed that the processing of "party

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The paper reviews the DSB's analysis of Austria Post's processing of customer data and assesses the relevant implications for the postal operators' direct marketing processing activities. The DSB decision touches upon the type of data being processed ("special categories of data" under Article 9 GDPR, parcel and relocation frequency data), the applicable legal bases (consent, legitimate interest, performance of a contract, performance of a task carried out in the public interest), and the importance of the impact assessment exercise and the public service mission entrusted to Austria Post.

Moving from the Decision, the paper considers the elements to be taken into account when processing customer data (personal/not personal) for marketing purposes and the respective limits of relying on legitimate interest or other legal bases, in particular in relation to further processing of those data. It then draws conclusions on adequate compliance from a postal operator's perspective, under the GDPR and the applicable national rules.

The paper is organized as follows: Section 2 looks at the DSB Decision with a focus on the two contested processing activities and the internal responsibilities. Section 3 examines the main lessons that can be drawn on the postal operators' processing of personal data for marketing purposes. Section 4 concludes.

2 The DSB Decision

Austria Post was charged by the DSB for having unlawfully processed customers' data relating to political "party affinity," and correlated with frequency of package deliveries and relocations for direct marketing purposes. That processing was carried out by Austria Post in the context of its activities as an address publishing house (*Adressverlag*) and direct marketing company (*Direktmarketingunternehmen*) pursuant to §151 Austrian Trade Act (*Gewerbeordnung*, "GewO").

2.1 The Processing of 'Party Affinity' Data

According to the DSB's findings on facts, Austria Post's practice of selling to direct marketing companies both purchased and self-collected target group addresses dated back to 3 April 2001. These personal data also included the so-called "affinities," which were calculated by Austria Post by using a marketing analysis process. The marketing classifications were based on socio-demographic criteria such as

affinity" data without the consent of the data subjects was unlawful (*Teilerkenntnisse* W258 2,217,446–1/15E and W258 2,217,446–1/35E); on the other, the BVwG annulled the fine imposed by the DSB and terminated the criminal proceedings based on a formal error – i.e., the DSB had failed to name a natural person to which the unlawful behaviour of Austria Post could be attributed (*Erkenntnis* W258 2,227,269–1/14E).

gender, age, place and type of residence, education, marital status, willingness to travel, cultural and leisure activities, online shopping, income, purchase power, etc. An algorithm was developed in 2015 to calculate, among other things, the probability with which people with certain social demographic characteristics in certain regions would have advertising interests in certain political parties ("party affinities"). These affinities were a calculated probability of a person's interest for advertisement by a given political party based on regional election results, socio-demographic information and opinion polls. Individuals were assigned to the marketing groups and thus to the "party affinities" and other affinities calculated by Austria Post based on their regional and social-demographic characteristics.

This processing ended in February 2019. Before then, Austria Post concluded contracts with two political parties for the monthly transmission of "party affinity" data.[4] In terms of data protection compliance, Austria Post based the processing of personal data for marketing purposes on §151 GewO and Article 6(1)(f) GDPR, i.e., on legitimate interest. While political opinions are undoubtedly a "special category of personal data" within the meaning of Article 9 GDPR, the DSB noted that Austria Post had concluded, in its data protection impact assessment, that there was no processing of special categories of personal data.[5] In addition, neither Austria Post's website, nor the forms with which personal data were collected contained information about the processing of special categories of personal data for direct marketing purposes, and no consent was obtained by customers in that respect.

Austria Post argued first that the data at issue were not 'information about' the person concerned but mere extrapolations. In fact, since personal information was collected via anonymized opinion polls and then used for statistical projections, their results did not show the actual political opinions of the persons concerned. Austria Post maintained that information extrapolated and sold were only the result of the intersection of statistical values, not information "about" a person within the meaning of Article 4(1) GDPR. Austria Post demonstrated that "party affinity" (as a statistical value) of an individual changed following their change of address, or based on their main or their secondary residence, while their political opinions would not likely change because of the move.

The DSB dismissed Austria Post's stance on the nature of the data, finding that, although statistically extrapolated, data on political affinity were attributed to specific persons, identifiable by name. As such, those data were "personal data" within the meaning of the GDPR. That was also confirmed by the fact that the "party

[4] See p. 1.12 of the Decision: "*Das Selektionskriterium der sogenannten „Parteiaffinitäten" wurde von der XYAG an politische Parteien, jedenfalls an SPÖ und ÖVP im Zeitraum von 16.04.2015 bis 18.11.2018, übermittelt*".

[5] Under Article 35(1) GDPR, "[*w*]here a type of processing in particular using new technologies, and taking into account the nature, scope, context and purposes of the processing, is likely to result in a high risk to the rights and freedoms of natural persons, the controller shall, prior to the processing, carry out an assessment of the impact of the envisaged processing operations on the protection of personal data". Article 35(3)(b) makes it clear that a data protection impact assessment shall in particular be required in the case of "processing on a large scale of special categories of data referred to in Article 9(1)".

affinity" data were included in the database extracts that were disclosed to data subjects as part of the provision of information in the context of responses to requests for data access under Article 15 GDPR. Were those not personal data, there would have been no need to disclose them because the GDPR would not be applicable.[6] In addition, the purpose of that data processing was personalized advertisement, which would not be possible in the absence of clear personal references. In any case, two political parties had concluded contracts for valuable consideration to receive monthly datasets on party affinities of individuals at the address level: the parties' interest in the political preferences of individuals was to target potential voters (or non-voters) of the respective political group with their political messages. Otherwise, these buyers could have used publicly accessible statistical evaluations without purchasing datasets for a fee.

The DSB also recalled that the term "personal data" must be interpreted broadly. According to the case law of the Court of Justice of the EU, the term is not restricted to information that is sensitive or private, but potentially encompasses all kinds of information, not only objective but also subjective, in the form of opinions and assessments, provided that it 'relates' to the data subject.[7] The WP29 Opinion on the concept of personal data (2007) also makes it clear that, for information to be personal data, it is not necessary that it be true or proven. Even invented (e.g., estimated, forecast) data are personal data if assigned to a real person. The Decision extensively quotes the case law and decision-making practice of the Constitutional Court, the former Data Protection Commission and the German Federal Constitutional Court on the relationship of statistical data to personal data.[8]

For the DSB, the fact that the supposed political affinity had no link with individuals' behavior (i.e., changed with change of address) was irrelevant, as the correctness of the data, from a data protection perspective, depends on their purpose. In this respect, the statement assigned to a particular person (e.g., high likelihood ÖVP), even if derived statistically, was correct in the above sense and in any case contained a statement about that person. The purpose of this data was precisely to provide the buyers of the data sets with statements about specifically named persons about their party preferences, so that they could be targeted with (electoral) advertising. In conclusion, even if, as argued by Austria Post, the data had their origin in anonymous surveys, due to their assignment to specific individuals they were not just statements aggregated into a statistical analysis, but statements about identified

[6] The DSB dismissed the "over-performance of its duties" justification by Austria Post in that respect, as Article 15(1)(b) GDPR confers to the data subject a right to information about the categories of personal data concerned by the processing. It cannot be left to the person concerned to assess which of the data categories in question actually are of a personal nature (see p. 2.2.1. of the Decision).

[7] Judgment of 20 December 2017, case C-434/16, Novak, ECLI:EU:C:2017:994, p. 34.

[8] Data relating to a (identified or identifiable) person must be considered personal, even if incorrect or invented, e.g. estimated, forecasted (Ziebarth (2017)). The same applies to probability statements relating to people, regardless of whether they relate to issues in the past, present or future (Ernst, 2017).

individuals (by first and last name, date of birth and address), and that was processing of personal data within the meaning of Article 4(1) GDPR.[9]

In addition, the DSB held that party affinity qualified as a special category of personal data within the meaning of Article 9 GDPR.[10] In this regard, in fact, for Article 9 to be correctly interpreted, it is not only data that directly reveal the features listed in Article 9 (political opinions, for what matters here) that are subject to special protection, but also indirect references to those features. In the case at issue, what mattered was not how the assignment of the "party affinities" to persons identified by name was classified and presented by the controller[11] ("average probabilities for a marketing group"), but rather the information content that was revealed in that specific processing context, according to the understanding and interpretation of the average recipient. For the DSB, the political party recipients of the data sets received a clear picture - even if only expressed in probability values - of the political preferences of the individuals concerned. If Austria Post's argument were valid, every controller could easily circumvent the scope of the GDPR by using statistical procedures and creating a *sui generis* data, which is excluded from the GDPR, for the classification of identified or identifiable persons.

As to the lawfulness of the processing, the special categories of data under Article 9 can be processed only against the legal bases listed in paragraph 2 thereof. No valid consent was searched and obtained by Austrian Post because the controller was of the opinion that data concerning political affinity were not personal data. Based on Article 9(2)(g) GDPR, which refers to "reasons of substantial public interest, on the basis of Union or Member State law which shall be proportionate to the aim pursued, respect the essence of the right to data protection and provide for suitable and specific measures to safeguard the fundamental rights and the interests of the data subject," the DSB also looked at section 151(4) GewO, according to which an express consent is required for processing for marketing purposes by third parties, in terms substantially similar to those under Article 9(2) GDPR.

As a result, the DSB concluded that Austria Post had unlawfully processed special categories of personal data within the meaning of Article 9(1) GDPR by

[9] For the DSB, the existence of personal data was also supported by the finding of the civil court at first instance (judgment of Landesgerich Feldkirch of 7.8.2019, GZ 57 Cg 30/19b). The LG Feldkirch awarded the plaintiff non-material damages according to Article 82 GDPR in the amount of €800, having Austria Post's unlawful processing of his party preferences "disturbed" the plaintiff. It shall be noted that, in appeal, the Higher Regional Court of Innsbruck (Oberlandesgericht Innsbruck) dismissed the claim for non-material damages (judgment of 13.2.2020, 1 R 182/19b).

[10] "Processing of personal data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or data concerning a natural person's sex life or sexual orientation shall be prohibited".

[11] Under Article 4(7) GDPR, "'controller' means the natural or legal person, public authority, agency or other body which, alone or jointly with others, determines the purposes and means of the processing of personal data; where the purposes and means of such processing are determined by Union or Member State law, the controller or the specific criteria for its nomination may be provided for by Union or Member State law".

processing data relating to the supposed political affinity of those concerned without their consent, thereby infringing Article 5(1)(a) on the principles relating to processing of personal data ("lawfulness, processing in good faith, transparency") and the processing ban under Article 9(1) GDPR. In addition, by having concluded in its data protection impact assessment that no special categories of personal data were processed within the meaning of Article 9 GDPR, and having made an incorrect assessment of the risks to the rights and freedoms of data subjects within the meaning of Article 35(7)(c) GDPR, Austria Post had provided an incorrect data protection impact assessment. However, with regard to the degree of culpability, the DSB conceded the conduct was merely negligent, since it was the consequence of the misjudgment of the quality of the party affinity data.

Furthermore, the DSB held that Austria Post's records of processing activities did not comply with Article 30(1)(c) GDPR, which requires that these records include, among other, a description of the categories of data subjects and the categories of personal data. Austria Post failed to provide the required lists in sufficient detail. In fact, as explained at p. 7.5 of the Decision, the records of processing activities must clearly state whether and which (special) categories of personal data are processed. The processing records are used by controllers to demonstrate compliance with the processing principles of Article 5(1) GDPR and must subsequently enable the Supervisory Authority to get a clear picture of the actual processing operations, in order to be able to check their legality. The mere reference to "marketing data" is too abstract and, as such, does not meet the requirements of this provision.

2.2 The Processing of 'Package Frequency Affinity' and 'Relocation Affinity' Data

The DSB observed that, since January 2016, Austria Post had processed package frequency and relocation affinity data, originally collected by the parcel delivery business area for operational purposes and for direct marketing purposes. Data on packages frequency (number of packages received by a given person within a certain range of time) past forwarding orders and relocations were statistically evaluated by the direct marketing division to calculate the likelihood of a new delivery to the same address and of a move at that address. The information was collected for shipment tracking and mail forwarding services. If customers did not wish their relocation data to be used for marketing purposes, active objection was required.

With regard to the legal bases for the processing of package and relocation affinity data, the DSB acknowledged that the data were collected in connection with the commercial provision of postal services. Recalling that Austria Post is the designated universal service provider under §6 Austrian Postal Law, the DSB noted that, in connection with the universal service, the legal basis for processing would be Article 6(1)(e) GDPR ("processing is necessary for the performance of a task carried out in the public interest"), read in conjunction with the relevant provisions of the Postal Law. Further, Austria Post processed data for the performance of delivery

contracts with its customers under Article 6(1)(b) GDPR and also on the basis of a legitimate interest within the meaning of Article 6(1)(f) GDPR, e.g., to enforce or defend against claims in connection with services provided.

As noted at p. 6.6 of the Decision, as a result of its activity as universal service provider, Austria Post necessarily has at its disposal a large amount of personal data that it can only access (the DSB qualifies that as "*privilegiert*") on the basis of its universal service obligations arising from the Postal Law. However, the DSB found that those data were transferred from the postal unit to the marketing unit and processed there for the purpose of marketing activities, as the DSB remarked, in a manner that "is not predictable by a parcel recipient."[12] As such, the processing of those data for direct marketing purposes not only was in breach of Article 5(1)(a) GDPR, which requires that personal data be processed "lawfully, fairly and in a transparent manner in relation to the data subject," but also entailed a change of purpose which was incompatible with the principle of purpose limitation laid down in Article 5(1)(b) GDPR.

The processing of personal data for further purposes incompatible with the original one is only allowed either in case of consent (Article 6(4)) or if the "new" purpose falls under Article 23(1) (and respects all requirements listed in Article 6(4)). However, neither of those provisions was found to apply to the case at stake. The recipients of packages had in no way consented to the further processing of their personal data for marketing purposes--the mere delivery process itself does not reveal any reason or opportunity for such consent—nor had those who issued forwarding orders in case of relocation, as the opt-out solution used by Austria Post failed short of the conditions for a valid consent within the meaning of Article 6(1)(a) GDPR. In addition, the processing for a purpose other than that for which the personal data had been collected could not be based on §151 GewO, as the latter did not meet the requirements of a "*Member State law which constitutes a necessary and proportionate measure in a democratic society to safeguard the objectives referred to in Article 23(1)*" which would justify restrictions of the scope of the obligations and rights provided for in Articles 12 to 22 GDPR.

As a result, the DSB concluded that the further processing of personal data on the parcel and relocation frequency without a legal basis infringed the principle of "specified, explicit and legitimate purposes" under Article 5(1)(b) and Article 6(4) GDPR.

2.3 The Internal Responsibilities and the Fine

The DSB also examined Austria Post's behavior in light of Article 35(1) GDPR, which concerns the use of new technologies that, due to the type, scope, circumstances and purposes of data processing, could lead to high risks[13]to the rights and

[12] See p. 3.7 of the Decision.

[13] "Where a type of processing in particular using new technologies, and taking into account the nature, scope, context and purposes of the processing, is likely to result in a high risk to the rights

freedoms of natural persons. One of the "likely high risk cases" in which a further assessment should be carried out under Article 35 is when the processing concerns special categories of personal data, such as information about the political opinions of individuals. Yet, in its data protection impact assessment before the entry into force of the GDPR, Austria Post denied the processing of special categories of personal data, although 'party affinity' was mentioned in its Appendix 2D. Therefore, the DSB concluded that the risk assessment within the meaning of Article 35(7)(c) GDPR had been made incorrectly.

Austria Post argued in response that all measures had been taken in order to ensure compliance with the GDPR and that, at best, the contested behavior was to be considered as an 'excusable mistake of law' within the meaning of Section 5§2 VStG (the administrative criminal code).[14] The DSB pointed out that, according to the settled case law of the Administrative Court, the 'excusable mistake of law' presupposes unawareness of the unlawful conduct, despite the due diligence required by its circumstances. Since there is an obligation to inquire, the ignorance of the prohibition can be reproached if the defendant did not obtain further information about the content of the relevant standards.[15]

Under Article 5(2) GDPR, each person involved in data protection is also responsible for compliance. The DSB reported that all staff responsible for data assessment within Austria Post were fully aware of all data processed by the marketing unit. The investigation showed that the preparation for the application of the GDPR "*was carried out in a strikingly superficial manner:*" no in-depth examination of legal risks was conducted by the Data Protection Officer in connection with the product range of the marketing unit in general and with the criterion of party affinities in particular, with a view to bringing all processing operations in line with the GDPR. In the absence of the above, such control should have been carried out by the head of the legal department and the head of the "Mail Solutions" division; or alternatively, by the board of directors. Since Austria Post omitted to carry out such a check, the DSB concluded that that behavior was to be qualified as a *grossly negligent* behavior, having regard to the scope of data processing, the number of data subjects and the potential dangers for them in terms of fundamental rights protection.

Interestingly, the DBS noted that it would have been reasonable for Austria Post *"– if only because of its size, its market position, the available knowledge and the available human resources –"* to deal substantially with the legal question of the data protection qualification of the party affinities they marketed. The simple

and freedoms of natural persons, the controller shall, prior to the processing, carry out an assessment of the impact of the envisaged processing operations on the protection of personal data. A single assessment may address a set of similar processing operations that present similar high risks".

[14] "Lack of knowledge of administrative rules and regulations violated on the part of the culprit is an excuse only in such cases if proven to be without his fault and if he was not able to realize the illicit character of his doing without knowing the respective provision of the administrative law".

[15] According to the Administrative Court, everyone "has to familiarize himself sufficiently with the relevant norms of his field of activity" (VwGH 14.1.2010, Zl. 2008/09/0175; Lewisch (2017)).

assumption that there was no data protection problem or the non-recognition of such a problem was a failure on the part of Austria Post.

The same was noted in connection with the legal question of the admissibility of the (further) processing operations of package and relocation frequency data by the marketing unit under the GDPR. The legal assumption that data originally collected in connection with the provision of postal services within the meaning of the Postal Act could be transferred to and further processed by the marketing division based on §151 GewO could not be upheld from a data protection law perspective. That was particularly the case against the background of the "privileged position" of Austria Post in the regulated postal services market, as the operator entrusted by the State with the provision of essential services under the Postal Act: the general public, but also the individual data subjects, could rightly expect a particularly careful, confidential and data protection-friendly handling of the data entrusted to Austria Post. Therefore, similarly to the conclusion reached in connection with the processing of party affinity, the DSB concluded for gross negligence also in this context.

Turning to the fine, the Decision moves from Article 83(3) GDPR, which states that if a controller, intentionally or negligently, for the same or linked processing operations, infringes several provisions of the Regulation, the total amount of the administrative fine shall not exceed the amount specified for the gravest infringement. Taking into account the infringement of Article 5(1) in conjunction with Article 9(1) GDPR in connection with the party affinity data, the turnover of the previous financial year (reported at around €1.8 billion), the nature, gravity and duration of the infringement and the number of persons affected by the processing (approximately six million), the degree of responsibility of the controller, the fact that Austria Post had already been fined for a previous (less serious) infringement and that it had derived financial benefits from the marketing of party affinities at the expense of the fundamental rights of the persons concerned, as well as mitigating circumstances (grossly negligent offence, the fact that data sets on party affinities were deleted on 22 January 2019 for reasons of corporate policy, the cooperation with the DSB during the investigation), the DSB decided to set the administrative fine at 1% of the reported turnover (€18.000.000).

3 Lessons from the Decision

The Decision is one of the first dealing with statistically extrapolated data. As any regulatory decision, it is to be read in the light of its particular factual and regulatory context and is still, at the time of writing, under judicial review. Yet, its analysis allows us to draw three main lessons on the postal operators' processing of personal data for marketing purposes.

3.1 Be Prudent and Consistent When Qualifying Processed Data (Personal vs. Non-personal)

The (obvious) first one is that the correct qualification of the data being processed as personal or non-personal is crucial for compliance. Personal data is defined in the GDPR as "any information relating to an identified or identifiable natural person ('data subject'); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person".[16] In other words, personal data is information that relates to an individual, who must be identified or identifiable either directly or indirectly from one or more identifiers or from factors specific to the individual.

While in most circumstances it is relatively straightforward to determine whether the processed data 'relates to' an 'identified' or an 'identifiable' individual, there might be cases where it is less clear to determine whether it is personal data and whether the GDPR applies (e.g., projections largely generated using other public information and predictive models, extrapolations resulting from the marketing analysis algorithms). The Decision shows that it is better to err on the side of caution in those circumstances, also in the light of the undisputed EU caselaw and guidance papers that support a broad interpretation of the term. Extreme caution is evidently warranted in case of special categories of data within the meaning of Article 9, because the sensitive nature of these data means, by definition, that there are greater risks to the interests and rights or freedoms of the individual, which in turn require a more robust analysis and a more compelling justification.

If nonetheless a "no personal data" conclusion is reached in the context of the data mapping for a given category of data, then, consistently with that conclusion, that category shall not appear in the recordings of processing activities nor be available for communication to data subjects in case of Article 15 requests for data access. In the Decision, the fact that the allegedly "non-personal" data were included in the response to data access requests played a relevant role and could not be justified as mere over-performance of Austria Post's duties.

3.2 Choose Carefully the Legal Basis for Processing

The second lesson is also relatively obvious and concerns the choice of the appropriate legal basis for processing. None of the six bases under Article 6 GDPR takes precedence over the others, but when it comes to direct marketing, data controllers

[16] The GDPR covers the processing of personal data processed wholly or partly by automated means (i.e., in electronic form) and personal data processed in a non-automated manner which forms part of, or is intended to form part of, a 'filing system'.

should carefully consider whether legitimate interest (as opposed to consent) is the appropriate lawful basis. It is true that Recital 47 states clearly that "[*t*]he processing of personal data for direct marketing purposes may be regarded as carried out for a legitimate interest" (emphasis added),[17] but the Decision shows that this does not mean that direct marketing always constitutes a legitimate interest. Whether a given processing is lawful on the basis of legitimate interest depends on the data controller being able to demonstrate a legitimate purpose and the necessity of personal data processing in achieving that purpose, in addition to providing a risk-based assessment of the processing. Such risk-based assessment should include the potential impacts of personal data processing on the individual, the severity of those impacts, the controller's willingness to disclose and discuss those potential impacts with the individual, opt-out mechanisms and any mitigating safeguards the controller can adopt to minimize those impacts.

In particular, when looking at the impact on individuals, the decision confirms that individuals have the absolute right to object to direct marketing under Article 21(2) GDPR. Data controllers should give individuals a clear option to opt out of direct marketing when they initially collect their data, the lack of any proactive opportunity to opt out in advance amounting to an unnecessary barrier to exercising their data protection rights.

To conclude, while it is common wisdom that legitimate interest provides more ongoing control and security over long-term processing than consent, where an individual could withdraw their consent at any time, the other side of the coin is that it is harder to demonstrate compliance. The Decision might be read as a cautionary tale against casual reliance on legitimate interests. As said above, relying on legitimate interest as the legal ground for processing requires a risk-based approach to compliance. However, when done properly, it can be an effective way of protecting the individual's interests, especially when combined with clear privacy information and an upfront opportunity to opt out.

3.3 Be Transparent and Mind the Implications of the USP Position

The principle of lawfulness, fairness and transparency in the data processing, provided for by Article 5(1)(a) GDPR, requires accounting for 'reasonable expectations' of data subjects, having regard to the specific relationship with the controller.[18] The European Data Protection Board also noted that "some personal data are

[17] The Article 29 WP Opinion 06/2014 on the notion of legitimate interests of the data controller under Article 7 of Directive 95/46/EC (WP217) refers to "conventional direct marketing and other forms of marketing or advertisement" among "the most common contexts in which the issue of legitimate interest in the meaning of [Article 6(1)(f) GDPR] may arise" (pp. 24–25).

[18] See EDPB Guidelines 2/2019 on the processing of personal data under Article 6(1)(b) GDPR in the context of the provision of online services to data subjects, p. 12 and fn. 8.

expected to be private or only processed in certain ways, and data processing should not be surprising to the data subject." There is a link here to the 'purpose limitation' principle in Article 5, which states that personal data shall be collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes. An assessment along the same lines of the risk assessment for legitimate interest is required in order to verify whether a new purpose is compatible with the original purpose of the processing. The Decision shows in this respect that both the link between the original purpose (performance of parcel delivery/forwarding order) and the new one (marketing) and the context in which data were collected, in particular the relationship with the individual and what they would reasonably expect from a postal operator entrusted with a public service, play a particularly relevant role in this respect.

While the "privileged" nature of the USP's access to personal data in the Austrian case remains open to question, the elements taken into account by the DSB when it comes to degree of responsibility of Austria Post (size, market position, available knowledge and human resources) are clearly applicable across the board and set the bar high for excusable errors on the part of USPs.

4 Conclusion

The decision reviewed in this paper confirms that processing of customer data for marketing purposes requires strict compliance with data protection rules. A postal operator, "*if only because of its size, its market position, the available knowledge and the available human resources,*" is accountable to a high degree and must be able to demonstrate, and document, the manner in which it complies with data protection law, including when it comes to the choice of legitimate interest as the appropriate legal basis for processing – and/or further processing – customer data for marketing purposes. The Decision indicates that unlawful processing of personal data might be costly, in terms not only of business disruption and financial implications, but also of loss of customers' confidence.

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The Universal Postal Union. Quo Vadis?

John Hearn

1 Introduction

Plenipotentiaries from the 192 members of the Universal Postal Union (UPU) were due to meet in Abidjan, Côte d'Ivoire, during August 2020 for the 27th Universal Postal Congress. The Congress was cancelled due to the global spread of the COVID-19 pandemic, but has been rearranged for August 2021, with the possibility that it will be held in Switzerland if it still cannot be held in Abidjan. Wherever and whenever the Congress is held Plenipotentiaries will be making very important decisions that will determine the future role of the UPU.

The background to the establishment of the UPU in 1874 and subsequent organizational developments is the subject of section 2. The evolution of postal services and the UPU in the period since the 1964 Vienna Congress is considered in section 3. "Reform of the Union[1]" has been on the agenda for some thirty years now but no consensus has emerged about a future role for the UPU. This is discussed in section 4.

Quo Vadis? Section 5 sets out a vision for a reformed UPU.

[1] As the UPU is sometimes called.

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2 Historical Background

The development of trade and the emergence of international postal services are inextricably interlinked. By the fifteenth century, organized postal services existed between Britain, the Low Countries, the Hanseatic League and the towns of the Rhine and northern Italy.

The introduction of the Penny Post and postage stamps by Britain in 1840 was copied by 21 countries worldwide within 15 years. But international mail was not directly affected by these reforms. International postage rates continued to be expensive and complicated. For example in 1849 a conference between the USA and Britain set a rate of 24 US cents, or one British shilling (twelve times the rate for domestic mail), for mail between the two countries.

Given the number of emigrants from Europe to North America it is not surprising that a campaign for Ocean Penny Post calling for drastic reductions in the high overseas postal rates to levels more affordable for emigrants was prevalent in the USA in the late 1840s and early 1850s. Elihu Burritt (1853) argued the case cogently for cheaper postage and the benefits it would bring to trade and commerce, the social happiness of more than three million emigrants, and more economical shipping arrangements.

Nor is it surprising that the first efforts to establish an international postal regime came from Washington. In May 1863 Montgomery Blair, then Postmaster General of the USA, organized the first multilateral conference on international postal services in Paris. Fifteen countries[2] were represented.

Another Plenipotentiary Conference was held in Berne during September 1874, at the invitation of the Swiss Government. The twenty-two countries represented[3] concluded a "Treaty Concerning the Formation of a General Postal Union" comprising "a single postal territory for the reciprocal exchange of correspondence".[4] Letter rates were fixed at the equivalent of 25 centimes[5] for each 15 grams for items addressed to any part of the Union's territory.[6] There were cheaper rates for postcards,[7] "legal and commercial documents, patterns of merchandise, newspapers, stitched or bound books, pamphlets, music, visiting cards, catalogues, prospectuses, announcements and notices of various kinds, whether printed,

[2] Austria, Belgium, Costa Rica, Denmark, France, Great Britain, the Hanseatic Towns, Italy, the Netherlands, Portugal, Prussia, the Sandwich Islands, Spain, Switzerland and the United States of America

[3] Austria – Hungary, Belgium, Denmark, Egypt, France, Germany, Great Britain, Greece, Italy, Luxembourg, The Netherlands, Norway, Portugal, Romania, Russia, Serbia, Spain, Sweden, Switzerland, Turkey and the USA

[4] Article 1

[5] At this time the gold franc was the standard currency of the Latin Monetary Union, which included France, Belgium, Switzerland and Italy

[6] Article 3

[7] Article 3

engraved, lithographed, or autographed, as well as for photographs."[8] Revenues were retained by the country where the letter was posted[9] – there was no attempt to provide for payments to compensate the destination country for the costs of delivery.

The Treaty also established the "International Bureau" (IB) to share information and standardize procedures including the basic format of stamps, and to account for transit fees.[10] Congresses were to be held regularly to revise and reenact the Treaty provisions.[11] The 1878 Paris Congress changed the name to the "Universal Postal Union."

The principle of a single postal territory was very important. During two world wars, postal services were maintained with mail being forwarded via neutral countries. It was this principle that facilitated the forwarding of Prisoner-of-War mail as guaranteed by the 1929 Geneva Convention.

2.1 Specialized Agencies of the United Nations (UN)

The United Nations was founded in 1945 after the Second World War by 51 countries committed to maintaining international peace and security, developing friendly relations among nations and promoting social progress, better living standards and human rights.

A feature of its Charter is that international organizations can enter into relationship agreements with the UN. These organizations are known as "specialized agencies". The International Civil Aviation Organization (ICAO) was recognized as a specialized agency from 1 October 1947. The UPU and the International Telecommunications Union (ITU) were recognized from 1 July 1948 and 26 April 1949 respectively. The comparable organization for the shipping industry, now called the International Maritime Organization (IMO), was not recognized until 17 February 1959.[12]

The UPU's agreement with the UN required the creation of an Executive and Liaison Committee (ELC) to oversee all UPU activities between Congresses and study questions regarding governmental policies on postal issues. It also required that requests for admission had to be approved by two thirds of the member

[8] Article 4

[9] Article 9

[10] Article 15

[11] Article 18

[12] Although the Inter-Governmental Maritime Consultative Organization (IMCO) was established by a convention agreed in Geneva in 1948 it was not ratified until 1958 because proposed powers over economic and commercial issues were not acceptable to many governments. The name was changed to the International Maritime Organization (IMO) in 1982.

countries,[13] but this change did little to restrain the growth in membership, from 88 in 1947 to 125 in 1964.

2.2 The 1964 Vienna Congress

The 1964 Vienna Congress was a significant turning point in the history of the UPU. It put in place a new structure for the Acts of the Union, giving the UPU a permanent Constitution,[14] supported by its General Regulations, the Universal Postal Convention and the latter's Detailed Regulations, both of these focusing on operational and commercial rules.

It also initiated changes to the UPU institutions. The ELC became the Executive Council. Its role was essentially unchanged - to oversee all UPU activities between Congresses and to study questions regarding governmental policies on postal issues. The changes initiated also led to the establishment of a Consultative Council for Postal Studies (CCPS) at the 1969 Tokyo Congress. Following the 1994 Seoul Congress the Executive Council became the Council of Administration (CA) and the CCPS became the Postal Operations Council (POC), dealing mainly with operational, economic and commercial issues.

The 1947 admission procedure was maintained, but any member of the United Nations could join by making a formal declaration of accession to the Constitution and to the compulsory Acts of the Union. Membership continued to grow, from 125 in 1964 and to 192 by 2012.

A key challenge arising from the increase in membership is that it is difficult to build a consensus for change. Decisions are made on the basis of one member (one country) one vote. According to the IPC[15] website, its 25 members deliver 80% of global mail volumes, but these countries only have 13% of the votes. Conversely, countries with 87% of the votes only account for 20% of mail.

3 Evolution of Postal Services and the UPU

The period since 1964 has witnessed dramatic changes in postal services as documented in Hearn (2020). The most important change so far as the impact on the UPU is concerned has been the corporatization and privatization of postal service providers; hitherto postal services were provided directly be the postal departments

[13] Since the 1878 Paris Congress any country could accede to the UPU merely by a unilateral declaration, without consulting the existing members beforehand.

[14] This does not need to be re-ratified every five years unlike previous Conventions.

[15] International Post Corporation. Its members include 21 European postal operators with a universal service obligation and the postal operators of Australia, Canada, New Zealand and the USA. Collectively, their operations deliver 80% of global mail volumes.

of the member governments. In recognition of this change, the 2004 Bucharest Congress inserted a requirement into the Convention[16] to designate the entity or entities responsible for fulfilling a member country's obligations to the UPU – to be called the Designated Operator.

Other changes with an impact on the UPU include the need to eliminate cross subsidies. Historically tariffs involved considerable cross subsidies between domestic and international services and between different classes of mail. This was sustainable only as long as the postal services had the benefit of a state monopoly. There was also greater competition from electronic communications and the emergence of new services, particularly for the delivery of parcels. The first European Postal Directive,[17] adopted in 1997, included specific provisions regarding market opening and cost orientation of tariffs and terminal dues.

3.1 Legal Status of Postal Services

From the start, the primary objective for the UPU was the creation of "a single postal territory for the reciprocal exchange of correspondence." The postal services concerned were provided directly be the postal departments of the member governments on terms and conditions set out in national laws, which included exemption from liability for loss or damage in accordance with the then prevalent principle of "state privilege" or "crown privilege."

To this day, the provisions of the UPU Convention facilitate this particular form of service provision. Specifically, Article 5.1 provides that "A postal item shall remain the property of the sender until it is delivered to the rightful owner." Consumers using such services still have few rights to reimbursement and/or compensation in the event of loss, theft or damage to items they had sent or which they expected to receive – the limited exceptions are set out in Article 22. In effect, the role of the postal service was as an agent or intermediary between sender and addressee. These provisions sit uncomfortably with the commercial changes that have happened over the last 50 years but they have not been repealed or amended.

3.2 Types of Postal Service

When the UPU was first established services were only provided for documents, although a distinction was made between letters (personal correspondence), on the one hand, and printed papers and commercial papers, on the other.

[16] article 2

[17] Directive 97/67/EC of the European Parliament and of the Council of 15 December 1997 on common rules for the development of the internal market of Community postal services and the improvement of quality of service.

At that time, the carriage of parcels of merchandise was usually the prerogative of the private sector, usually the railways. In 1880, an Administrative Conference in Paris concluded a Special Convention on Postal Parcels. This convention did not make carriage of parcels a prerogative of the post offices nor modify the prerogatives of the private sector. The parties to the Parcel Agreement simply agreed to arrange for the delivery of parcels. Until 2016, the UPU Conventions provided "Any member country whose designated operator does not undertake the conveyance of parcels may arrange for the provisions of the Convention to be implemented by transport companies."

The 1880 Convention encouraged the introduction of a postal parcel service within the United Kingdom in 1882. However, the United States of America did not introduce a domestic parcel service until 1913 and countries such as France, Belgium and Spain arranged for delivery of international postal parcels by railway companies well into the second half of the twentieth Century.

Services are now distinguished by speed of handling (Priority/non-Priority) and format (small letters, large letters, bulky letters or small packets). Parcel services are subject to different regulations and there is a significant difference in price.[18] Small packets can weight up to 2 kg and be up to about 0.027 m^3 in size, and charges are normally based on weight. "Postal parcels" are larger (up to about 0.85 m^3) and heavier (up to 20 kg or 30 kg).

3.3 Business Trends

Today the importance of letters compared to parcels is changing. Over the last decade[19] letter post volumes in general, and international volumes in particular, have declined significantly. The UPU (2020) reports that the global compound rate of decline in domestic letters has been 2.8 per cent annually,[20] but international letter volumes have declined at a faster rate − 3.12%. On the other hand, parcel post volumes have increased by 7.49% per annum for domestic parcels, and 12.98% per annum for international postal parcels over the same period. Parcels still represent less than 5% of total volumes,[21] but over 40% of revenues; up from 26% a decade earlier. The likelihood is that the real rate of decline in documents is greater as small packets containing merchandise are counted as letter post.[22] Neither do

[18] For example An Post, the Irish designated operator, charges €14.50 for a small packet weighing 2 kg sent to Europe and €35.50 for a parcel of the same weight. The comparable prices to other countries are €22.50 and €36.50.

[19] 2008–2018.

[20] The rate of decline in 2018 (−4.9%) means that domestic letter-post volumes are decreasing at an accelerating rate.

[21] 15.06bn parcels compared to 299.31bn letters.

[22] The available evidence suggests that over 90% of postal items containing merchandise are small packets (letter post), and the average weight of a "postal parcel" is less than 3 kg

these figures take into account the extent to which the traditional postal operators (the Designated Operators) are losing market share following the emergence of new services and competing operators. (See Table 1).

There are also considerable variations from country to country in Designated Operators' market shares in parcel and express markets. (See Table 2).

As Hearn (2018) observed the traditional postal services are losing the competitive battle with the new means of communication.

3.4 Universal Postal Service

Article 3 of the UPU Convention now requires member countries to ensure that all users/customers enjoy the right to a universal postal service involving the permanent provision of quality basic postal services at all points in their territory, at affordable prices. The concept of "universal service" was developed by the European Union and is not unique to the postal sector – it applies to all Services of General Economic Interest (SGEI). Section 3 of Hearn (2018) gives a full explanation of this principle and its application to the European Postal Sector.

New service providers have emerged providing services on a contractual basis well outside the concept of this "universal service", particularly concerning the delivery of parcels. Universal service providers (USPs) also provide services outside the scope of "universal service", and compete with USPs in other countries by offering "Remail"[23] and worldwide postal services through ETOEs.[24] In some countries, the profits from these services are used to subsidize the provision of "universal service".

Within the European Union member states already have considerable flexibility in how they define the universal service they are obliged to secure. The primary objective of the UPU to create "a single postal territory for the reciprocal exchange

Table 1 Designated Operators' market share – global mean

Letters (including packets containing merchandise)	76.7%
Parcels	35.5%
Express	39.9%

Source: UPU (2020)

[23] Domestic mail which is transported, physically or electronically, to another country and then mailed back to the country of origin to obtain a lower price; made possible by below cost terminal dues for cross-border mail.

[24] Extra-territorial Offices of Exchange.

Table 2 Designated Operators' share of domestic parcel & express deliveries in 2016 (selected countries)

The Netherlands	60%
France	45%
Belgium	28%
Ireland	25%
Spain	25%
Italy	20%

Source: Copenhagen Economics (2019) Fig. 7

of correspondence" is still important. However, many of the new service providers prefer to offer a seamless service entirely under their control rather than relying on reciprocal exchange. It is for each member state to decide how its universal service obligations should be achieved.

3.5 Terminal Dues (price fixing)

When the UPU was first established revenues were retained by the country where the letter was posted. That decision remained unchanged until the 1969 Tokyo Congress of the UPU, which introduced a system of "terminal dues" based on a flat rate charge per kg on the excess weight received. The system of terminal dues has evolved significantly since then, including many agreements introduced on a multi-lateral or bilateral basis in response to regulatory concerns. The UPU terminal dues system patently imposed constraints on what might be agreed by multi-lateral or bilateral agreements.[25]

As with any system of price fixing, there are winners and losers. Campbell (2016) concluded that the total amount of implied net transfers is of the order of SDR 4 billion over 4 years. Under the UPU terminal dues system, the entire cost of this global network of postal subsidies is paid by 12–15 industrialized countries and their mailers, including the Designated Operators of Canada, the Nordic countries, Switzerland, Italy, France, Japan, and Ireland.

Specific disclosures by An Post, the Irish Designated Operator, in its Regulatory Accounts for 2019 confirm that it lost €28.7 m on a turnover of € 81.0 m in providing delivery services for other Designated Operators. Of this more than half, €15.8 m, was incurred in delivering packets, parcels and registered items originating outside the EU.

The recent growth in e-commerce imports from Asia, facilitated by distortionary UPU terminal dues, prompted both the EU and the USA to take action. The EU used its taxation and customs powers to address the distortions in trade. On the other

[25] ComReg 03/40 provides a useful account of the evolution of terminal dues over this period.

hand, the USA focused on the terminal dues aspect. The USA gave notice in October 2018 that it would withdraw from the UPU because of concerns that the rates set by the UPU for delivery of lightweight packages from countries such as China, was putting American businesses at a disadvantage. Following an Extraordinary Congress in September 2019, which adopted proposals addressing the concerns of the USA, the USA rescinded its notice to withdraw.

The revised system, as set out in Article 28bis of the UPU Convention, however did not resolve all of the net transfers identified in Campbell (2016). First, the ability to self-declare terminal dues rates only applies to bulky letters and small packet. Second, there is a cap on the rates that might be self-declared of 70%[26] of domestic tariffs. Third, there is a delay between calculating the rates and the rates coming into effect. Fourth, there is a requirement that an average weight of 0.158 kg should be used in the calculations. Fifth, there are limits on the increase that may be applied from year to year. Finally, "full" self-declared rates (i.e., rates which meet all of these conditions) could be applied immediately (beginning 1 July 2020) only on small packets and bulky letters sent to or from the US.[27] For all other flows, self-declared rates are further limited to annual increases of 15% to 17%. By 2025, it is unlikely that Designated Operators in most industrialized countries will be able to charge full self-declared rates.

3.6 Customs clearance

Historically the Designated Operators have benefitted from simplified customs clearance. Correspondence is not normally subject to customs control, and there is a simplified customs declaration, CN22, which can be affixed to the front of most postal items. It is only when the contents exceed 300 SDR in value that a more detailed declaration, CN23, must accompany the items. It is a principle of this simplified procedure that customs duties and taxes have to be collected before the postal item is delivered to the addressee, but the modalities of how this is achieved differ significantly from country to country.

Other delivery companies are subject to normal customs control procedures. As might reasonably be expected, the different customs control procedures applicable to the two types of carrier give rise to market distortions. In particular:

Distortion of the market for the provision of cross-border delivery services, appearing to favor postal operators in many instances; and

Distortion of the market for e-commerce sales, appearing to favor sales for example by non-EU e-retailers over EU e-retailers.

[26] This is an "average" figure; by definition half of the DOs would need to apply a greater percentage to cover their costs.

[27] In return for its early introduction of full self-declared rates, the US agreed to pay a charge of eight million CHF per annum to the Union, for five consecutive years.

Copenhagen Economics (2016) reported on a study it conducted on behalf of UPS which attempts to quantify the impacts of these distortions. The study found that VAT was collected on only 35% of the shipments dispatched by the postal services compared with a 98% collection rate for the express carriers. More surprisingly, customs duties were collected on only 47% of postal shipments compared with a 99% collection rate for the express carriers.

The simplified customs arrangements combined with low value exemptions afforded by some countries have been exploited by ecommerce retailers, and may also be the conduit of choice for individuals that send things that shouldn't be sent. Taxation and Customs authorities are responding by eliminating low value exemptions on postal imports and ensuring that value added tax and customs duties are paid by commercial senders before the goods are dispatched, such as the EU's IOSS proposals.[28]

The EU will also have special arrangements for the collection of VAT on packets/parcels not liable for customs duty[29] sent by private individuals or other entities outside the IOSS pre-payment system. This involves the operator making the customs declaration, collecting the VAT from the customer, and making a monthly payment of the import tax effectively collected. This final provision avoids burdensome refund procedures when goods are refused or otherwise not delivered.

An obligation to send advance cargo information is also being phased in, both in connection with customs obligations but also relating to air security. These are all very significant developments leading to a level playing field so far as customs clearance is concerned. However, it is difficult to reconcile how goods dispatched by ecommerce retailers and similar customers can handled under the "universal service" conditions set out in the UPU Acts.[30] Also, the UPU Regulation[31] that "designated operators shall accept no liability for the customs declarations" and that "completion of customs declarations shall be the responsibility of the sender alone" are incompatible with the new customs regulations and will need to be changed.

The Agenda for the UPU during this period was very full but, with the benefit of hindsight, has been about transitioning towards a new order and reacting to domestic and external developments rather than driving change. An almost continuous item on the UPU agenda has been its role in price setting. To a very large extent, the agenda is still unfinished business. Now time is running out and decisions will have to be made once and for all.

[28] VAT Import One Stop Shop (IOSS)

[29] Value less than €150, or not subject to excise duties.

[30] See Resolution C 44/2004 Extraterritorial offices of exchange (ETOEs) which decided that "items sent from ETOEs are considered commercial items not subject to the UPU Acts …."

[31] UPU Convention Manual, Berne 2020, International Bureau of the Universal Postal Union. Regulations Article 20–001 Items subject to customs control

4 "Reform of the Union"

Campbell (1993) described an extraordinary ministerial level conference held in May 1992 to discuss the future of the UPU, and the questions never asked before including: Should private companies be admitted to the UPU? Which of the traditional services provided by the UPU and the postal administrations can be better provided by private companies or by joint ventures between postal administrations and private companies? Should the UPU be restructured?

The 1999 Beijing Congress identified the need to distinguish between the governmental and operational roles within the UPU.[32] The 2016 Istanbul Congress adopted a policy on the access of wider postal sector players. Finally as noted in section 3 the USA gave notice in October 2018 that it would withdraw from the UPU because of concerns that the terminal dues arrangements were putting American businesses at a disadvantage.

The debate on reform continues.

4.1 Wider Postal sector involvement

The issue of wider postal sector involvement has been on the UPU agenda for up to 30 years. But the focus has been very much on involving organizations in the work of the UPU and its designated operators rather than genuinely seeking to embrace the wider postal sector.

For example a Consultative Committee was established by the 2004 Bucharest Congress, but according to Union Postale (2020) it has had limited influence in the UPU. Its membership now stands at just 14 organizations.[33]

In the CERP Newsletter (2012) the current Director General of the UPU expressed his opinion that the "UPU must not let go its fundamental principles and values while opening up. These new comers should only be admitted if they will add value to UPU."

The 2016 Istanbul Congress adopted a policy on the access of wider postal sector players to UPU products and services. But as the recitals make clear the objective was to provide access to "customers, postal suppliers, supply chain service providers (e.g. Customs, airlines and other transporters), and non-designated operators that use or may wish to use UPU products, services and networks under predefined conditions"[34] rather than to embrace the wider postal sector in its entirety. Indeed, it might be foreseen that this policy is a Trojan horse to enable the UPU "to make some products available directly to those customers".[35]

[32] Resolution C 107/1999

[33] In 2004 there were 22 members.

[34] Resolution C 10/2016

[35] See Annex to Resolution C 10/2016 Annex para 5.

The decision of the USA to withdraw from the UPU rang alarm bells not just in relation to terminal dues but also about reform of the Union, and in particular wider postal sector engagement. The issue is now top of the agenda for the 27th UPU Congress.

In February 2020, the UPU organized a High Level Forum on wider postal sector engagement, and it intends to secure a mandate to pursue this strategy at its next Congress. While there is clearly a consensus that wider postal sector engagement is a desirable objective there does not appear to be a consensus about what this means in practice.

For example, Post Europe (2020) observations include "The ultimate purpose and principles of opening are not clear and need to be defined"; the "type, scope and role of wider postal sector players that could join in UPU activities as a result of opening are unclear and need to be clearly outlined;" and most fundamentally that the "UPU is an inter-governmental organization and [therefore] …. the discussion could only be about participation of other players in certain UPU services and programs".

On the other hand the private sector operator UPS emphasized the importance of competition and suggested that, although the universal postal service was important, it must be defined and quantified to avoid creating unnecessary challenges for USPs/ Designated Operators and other sector players.[36]

The involvement of entities other than the member states' government in the affairs of inter-governmental organizations is not unusual. For example the ICAO has a list of organizations which "may be invited to attend suitable ICAO meetings"[37] including about fifty non-governmental organizations. The IMO has 80 international non-governmental organizations in consultative status.[38] The ITU claims a membership of over 900 companies, universities, research institutes and international and regional organizations, including private sector companies such as Microsoft and Vodafone and many SMEs. Only the 193 Member States can vote at the ITU Plenipotentiary Conference, held every four years and at the ITU Council, which meets annually. The Plenipotentiary Conference sets the general policies of the organization. The Council acts as the Union's governing body in the interval between Plenipotentiary Conferences,

An issue of concern for the UPU must be the extent to which its designated operators are co-operating outside the framework of the UPU through initiatives such as the IPC Interconnect platform. Also CEN,[39] mandated by the European Commission, has developed a standard for a 'harmonized parcel label' open to all carriers, using the IPC Harmonized Label as a blueprint. It also allows for carrier-specific information by making provision for e-commerce retailers to add a unique

[36] Union Postale (2020)

[37] See https://www.icao.int/about-icao/Pages/Invited-Organizations.aspx

[38] See https://www.imo.org/en/About/Membership/Pages/Default.aspx for details of the criteria for this status.

[39] The European Standards Authority

identifier to allow them to track shipments irrespective of carrier used. This might play a role in customs and tax processing for intra-EU e-commerce imports in the future. European parcel carriers like DPD, GLS and DHL Parcel Europe, all owned by designated operators, have developed their own solutions and standards to organize cross-border parcel flows.[40]

In the author's opinion, the imperative is to articulate a vision for a reformed UPU before the question of wider postal sector involvement can be resolved.

4.2 E-Commerce

The 2016 Istanbul Congress initiated a proposal to introduce an Integrated Product Plan (IPP) to simplify the offer to customers operating in the e-Commerce sector. The intention is that items containing merchandise can only be sent as a small packet or parcel, and that the parcel service will be presented as a part of a single service encompassing all items weighing up to 30 kg.

The IPP proposal is prima facie attractive. E-Commerce is one of the faster growing segments of international trade and the ubiquitous nature of UPU designated operators' delivery networks makes them attractive to e-commerce retailers. However, the UPU is an inter-governmental organization that does not directly sell or provide postal services. It simply facilitates the member states' designated operators in providing their universal services. Furthermore, the legal framework, as described in section 3, is not intuitively attractive to ecommerce retailers. Consumer protection legislation[41] often requires that the risk of loss or damage remains with the seller until the consumer is in physical possession of the goods. Logically, ecommerce retailers need to be able to use a delivery company willing and able to negotiate a bespoke contract, enforceable under contract law, which protects their interests in terms of securing a proof of delivery, offering compensation for loss or damage due to the negligence of the delivery company and generally accepting that they are the agent of the retailer and not the addressee. Designated operators are well able to provide services which meet these requirements, but not as part of their UPU commitments. Furthermore, they provide these services in competition with other designated operators and private sector delivery companies.

A report for the European Parliament, Copenhagen Economics (2019), shows that these markets are fragmented, USPs/designated operators' market shares are relatively low, and the new delivery players entering the parcel segment, are challenging incumbents' business models and profitability. It concludes "The future challenge in many [European] Member States will … [be] to ensure that there is a viable postal operator, and different Member States are reaching this future at different paces."

[40] See WiK-Consult (2019) for more details on these developments.

[41] Such as EU Consumer Rights Directive (2011/83/EU)

4.3 Sustainability of USPs/Designated Operators

McKinsey & Company (2019) suggests USPs/designated operators are facing an immediate tipping point, drawing analogy with other twilight industries such as video rentals, travel agencies, and taxi services. It identifies three types of competitors: "Expanding", former B2B[42]-focused parcel specialists and express integrators such as DPD, GLS, Aramex; "Start-ups" such as Postmates, Deliveroo, Instacart, which have usually entered the market with a specialized value proposition on the back of growth financing; "Forward-integrating" e-tailers such as Amazon, Alibaba/Cainiao, JD.com that have taken over aspects of the support logistics beyond fulfilment.

It is difficult to envisage a role for the UPU in these competitive markets. The Covid-19 crisis has demonstrated the weaknesses in the UPU "business model", with many designated operators forced to suspend or delay services because of the non-availability of air services, and some designated operators suspending transit à découvert and closed-transit operations. Some competing operators such as UPS, FedEx and DHL operate their own airlines, while others operate European road networks. All therefore have greater ability to meet their customer needs.

4.4 Separation of Governmental, Operational and Commercial Issues

The UPU is unique among the specialized agencies of the UN in that it is formally focused not just on issues which are the responsibility of the member states' governments, but also on issues that concern the commercial and operational interests of the designated operators. By contrast, when UN agencies such as the ICAO and IMO were establish governments specifically excluded such economic and commercial functions. The service providers, even where owned by the state, had to form their own trade association(s).

The commingling of governmental and commercial functions may have been appropriate when the UPU was established in 1874 when postal services were directly provided by the government and with the benefit of a statutory monopoly. The processes of corporatization and privatization, initiated in some countries more than fifty years ago, and the requirement of the EU Postal Directives to separate the exercise of governmental authority from the competitive and commercial activities of the USP, removes any justification for such commingling.

The most fundamental issue for the UPU to address, in the author's opinion, is the relationship between its members (governments), their designated operators and operators on other delivery markets. Numerous independent studies have concluded that the UPU must separate governmental and commercial functions. But the UPU

[42] Business to Business

has resisted all such proposals and remained an intergovernmental entity which employs governmental authority to advance what has evolved into essentially commercial objectives. If the UPU is to serve the wider postal sector in a competitive international commercial package market, it must embrace the cardinal principle of separation of governmental and commercial functions.[43]

5 Conclusion: Quo Vadis? – A Vision for a Reformed UPU

The decision of the USA to serve notice that it would withdraw from membership of the UPU sounded alarm bells about the future of the organization. So far, a consensus about its future role is not discernible, as demonstrated by PostEurop's statement on UPU's opening ahead of the UPU high-level forum considered in section 4.

There are two ways forward for the UPU. The first is as an inter-governmental organization focused on the worldwide governance of the wider postal sector and securing the provision of universal service. The second is as a representative organization, solely promoting the interests of the USPs / designated operators charged by governments with the provision of universal service.

5.1 Governance of the Wider Postal Sector

The principal objective must be to promote the evolution of postal services to meet the needs of all users. This will involve the UPU focusing solely on policy issues in the same way as the ICAO and IMO have done since their inception. The goal should be that a wide range of services meeting the needs of customers, including e-commerce retailers, are provided by existing and new operators.

5.2 Provision of Universal Service

National governments should make commitments, similar to those given to the WTO[44] in relation to international telephony, to ensure the provision of a worldwide universal postal service, ensuring interconnection of national postal networks, where appropriate and necessary, UPU members (i.e. Governments) should commit to ensuring that at least one supplier will accept postal items for delivery to all addresses in their state on a non-discriminatory, cost-oriented basis. There should also be a commitment to ensuring at least one supplier in their state will accept postal items for forwarding to addresses in all other UPU member states.

[43] WiK-Consult (2019) provides a much more detailed analysis of this issue.

[44] World Trade Organization

The market share of USPs / designated operators is low and in some countries calls into question their long-term viability. Governments have a responsibility to ensure that the obstacles to a thriving modernized postal sector are addressed.

The unique legal basis on which USPs / designated operators provide postal services is not attractive to e-commerce retailers and other commercial customers and needs to be reconsidered. As discussed in section 3, National Customs and Tax authorities are already moving towards a level playing field.

Operational and Commercial issues should be left to the relevant operators to decide in whatever forum they wish, subject to compliance with anti-trust legislation. There is no precedent for the UPU's prescriptive role in price setting, which only started in 1969 at about the same time as the corporatization and privatization of postal operators was starting. It is clearly undesirable for governments to be involved in price setting when it causes distortions in competitive markets. Designated operators cannot use an intergovernmental treaty to avoid their obligations under Competition/Anti-Trust law forever. In both the civil aviation and shipping sectors there was a clear governmental preference to leave these aspects to the operators concerned,[45] albeit granting them immunity from antitrust laws.[46]

5.3 UPU as a Representative Organization

The second way forward is as a representative organization, solely promoting the interests of the USPs / designated operators charged by governments with the provision of universal service. This is unlikely to be successful in the long-term. It is clear from the material presented that some USPs / designated operators are progressing at a different rate than others. Also some are competing with each other and cooperating with each other through organizations outside the UPU. Some own global or regional networks that offer a "seamless service" to potential customers. While some governments may wish to protect their national champion this is only possible if this is a shared vision by all governments.

Both options involve considerable reforms. Will the UPU be able to agree on a way forward before its time runs out?

[45] See Sock-Yong Phang (2009) for a comprehensive consideration of Competition Law and the aviation and maritime industries. Sjostrom (2009) analyzes the background to rate setting in shipping. See OCED (2013) for a description of the international termination rates in telecommunications.

[46] In recent decades, the antitrust immunity granted to these operators' organizations have been repealed.

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Do We Need to Redefine the Legal Definition of the Postal Service?

Mateusz Chołodecki

1 Introduction

Postal markets are facing probably the biggest changes mainly caused by users switching to digital communications and by the rapidly growing e-commerce market. Consequently, postal markets are experiencing declining volumes of traditional mail and an increasing volume of parcels (Hearn, 2016). In order to meet the new user expectations, governments are trying to provide public services in a digitalized form (Gori & Parcu, 2020). At the same time, new entrants like Amazon, IKEA, Allegro and Tesco, are posing a challenge to traditional postal markets by directly delivering their products faster and more cheaply.

Currently, the postal service is strictly defined by various legal sources, such as the Regulation of the Universal Postal Union, the EU Postal Directive, and national legislations. Most of these regulations restrict postal service to the clearance, sorting, transport and delivery of postal items. Traditional postal operators have been trying to adapt to the new needs of users by offering, for example, parcel lockers, hybrid mail, secure digital e-boxes, digital identities, and other products and services. Most of these new services fall beyond the scope of postal regulation.

This situation raises the following questions: what is the legal scope of the postal market? Which services are provided by entities on the market that are classified as providing postal services? Section 2 focuses on the current postal regulations with regard to the definition of the postal service under different international and national legislations. Section 3 characterizes the inner and outer limits of the scope of postal service. In this section the role of the legal definition and the consequences of such a definition for legal interpretation has been presented. Section 4 concludes

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the paper and shows that present definitions of the postal service do not correspond to the factual scope of the postal market and thus, the service should be redefined.

2 The Legal Definition of the Postal Service

There is no doubt that the postal service plays a key role in society as an essential instrument of communication and trade. Before the liberalization process began in Europe and in other countries, most postal operators were a part of the public sector, performing various public duties as a special link between the state and its citizens. Indeed, all the business performed by the state-owned postal operator simply defined "postal service". Recent developments in the postal market have triggered a discussion about the legal framework of the postal service, i.e., what is the exact scope of the postal service. Brennan and Crew (2014), discussing the USO for postal market, emphasized that without a clear and exact definition of the postal service, which states its precise bounds, lawmakers will not be able to establish proper postal regulation.[1]

2.1 International Law: UPU

For nearly 150 years, the Universal Postal Union (UPU) has created general regulations for the global postal market. UPU is one of the first international institutions to create global solutions and to organize international cooperation. The UPU regulations have had a major impact on national postal regulations. A primary aim of the UPU is the improvement of the postal services (Article 1.2 UPU Constitution). Hence, the Constitution of the UPU contains the most important and influential definition of the postal market. For years, the legal definition of the postal services in many countries was mainly based on the UPU definition. The 1999 UPU 22nd Congress held in Beijing fundamentally reformed the international postal law, adapting it to the changes already made by several industrialized countries (Luff, 2002). Nevertheless, the current legal agenda has been in existence for more than 20 years, which is a considerable period, given that the postal environment has undergone significant change.

The definition from the UPU Constitution emphasizes the logistical aspect of the postal service, indicating that it is the collection, processing, transmission and

[1] The need for a new concept of the postal service in EU was emphasised several times by the European Regulators Group for Postal Services (ERGP) an advisory group to the European Commission in their reports, primary in the report published simultaneously with this paper: ERGP PL II (20) 7 Report on postal definitions and ERGP PL (18) 49 ERGP Report Developments in the postal sector and implications for regulation; ERGP PL I (19) 12 ERGP Opinion on the review of the regulatory framework for postal services.

delivery of postal items. At the same time, the main obligations of postal services are to satisfy certain social and economic objectives of the member countries (Article 1bis). In order to fully understand the definition of the postal service from the UPU Constitution, we need to explain what postal items are. An answer to this question is provided in the UPU Convention: a *postal item* is a generic term referring to anything dispatched by the designated operator of a member country, i.e., letter post, parcel post, money orders, etc.

The modernization of the scope of postal services arrived with the 2016 UPU 26th Congress held in Istanbul, which added a new type of postal service, described as *electronic postal services*. According to art 17 of the UPU Convention, electronic postal services are the digital equivalent of the traditional postal services i.e., electronic postal mail,[2] electronic postal registered mail,[3] electronic postal certification mark[4] and electronic postal mailbox.[5] The UPU definition of the postal service seems to be obsolete for modern postal markets. The provision of electronic postal services is not obligatory, the regulation is focused solely on the Universal Service Provider (USP), and these services are not strictly part of the universal service obligation.[6]

In this UPU regulatory approach, we can see the growing gap between the postal markets in industrialized countries such as the EU Member States, the USA, Japan and other developing and less developed countries. This gap is mainly attributed to different factors. The main factor in developed countries is access to e-administration and the growth of e-commerce. Thus, these two factors are not covered by traditional postal services as defined in the UPU regulations.

2.2 EU Law

For a long time, the debate concerning the EU postal service was essentially political, with the main focus on the postal incumbents serving as the USP. Indeed, from the very beginning, EU postal regulations were devoted to the traditional aspects of the postal services. Thus, the universal service obligation is the central focus of the regulatory policy. Adopted on 15 December 1997, the Postal Services Directive

[2] Electronic postal service involving the transmission of electronic messages and information by designated operators.

[3] Secure electronic postal service that provides proof of sending and proof of delivery of an electronic message and a secure communication channel to the authenticated users.

[4] Provides evidentiary proof of an electronic event, in a given form, at a given time, and involving one or more parties.

[5] Enables the sending of electronic messages by an authenticated mailer and the delivery and storage of electronic messages and information for the authenticated addressee.

[6] According to the UPU Convention, a designated operator is any governmental or non-governmental entity officially designated by the member country to operate postal services and to fulfil the related obligations arising out of the Acts of the Union on its territory.

97/67/EC[7] established the first regulatory framework for the European postal services. The directive emphasized that the liberalization of the market must be carried out in a way to protect the ability of the Universal Service Providers (USP) to meet their universal service obligations (Cremer et al., 2008, p. 23). Limiting competition on the market by the directive was justified by the view that entry could harm the profitability and market position of the postal incumbents. Thus, competition could affect proper USO performance. The directive has been amended only twice, by Directive 2002/39/EC[8] (the so-called 2nd Postal Directive) and Directive 2008/6/EC[9] (the so-called 3rd Postal Directive). The 3rd Postal Directive introduced the legal basis for establishing the EU postal market for the postal services by providing the last legislative step in the process of gradual market opening (liberalization process).

Nevertheless, the scope of the postal services has not been changed. The postal directive defined a postal service as a service involving the clearance, sorting, transport and distribution of postal items (Article 2.1.).[10] This is followed by a definition of the postal item, namely an addressed item to be carried by a postal service provider. In addition to items of correspondence, such items also include books, catalogues, newspapers, periodicals and postal parcels containing merchandise, with or without commercial value (Article 2.6.). Similar to the UPU regulation, the logistical aspect (physical component) of the EU postal service plays a key role.[11] Such a traditional approach is highlighted in the postal directive, where new services and document exchange do not form part of the universal service[12] (services quite distinct from conventional services).[13]

[7] Directive 97/67/EC of the European Parliament and of the Council of 15 December 1997 on common rules for the development of the internal market of Community postal services and the improvement of quality of service, OJ L 15, 21.1.1998, pp. 14–25.

[8] Directive 2002/39/EC of the European Parliament and of the Council of 10 June 2002 amending Directive 97/67/EC with regard to the further opening to competition of Community postal services, OJ L 176, 5.7.2002, pp. 21–25.

[9] Directive 2008/6/EC of the European Parliament and of the Council of 20 February 2008 amending Directive 97/67/EC with regard to the full accomplishment of the internal market of Community postal services, OJ L 52, 27.2.2008, pp. 3–20.

[10] For more see: Joined Cases C-259/16 and C-260/16: Judgment of the Court (Fifth Chamber) of 31 May 2018 (request for a preliminary ruling from the Tribunale amministrativo regionale per il Lazio—Italy)—Confederazione Generale Italiana dei Trasporti e della Logistica (Confetra), OJ C 259, 23.7.2018, pp. 3–4.

[11] The ERGP PL II (20) 7 Report on postal definitions clearly shows that the Postal Directive is unclear even in its basic aspects.

[12] According to the Postal Directive, universal service is guaranteed to be not less than five working days a week, save in circumstances or geographical conditions deemed exceptional. It includes as a minimum: one clearance, one delivery to the home or premises of every natural or legal person or, by way of derogation, under conditions at the discretion of the national regulatory authority, one delivery to appropriate installations. Each Member State shall adopt the measures necessary to ensure that the universal service includes the following minimum facilities: the clearance, sorting, transport and distribution of postal items up to two kilograms, the clearance, sorting, transport and distribution of postal packages up to 10 kg, services for registered items and insured items (art 3).

[13] No. 21 of the postal directive introduction.

The last amendment of the 3rd postal directive was adopted in 2008, more than a decade ago. In these past years, the EU postal market has undergone substantial change, in terms of technological and consumer expectations.[14] This entailed that the postal market has changed from delivering traditional mail (letters) to delivering parcels; from a USP being an analogue connector between citizens and government to a digital operator of e-administration (e-government).[15] As a consequence of the market changes, the USO in the EU countries has been adjusted to new needs and expectations. In some of the countries, USP are legally responsible for e-administration, especially delivering digital correspondence that to a large degree substitutes for letters. This is particularly evident in Germany, where there is no designated USP (Deutsche Post provided a service without any obligation). Thus, the postal market seems to be much beyond the legal framework of the postal services.

2.3 National Regulations

Six different examples of postal legislation from Europe and Canada represent a different postal market and a different regulatory approach, especially regarding the USP. These differences are caused by the distinct legal traditions of these countries, their postal history, and the political debate about the role of postal incumbents. The moment when the postal market was liberalized seems to have played an important role in the market situation.

Table with summarized definitions from the presented countries.

[14] Regulation (EU) 2018/644 of the European Parliament and of the Council of 18 April 2018 on cross-border parcel delivery services (OJ L 112, 2.5.2018, pp. 19–28) was established to solve some of the emerging problems of the postal sector. According to the recital 9 of the Regulation "In order to improve cross-border parcel delivery services, especially for individuals and micro and small businesses, including those in remote or sparsely populated areas, and for individuals with disabilities or with reduced mobility, it is necessary to improve the access to and transparency of public lists of tariffs for a limited set of cross-border parcel delivery services. Making cross-border prices more transparent and easily comparable across the Union should encourage the reduction of unreasonable differences between tariffs, including, where applicable, unjustified differences between domestic and cross-border tariffs." This Regulation does not change the basic definitions of the Postal Directive (recital 13 and 14). For more see i.e., ERGP PL (15) 28 Report on the legal regimes applicable to European domestic and cross-border e-commerce parcels delivery or Consult, W.I.K., 2019. Development of cross–border e-commerce through parcel delivery. A study for DG GROW.

[15] The State of Texas has an original example of the e-government definition, which defines e-administration (e-government) as "Government activities that take place by digital processes over a computer network, usually the Internet, between the government and members of the public and entities in the private sector, especially regulated entities. These activities generally involve the electronic exchange of information to acquire or provide products or services, to place or receive orders, to provide or obtain information, or to complete financial transactions". State of Texas E-government Task Force (2003) (www.dir.state.tx.us/taskforce/Surveys/State_Survey/app_b.htm).

	Market situation	Definition of the postal service	Definition of the postal items
Belgium	Liberalized (open market)	Services consisting of the collection, sorting, transport and distribution of postal items	Addressed item in the final form in which it is to be transported by the postal service provider and whose weight does not exceed 31.5 kg
Italy	Liberalized (open market)	Services involving the clearance, sorting, transport and delivery of postal items	The item, in its final form at the time that it is taken over by the postal service provider; this includes, in addition to items of correspondence, books, catalogs, newspapers, periodicals and similar items as well as postal packages containing goods with or without commercial value
Poland	Liberalized (open market)	The performance on a commercial basis, in domestic or cross-border traffic, of the collectively or separately provided clearance, sorting, delivery of postal items and printed forms. The postal service includes the transport of letter items and printed forms, if provided collectively with at least one of the activities such as clearance, sorting or delivery; sending postal items by electronic communications means if, at the stage of the clearance, transport or delivery of information message they take the physical form of a letter item (hybrid postal service); the operation of points of exchange enabling the clearance, and exchange of correspondence between entities using the service of these points and handling postal money orders (banking activity)	An object bearing the marking of an addressee and an address, submitted for clearance or cleared by the postal operator in order to transport it and deliver to the addressee
Switzerland	Postal monopoly for Swiss Post	Not defined	Not defined
France	Liberalized (open market)	The clearance, sorting, transport and delivery of postal items in the course of regular rounds	Any item to be delivered to the address indicated by the sender on the item itself, or on its wrapping, and presented in the final form in which it is to be carried
Canada	Postal monopoly for Canada Post	Not defined	Not defined

2.3.1 Belgium

Belgium has a very interesting postal market, mainly due to the strong market position of the postal incumbent – bpost, especially in parcel delivery. The legal scope of the USO also distinguishes Belgian postal regulation from the other EU legislation. The 3rd Postal Directive was transposed into Belgian law in 2010, amending the Postal Act of 21 March 1991. The data source shows that the Belgian postal sector, like other European markets, has experienced a decrease in the letter market and extensive growth in the parcel markets. Nevertheless, according to the data provided by the bipt – Belgian National Regulatory Authority (NRA) (*Institut belge des services postaux et des télécommunications*) bpost has the biggest market share, based on volume within the segment of the parcel and express mail items (40–45%). Thus, bpost has taken much of the market share based on turnover in the Belgian postal sector (60–70% of a total of 2692 million EURO).[16]

In Belgium, Article 2.1. of the Belgian Postal Act covers the definitions of the postal services, describing these as services consisting of the collection,[17] sorting, transport and distribution[18] of postal items.[19] Exceptions from this definition include the case when postal services are offered by the natural or legal person from whom the mail originates (self-delivery). The Belgian Postal Act separately defines a postal provider as an entity that offers at least one or more postal services (Article 2.2). Significantly, Belgium has eliminated the definition of the USO as well. Before the 2010 amendment, the USO was defined in a conventional way, similar to the Postal Directive, as the collection, sorting, transport and delivery, at least 5 days a week, of postal items up to 2 kg and of postal parcels up to 10 kg, the delivery of postal parcels from other member states up to 20 kg, services relating to registered postal items, and postal items with insured values.[20] Since 2010, the scope of the USO has been subjected to an individual license, granted by the BIPT. The Belgian NRA is not limited now by any specific scope of the services. Removal of the USO definition in Belgium was probably caused by the growing costs of the service and their unsuitability for social needs.

[16] Communication du Conseil de l'IBPT du 16 octobre 2020 concernant l'observatoire du marché des activités postales en Belgique pour 2019.

[17] The term collection is defined as the operation whereby a postal service provider collects postal items (article 2.5 of the Belgian Postal Act).

[18] The term distribution is defined as the process from sorting in distribution centres to the delivery of postal items to the addressees (article 2.6 of the Belgian Postal Act).

[19] The term postal item is defined as an addressed item in the final form in which it is to be transported by the postal service provider and whose weight does not exceed 31.5 kg (article 2.7 of the Belgian Postal Act).

[20] Notice that in the presented legislation the dimension and weight of the postal items i.e. letters and parcels are different from each other. The EU postal directive gives only maximum for the dimension and weight of the USO (Article 3). The most probable explanation for such differences is the historical background of postal services in particular countries.

2.3.2 Italy

Italy has an incumbent – Poste Italiane, with a strong position not only on the postal market but also of postal savings products, and financial and insurance services. Poste Italiane is designated as the USP in Italy. The company was privatized and is listed on the Milano stock exchange. The Italian State indirectly controls less than 30% of the shares in Poste Italiane. Such privatization of postal incumbents, especially via a stock exchange, is still uncommon in Europe.

The current legal definition of the postal services in Italy[21] directly incorporates the EU Postal Directive adoption (Article 2, § 1, point 1 of said directive). Indeed, Article 1.2., letter a of the Italian Postal Act[22] states that for the purpose of the decree (the Postal Act) the following definition applies: *postal services: services involving the clearance, sorting, transport and delivery of postal items.* A postal item is defined as the item, in its final form at the time that it is taken over by the postal service provider. The definition includes, in addition to items of correspondence, books, catalogs, newspapers, periodicals and similar items as well as postal packages containing goods with or without commercial value (Article 1.2 letter of the Italian Postal Act). Therefore, according to Italian legislation, a postal service provider is the company providing one or more postal services (Article 1.2 letter u-bis the Italian Postal Act).

2.3.3 Poland

The Polish postal is a good example of postal transformation within the new EU Member States from the Central and Eastern Europe region (CEE). Similar to other postal markets from the CEE, the Polish postal market used to be a monopoly, with one state-owned postal operator – Poczta Polska S.A. The liberalization of the postal market in the CEE countries came after their accession to the EU in 2004. The 3rd EU Postal Directive was implemented in Poland by the new Postal Law Act in 2013.[23]

The Polish definition of the postal service contains a broader range of services than provided in the definition from the EU postal directive. Article 2.1. of the Polish Postal Law Act defines postal service as the performance on a commercial basis, in domestic or cross-border traffic, of the collectively or separately provided clearance, sorting, delivery of postal items and printed forms. Moreover, the postal service includes the transport of letter items and printed forms, if provided collectively with at least one of the activities such as clearance, sorting or delivery; sending postal items by electronic communications means if, at the stage of the clearance,

[21] The Italian Postal Act, legislative decree n. 261/1999.

[22] LEGISLATIVE DECREE 22 July 1999, n. 261.

[23] Act of 1 January 2013 Postal Law, consolidated text Journal of Laws of 2012, item 1529, as amended.

transport or delivery of information message, they take the physical form of a letter item (hybrid postal service); the operation of points of exchange enabling the clearance, and exchange of correspondence between entities using the service of these points and handling postal money orders (banking activity). According to the Article 2.2. of the Postal Law Act, excluded from postal service are, inter alia, transport and delivery of one's own postal items, if performed without the participation of third parties and the carriage of goods other than correspondence, performed under separate provisions.[24] According to distinct definition of the postal item is an object bearing the marking of an addressee and an address, submitted for clearance or cleared by the postal operator in order to transport it and deliver to the addressee (Article 3.21 of the Postal Law Act). The Polish regulation thus covers both the old types of what was known as postal service, including postal money orders, and future postal services, such as hybrid postal service. Indeed, both old and new services were incorporated into the Postal Law Act in favor of Poczta Polska S.A., as it is the sole entity that offers them.

Poland was one of the last EU countries to fully open its postal market (Chołodecki, 2020). Poczta Polska S.A. has been designated as a USP from the early beginning of USO regulation. According to the Postal Law Act, only Poczta Polska S.A. fulfils the conditions for the USP due to infrastructural requirements, especially an appropriate postal offices network. Approximately 90% of the services covered by the USO in Poland is traditional letter delivery. Hence, Poczta Polska S.A. is the sole player on the traditional mail market, where revenues and volumes are continually decreasing. In contrast, on the highly competitive courier market, with little participation of Poczta Polska S.A., revenues and volume are constantly growing.[25]

2.3.4 Switzerland

Switzerland is not an EU Member State and neither is it a member of the European Economic Area (EEA). However, Switzerland is a member of the European Free Trade Association (EFTA). Indeed, it is interesting to research the European legislation of a country which is not required to implement the EU postal regulation.

Due to the fact that Switzerland has its own regulatory policy for the postal market, it is worth describing its path toward today's market situation. Following political pressure and lobbying from competitors, limited liberalization of the Swiss postal sector came into effect. The liberalization was introduced in several steps. First, parcel delivery was fully opened in 2004. Second, letter delivery was partly opened in 2006, with the exception of addressed letters of up to 100 g. Subsequently, delivery opened for letters weighing to 50 g in 2009. The biggest difference between Switzerland and the EU is that Swiss Post still has a monopoly over letter mail up

[24] A full list of inclusions can be found in Article 2.2. of the Polish Postal Law Act.

[25] Source: The UKE Report on the state of the postal market in 2019.

to 50 g.[26] With the liberalization of the postal market, Switzerland decided to create the postal regulatory authority – The Federal Postal Commission (*Eidgenössische Postkommission* – PostCom). Ongoing postal legislation in Switzerland entered into force on 1 October 2012. This amendment replaced the licensing system with one register of postal operators run by PostCom.[27]

Neither the Federal Act on the Organisation of Swiss Post[28] nor the Postal Ordinance Act (VPG)[29] provided a definition of the postal service. Nevertheless, the VPG defines a (postal) provider as a natural or legal person who commercially offers customers all postal services in their own name, regardless of whether they provide the postal services themselves or use third parties (Article 1a). According to PostCom, providers deliver addressed parcels weighing up to 30 kg, addressed letters up to 2 kg and newspapers and magazines.[30]

In fact, the postal service is based on physical properties. The USO in Switzerland can be helpful to decode the scope of postal service. Indeed, the VPG contains precise scope of the USO, which is called the basic service (*Die Grundversorgung*) for domestic postal services,[31] stating that it should include at least one offer for the transport of the following addressed mail items: letters up to 1 kg and parcels up to 20 kg as individual items[32] with time of their delivery, and letters up to 1 kg and parcels up to 20 kg as bulk mail;[33] the daily delivery of newspapers and magazines; as well as subscribed and court and debt collection documents with acknowledgment of receipt. At the same time, however, express and courier mail items that have these physical properties are not part of the basic service offer (USO).

[26] Swiss Post is a public corporation, owned entirely by the State (Swiss Confederation). For more about the Swiss Post see: *Strategische Ziele des Bundesrates für die Schweizerische Post AG 2017–2020* vom 9. Dezember 2016 (https://www.admin.ch/opc/de/federal-gazette/2017/125.pdf).

[27] The registration in PostCom depends on the annual turnover by postal providers (Articles 3 and 8 VPG). There are two types of registration. The amount of annual revenue from postal services determines whether providers are subject to the ordinary duty to register (due to an annual turnover in excess of CHF 500,000 for commercial postal services) or the simple duty to Register (less than CHF 500,000).

[28] Bundesgesetz über die Organisation der Schweizerischen Post (*Postorganisationsgesetz*, POG) vom 17. Dezember 2010 (AS 2012 5043).

[29] Postverordnung (VPG) vom 29. August 2012 (AS 2012 5009).

[30] https://www.postcom.admin.ch/en/postal-markets/general-information/

[31] The basic service in cross-border postal traffic includes at least one offer for the transport of the following addressed postal items abroad: letters up to 1 kg and parcels up to 20 kg as single items; letters up to 1 kg and parcels up to 20 kg as bulk mail.

[32] Mail which the sender hands over to Swiss Post for carriage under general terms and conditions are considered individual items.

[33] Mail items for which the sender concludes a written transport contract with Swiss Post on individual contractual terms are considered bulk mail.

2.3.5 France

French postal regulation is stated mainly by the Postal and Electronic Communications Code (*Code des postes et des communications électroniques* – PECC). The postal incumbent acting as a USP[34] is a public-owned limited company with the majority of 74% of the capital owned by the State, and 26% owned by *Caisse des Dépôts et Consignations*.[35] The PECC literally (*expressis verbis*) designates La Poste as the USP. The PECC placed special responsibilities on La Poste, such as providing assistance in defining French positions with European and international organizations competent in matters of regulation and standardization in the field of postal services or in this same area (Article R1-1-22 PECC). Furthermore, the PECC gives La Poste the ability to create laboratories, and to associate or cooperate with all organizations or companies, to undertake research (Article R1-1-23 PECC).

For providing express delivery (both mail and parcels), operators do not need any authorization (open access). Competition in the French postal sector remains rather low, except the express delivery sector mostly due to the fact that the French postal regulation gives a strong position to La Poste, both as a USP and as a provider of other public services. In the traditional mail segment, La Poste still has a dominant position. DPDgroup,[36] a subsidiary of La Poste, is also the market leader in the express market. La Poste still has a leading position on the French postal market, and has a global expansion strategy for other markets via DPDgroup.

Similar to other EU national legislations, the PECC defines that the postal services as comprising the clearance, sorting, transport and delivery of postal items in the course of regular rounds. A postal item is defined as any item to be delivered to the address indicated by the sender on the item itself, or on its wrapping, and presented in the final form in which it is to be carried. The French regulation contains a distinct definition of an item of correspondence. Such an item is a postal item not exceeding two kilograms and containing a communication in written form in a physical medium. Direct mail partially consists of items of correspondence. Additionally, postal items include: books, catalogues, newspapers, periodicals and postal parcels containing merchandise with or without commercial value, but books, catalogues, newspapers and periodicals are not items of correspondence.

[34] According to the French postal regulation, the USO shall include national and cross-border services for mail weighing 2 kg or less, parcels weighing up to 20 kg, recorded delivery items and declared value items. Clearance and delivery services under the universal postal service shall be provided on each working day, except in exceptional circumstances. Deliveries shall be provided to appropriate installations at the home or premises of every natural or legal person or, by way of derogation, subject to conditions laid down by decree.

[35] According to the French Monetary and Financial Code*, Caisse des Dépôts et Consignations* are a "public group serving the public interest" and a "long-term investor". The fund is a government institution under the control of the French Parliament.

[36] DPDgroup is owned by La Poste and its brands are: DPD, Chronopost, Seur and BRT.

2.3.6 Canada

In contrast to all the previously presented cases, Canada has a strong postal monopoly (see more Sidakt & Spulber, 1997). The state-owned Canada Post,[37] which is a Crown corporation, still possesses a monopoly over mail and also competes with private operators in parcel delivery. Thus, there are two postal markets, the first being for traditional mail with legal monopoly, and the second being the parcel market. Canada Post is present in both markets. According to the Canada Post Corporation Act,[38] the objectives of the Canada Post are to establish and operate a postal service for the collection, transmission and delivery of messages, information, funds and goods both within Canada and outside Canada; to manufacture and provide products and services such as are, in the opinion of the Corporation, necessary.

Canada Post has the sole and exclusive privilege of collecting, transmitting and delivering letters to the addressee thereof within Canada (Article 14 (1) of the Canada Post Corporation). Article 15 (1) of the Canada Post Corporation states a number of exceptions to the exclusive privilege. These include, inter alia: letters carried incidentally and delivered to the addressee thereof by a friend of the sender or addressee, Commission affidavits, writs, processes or proceedings issued by a court of justice or letters in the course of transmission by any electronic or optical means.[39] Hence, the exclusive privilege does not apply to letters intended for delivery to an addressee outside Canada (cross-border mail). According to Article 56 of the Canada Post Corporation, violation of the privilege is an offence and can be liable to imprisonment for a term not exceeding 5 years.

Government reports and independent audits suggests that because of global postal trends, i.e. the decline in the volume of letters and strong competition on the parcel market, Canada Post is marginally profitable.[40] In 2018 and 2019, Canada Post Group of Companies posted a loss before tax.[41]

3 Scope of the Postal Service

In addition to determining what the legal definition of the postal service, it is necessary to consider the inner and outer limits of the scope of postal service. First of all, it is necessary to clarify the role of the legal definition and the consequences of such a definition for legal interpretation. The justification for legal definitions in laws is

[37] Officially the Canada Post Corporation.

[38] R.S.C., 1985, c. C-10.

[39] A full list of inclusions can be found in Article 15 (1) of the Canada Post Corporation.

[40] The Way Forward For Canada Post. Report of the Standing Committee on Government Operations and Estimates, December 2016 42nd Parliament, 1st Session.

[41] 2019 Annual Report Canada Post Corporation. Financial Section.

to clearly and definitively determine the specific terms or things used in the law. The legal interpretation of a term or thing defined in a legal act is the only authorized meaning (version) of it. The legal definition can expand or limit the normal (colloquial) meaning of a term or thing. The legal definition can even give a completely different meaning of a term or a thing if it is necessary for a particular legal regulation. Indeed, particular regulations are circumscribed by legal definitions.

In light of this, every activity run by postal operators that falls outside of the legal definition of the postal service is not, in legal terms, part of the post. This does not mean that postal operators can only run postal services, but very often business activities like banking or insurance are conducted by subsidiary companies due to other regulatory restriction, i.e., financial regulations.

To find the meaning of the term 'postal service', we must understand why the post was created. The postal services are as old as society itself, appearing when people decided to communicate with each other at distance. With increasing social needs, the post started to transfer not only simple information but also letters, gifts (parcels), and money. Indeed, we should consider the post as a connector between people, which ensures meeting fundamental communication needs (Gottschalk, 2020).

As was discussed above, law strictly limits the postal business through postal service definition. However, technical developments and social needs change the postal sector very quickly (Scorca, 2018). Traditional postal services are declining, and people are using new forms of what is understood as the postal service (connector). In 2016, Regulation (EU) no 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC (abbreviated to eIDAS) came into force. eIDAS provides e-administration for registered electronic delivery, which allows the sending and receiving of data that enjoy the legal presumption of authenticity and integrity. This tool may be effectively used in courts and administrative proceedings.

Such deliveries are analogous to that assigned to the delivery of traditional registered mail. As a consequence, many European countries have witnessed the expansion of IT systems, which are about to become a modern equivalent of the postal services. Those services, mostly known as "digital mailboxes" or "certified electronic mail", have been used by the governments of individual European countries for correspondence with their citizens. Regardless of its structure and detailed IT architecture, the purpose of each system is to speed up and facilitate communication between the citizens and the state administration via the Internet.[42] Romito et al. (2020, p. 62) has accurately pointed that digitalization of the postal sector is "so

[42] Leading systems can be distinguished among the solutions used in digital turnover for contacts between the citizens and the public administration e.g.: digital mail boxes – the services provided by postal operators upgrading their offer; frequently they allow the sending of both electronic correspondence and hybrid correspondence – examples: Moje Datova Schranka (Czechia), LaPoste box (France), a dedicated e-mail address + encrypting program (@eesti.ee + DigiDoc – a solution applied in Estonia) or certified electronic mail – assigned electronic mail systems (frequently

deep that it must be reflected in a change in the regulatory and legal context in all its different aspects". Nonetheless, digital services cannot replace the universal postal service obligation. To solve such a problem, Gori and Parcu (2020) proposed to completely redesign and unify the USO on postal and telecommunication sectors by creating one common communication universal service.

The last example refers to the procedure of registered electronic delivery, whose importance, pursuant to the eIDAS Regulation, is identical to that of registered mail in terms of legal effects. Examples of digital mail boxes in the CEE countries are: *Moje Datova Schranka* in the Czech Republic, or in Estonia a dedicated e-mail address plus encrypting program (@eesti.ee and DigiDoc). Regardless of its structure and detailed IT architecture, the purpose of each system is to facilitate and accelerate communication between citizens and the state administration. The solution would meet the requirements of those who like to have their matters handled in public offices without the necessity of their personal appearance at any office. The Czech solution perform by the Czech Post – Česká Pošta can be seen as a transformation from the traditional national postal operator into the national digital operator. However, from the legal point of view, such a transformation does not fulfil the framework of the postal service.

4 Conclusions

The postal industry faces unprecedented changes. This is a global trend with an impact on every postal operator, from providers with a postal monopoly to courier operators, but "The future holds tremendous promise and opportunity for POs" (Houck, 2016, p. 101). Such changes require changes in the postal legislation. In the ongoing discussions, one of the main issues is the need for a new definition of a postal service as a fundamental element of such a legal framework.

Selected cases show that the postal legislation can significantly differ among countries. For example, Italy implemented only the EU postal service definition, whereas Poland extended its postal service definition. Other legislations have preserved the postal monopoly but did not define the remaining postal services. The postal regulations presented in this paper show that the definition of the postal service has been limited to its logistical component. Therefore, the legal definition does not cover all aspects of the actual postal market. Thus, some aspects of postal activity are over-regulated, as in the case of the USO, while in some respects postal activities are not regulated, such as the phenomenon of parcel lockers. A third aspect concerns digitalization performed by the USP. In some countries, like Poland, it is a legal obligation of the USP, while not being part of its definition of postal activity.

encrypted) with an option of document storage, for example: De-Mail (Germany), PEC (Posta Elettronica Certificata, Italy), IncaMail (Switzerland).

Do we need a legal definition of the postal service? The answer is yes, as long as the postal market is under sector-specific regulation. Only by a legal definition can the scope of sector-specific regulation be strictly confined. All regulatory interference limits the freedom of the market or the freedom of choice of the market players (Baldwin et al., 2012). The regulatory power exerted by the public authorities such as postal NRA must be strictly limited, especially in terms of the scope of regulation.

The issues associated with the definition of the postal service remain unresolved. It is rather a process, which needs to be adapted to the current necessities. Lawmakers must start with the role of the postal service in their society. Thus, the post as a connector – between people, between businesses, and between both of these and the public authorities (government) – must be taken as a starting point (indication) for the definition of the postal service. In light of that, special digital correspondence can be covered by the new definition of the postal service as having a postal nature.[43]

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The Future of Services of General Economic Interest in the Postal Industry

Francesco Russo, Simona Romito, and Stefano Gori

1 Introduction

In recent years, two main trends have strongly influenced the postal industry, digitalization, which caused a deep decline in mail volume, and an e-commerce boost, which strongly boosted parcel demand. These trends will continue to influence the industry in coming years. Considering this scenario, the Universal Service Providers (USPs) have diversified their business to increase their streams of profits, for example by increasing revenues from parcels. Another option has been the exploitation of economies of scope generated by other services through the post office network (for example the sale of products with higher margins such as financial services).

These elements make the issue of sustainability of the universal service obligations (USO) a crucial topic, considering that direct subsidies, even when allowed, are unlikely to be enough, because of the limits to government expenditure determined by long-term low economic growth and deficit constraints.

The European Commission has a clear definition of services of general economic interest (SGEIs): "Services of general economic interest (SGEIs) are economic activities that public authorities identify as being of particular importance to citizens and that would not be supplied (or would be supplied under different

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conditions) if there were no public intervention. Examples are transport networks, postal services and social services."[1]

Furthermore, the Communication from the Commission on the application of the European Union State aid compensation rules for the provision of SGEIs (2012/C 8/02) states that funds are provided when there is a market failure (at §48). In addition, the notion of SGEI is an "evolving notion" (at §45). It is worth noting that this evolution emerges from "needs of citizens, technological and market developments and social and political preferences".[2] Moreover, the compensation provision for SGEIs includes a reasonable rate of profit. Hence, in the postal sector, SGEIs can generate a double benefit, an increase in revenues/profits of USPs and an increase in social welfare due to "their central role in promoting social and territorial cohesion".[3]

Thanks to the ubiquity of their acceptance of postal products (Post office network for those operators with a physical network) and delivery networks (postmen), USPs can become natural providers of more SGEIs than universal service (US) mail delivery, thus benefiting from new possible streams of revenues/profits. Copenhagen Economics, (2018), Main Developments in the Postal Sector (2013–2016) (from p. 116 to p. 119) has analyzed different SGEIs provided from different European USPs. Interesting examples are bpost and La Poste, both provide different SGEIs other than US, thus increasing their revenues/profits and the social welfare as citizens can access services that otherwise will not be provided "satisfactorily under condition such as price, objective quality characteristics, continuity and access to the service".[4]

After this introduction, Section 2 of this chapter analyzes the main dynamics of the postal industry (e-substitutions, parcel growth, diversification of revenues) and the EU legal framework with regard to the SGEIs. Section 3 examines the features of the SGEIs provided by bpost and La Poste showing the benefits for the community and the USPs. Section 4 analyzes the case of a USP that access to different SGEIs other than USO. Section 5 concludes discussing the benefits deriving from providing new SGEIs other than USO, taking into account the effects on social welfare and on USO sustainability while avoiding competition distortion.

[1] European Commission website, https://ec.europa.eu/competition/state_aid/overview/public_services_en.html

[2] Communication from the Commission on the application of the European Union State aid rules to compensation granted for the provision of services of general economic interest (2012/C 8/02), at §45.

[3] Communication from the Commission on the application of the European Union State aid rules to compensation granted for the provision of services of general economic interest (from the European Commission) (2012/C 8/02), at §1.

[4] Communication on the application of the European Union State aid rules to the compensation granted for the provision of services of general economic interest (from the European Commission) (2012/C 8/02), at §48.

2 Main Dynamics of the Postal Industry and the Chance Offered by SGEIs

Digitalization has deeply affected the postal industry in the last years. In particular, communication processes have been digitalized resulting in a strong decrease in mail volumes. Unluckily this phenomenon will continue to affect the industry in the future. The table below shows some data (Table 1).

The table above shows the negative trend of mail volumes in recent years, the Danish figure shows how this trend can have a profound negative impact on a USP.

The growth in e-commerce has generated a counter balancing positive effect in the postal industry as it has determined a huge increase in parcel volumes. Hopefully for USPs this trend will continue and they will gain new flows of shipments as long as they continue to adapt their mail-driven operational network to the required operational features for parcel's delivery. However, the USPs will face new challenges deriving from platforms that develop their own delivery network syphoning precious volumes.

As regards profitability, several POs after taking into account the decrease in mail volumes have redeployed their assets to diversify their activities and offer services sometime very far different from mail delivery. For instance, many operators have started selling financial services, through the post office network, as financial services have a higher margin compared to mail services. In this way, the potential economies of scale and scope of an ubiquitous asset such as the post office network are better exploited (Table 2).

SGEIs present another interesting opportunity of diversification. The Communication on the application of the European Union State aid rules (2012/C 8/02), at §1, states that SGEIs have a "central role in promoting social and territorial cohesion". However, they can be entrusted only where there is a market failure.[5] It is worth noting that there is no static definition of the SGEI in the Communication (2012/C 8/02) but it is stated that it "is an evolving notion" and depends on "the

Table 1 The negative trend of mail volumes

	Average change rate per year – letter post volumes		
	2013–2016	Minimum	Maximum
EU countries	−4.20%	Germany −2%	Denmark −15%

Source: Copenhagen Economics, (2018), Main developments in the postal sector (2013–2016)

[5] Communication from the Commission on the application of the European Union State aid rules to compensation granted for the provision of services of general economic interest (2012/C 8/02), at §48: "The Commission thus considers that it would not be appropriate to attach specific public service obligations to an activity which is already provided or can be provided satisfactorily and under conditions, such as price, objective quality characteristics, continuity and access to the service, consistent with the public interest, as defined by the State, by undertakings operating under normal market conditions."

Table 2 The diversification of revenues

% USPs letter post revenues over total domestic revenues across all activities		
EU countries	Minimum value – countries:	Maximum value – countries:
53%	DE – 16%	PL – 90%
	LU – 20%	IS – 83%

Source: Copenhagen Economics, (2018), Main developments in the postal sector (2013–2016)
Relative to the data the report specifies: "Countries that include other postal services not just letter post: FR, IE, IT – includes letter and parcel service; DE – represents postal business revenues in total Group's revenues; NO- represents the mail segments; HR, IS, LT, LU, MT – include other not specified postal services; PL – include all US services; SE, CH – revenues for communication services. The EU, EEA & CH average is an unweight average"

need of citizens, technological and market developments, and social and political preferences" (at §45). Hence SGEIs may become a flexible instrument to improve the general welfare. Considering all these elements, the USPs can play an important role by extracting value from the ubiquity of post offices and delivery networks, and have a possibility of exploiting untapped economies of scale and scope in the provision of these diversified services. The USPs could benefit from SGEIs as they could represent not only a new stream of revenues but also of profits, as the Communication (2012/C 8/02) (§60) carries the recognition of a reasonable rate of profit as a part of the compensation for the provision of these services. In fact, the Communication from the Commission – European Union Framework for State aid in the form of public service compensation (2012/C 8/03) establishes that state funds must cover the net cost for providing the public service obligations and a reasonable profit (§21). Different indicators are allowed but the "projected profit does not exceed what would be required by a typical company considering whether or not to provide the service".[6] The Communication (2012/C 8/03), at §24, also states that the methodology to calculate the net cost to provide a SGEI is the "net avoided cost methodology, where required by union or national/EC legislation". With respect to the postal industry,[7] Annex 1 to the Directive 97/67/EC of the European Parliament and of the Council (15/12/97) on common rules for the development of the internal market of Community postal services and improvement of quality of services is set as a guidance to the net avoided cost methodology calculation. Annex 1 underlines that the calculation should take into account the fact that USP have an "entitlement to a reasonable profit". Hence the legislative framework is clear in defining the reasonable rate of return as an important element to be considered in the calculation of SGEIs compensation.[8]

From the analysis above, it emerges that SGEIs are flexible instruments that in the context of a market failure can benefit citizens without distorting competition. The Communication (2012/C 8/03), in sections 2.2 to 2.10, sets the conditions that SGEIs must meet in order not to "affect the development of trade to such an extent as to be contrary to the interest of the Union".[9] When these conditions are satisfied, the SGEIs do not distort competition and the compensation, including a reasonable profit, becomes a legitimate source of both revenues and profits for the SGEIs' provider.

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[6] Communication from the Commission – European Union Framework for State aid in the form of public service compensation (2012/C 8/03), at §24.

[7] Communication from the Commission – European Union Framework for State aid in the form of public service compensation (2012/C 8/03), at §26.

[8] Annex 1 sets the specific rules to calculate the net cost and beyond the "entitlement to a reasonable profit" it sets that: "The net cost of universal service obligations is to be calculated, as the difference between the net cost for a designated universal service provider of operating with the universal service obligations and the same postal service provider operating without the universal service obligations. The calculation shall take into account all other relevant elements, including any intangible and market benefits."

[9] Communication from the Commission – European Union Framework for State aid in the form of public service compensation (2012/C 8/03), at §21.

3 bpost and La Poste SGEIs: Interesting Examples

A first interesting example of a USP that provides several and diversified SGEIs, other than postal universal service, is bpost. It delivers the Press Distribution SGEI, the Retail Network SGEI, Day to Day SGEIs and ad hoc SGEIs. All these examples of SGEIs cover the period between 2016 and 2020 and except the Press Distribution[10] are entrusted under the 6th Management Contract of bpost.[11] It is worth noting that the State compensations for these SGEIs have been approved by the European Commission as they have been considered aid compatible with an internal market.[12] bpost is entrusted with Belgium universal service[13,14] by law and the 6th Management Contract confirms the provision regarding USO stated in the 5th Management Contract.[15] The press distribution SGEI allows home distribution of newspapers and periodicals, which have specified features such as the frequency of publication in the whole territory at uniform and affordable rates. The Retail Network requires bpost to hold a denser network on the Belgian territory, hence the number of post offices available is higher than the network necessary to satisfy the delivery of USO (and other public services) and it is not commercially viable.

"Day to Day" SGEIs include cash at counter services, which provide to citizens the availability of affordable cash services and the home delivery of pensions. This service allows old people and people with limited mobility to receive their pensions at home all over the country at no additional charge. Ad hoc SGEIs include: the social role of postman, the delivery of addressed or unaddressed election printed items, the delivery of postal items sent by associations at special price, the delivery of letter post items that fall within the freepost system, management of fishing permits (printing, sale, reimbursement, replace and exchange of them). In more detail: the social role of the postmen is related to services provided to lonely and poor people; the delivery of addressed and unaddressed election printed items including the distribution of election material at reduced tariffs; the delivery of postal items sent by associations related to associations' items delivered at special price; the delivery of letter post items within the freepost system covers items addressed/originating from the King and from Public Institutions; and the management of fishing permits includes printing, sale, reimbursement, replacement and exchange of fishing permits.

[10] The service concession agreements for the distribution of recognized periodicals and newspapers entrust bpost.

[11] bpost, L'Etat belge, 6ème Contract de gestion Attribution de services d'intérêt économique general à bpost, 12/09/2016 (original text in French).

[12] European Commission Decision State aid SA.42366 (2016/N) – Belgium.

[13] bpost is entrusted of the Universal Service Obligation until 31 December 2018.

[14] A new Management Contract regarding only the universal services has been signed in 2019 for the period 2019–2023 (bpost, L'Etat belge, Contract de gestion relative aux obligations de service postal universel, 02/05/2019) (original text in French).

[15] European Commission Decision State aid SA.42366 (2016/N) – Belgium, at §76.

All the SGEIs described above are compensated from the State, there are also certain SGEIs delivered by bpost that are not compensated: the USO and some ad hoc SGEIs.[16] Table 3 below shows the main elements of the SGEIs that receive the State contributions: the aim and the resulting benefits provided to the citizens, the State compensations and the asset of the universal service provider utilized to provide the SGEI.

Analyzing the different SGEIs entrusted to bpost, it emerges that all of them (including the ones that are not compensated) constitute a complex and amazing tool kit able to strongly improve social and territorial cohesion. The variety, complexity and number of services offered use both the acceptance and the delivery network, thus optimizing the supply of the various SGEIs both for the USP and for the State. A key element is the exploitation of the physical assets of the USP making them profitable countering the economic negative effect caused by the electronic substitution. In fact, bpost will receive state funds for about 1.3 bln € during years 2016–2020. It is worth noting that these compensations include a reasonable rate of profit that contributes to the overall company profitability.[17]

A second important example of USP who is entrusted with different SGEIs is La Poste in France as it delivers both the postal universal service and several other SGEIs, namely: "the press distribution and delivery", the contribution to the development of the territory through its network of contact points ("territorial presence"); the banking accessibility.

The Contract d'Enterprise 2018–2022 relatif aux Missions de Service Public Confies au Groupe La Poste[18] (CdE) defines the terms and conditions of the SGEIs implementations. The USO doesn't foresee a compensation in the CdE while these other SGEIs are compensated. The press distribution and delivery has the aim to develop pluralism through the widespread of politic and general information. Publishers can send their publications at a reduced tariff and the State compensates La Poste for the net cost borne. This SGEI is used to distribute publications in rural and less economically developed areas.

The contribution to the development of the territory through its network of contact points consists in the maintenance of a post office network exceeding that established by the USO,[19] especially in rural areas.[20] The State compensation consists in

[16] There are some ad hoc SGEIs which are not compensated: please postmen service, dissemination of information to the public, cooperation with regard to the delivery of voting paper packages, payment of attendance fee during elections, financial and administrative processing of fines, sales of stamps and other postal values.

[17] European Commission Decision State aid SA.42366 (2016/N) – Belgium, at §49, §94.

[18] La Poste, L'Etat, (2017), Contract d'Enterprise 2018–2022 relatif aux Missions de Service Public Confies au Groupe La Poste.

[19] La Poste has to keep a network of at least 17,000 (including the USO points) and they can be also agencies.

[20] This State aid has been approved by EC and relatively to the importance of this Mission Vice President Margrethe Vestager, said; "Easy access to postal services is vital for all EU citizens. Today's decision enables La Poste to receive compensation so that it can continue performing its fundamental social and economic role and important public-service mission, without unduly dis-

Table 3 bpost's SGEIs

SGEIs – years 2016–2020	Compensated services provided	Aim	State funds in M€	Asset exploited
Press distribution	Distribution of recognised newspapers	Information widespread at affordable rate	591.6	Delivery network
	Distribution of recognised periodicals		267.2	
Retail network	Maintenance of the "retail network"	Provide a full territorial presence and proximity	458.4	Improvement of assets (more post offices)
Day-to-day	Deposit of cash at the counter	Universal financial services at affordable prices		Post office network
	Home delivery of pensions	Provisions of doorstep payments to old people and people with limited moving capabilities		Delivery network
Ad hoc	Social role of postman	Provisions of services to least privileged and lonely people		
	Delivery of addressed or unaddressed election printed items	Guarantee of an open and democratic election process		
	Delivery at a special price of postal items sent by associations	Support of the associations		
	Delivery of letter post items within the freepost system	Improvement of contacts among citizens and institutions		
	Management of fish permits	Better management and control of fish permits		Delivery network/ post office network

Source: European Commission Decision State aid SA.42366 (2016/N) – Belgium

a reduction in local taxes. The banking accessibility has the aim to provide all the citizens, without any restriction, a basic saving product, the "Livret A". Hence, citizens who are financially fragile can access to a saving product. Relatively to the "Livret A" La Poste has to distribute it and offer free financial transactions. Table 4 below shows the main elements of the SGEIs by listing the ones that receive a State contribution.

The table above shows how the postal infrastructure is used to pursue objectives of general interest fundamental in a developed society, such as the development of

torting competition". Press Release of European Commission, (2018), State aid: Commission approves compensation granted by France to the French post office for its territorial coverage, IP/18/2843.

pluralism and the usage of financial instruments (from the French "bancarisation") for all citizens including the most financially fragile. It is also recognized the value of the postal network for the community in order to fully implement the territorial presence.

This benchmarking of the different SGEIs of two important European postal operators shows that both have SGEIs, which further develop the postal network, by exploiting its unique infrastructure that is able to offer a diversified set of services (e.g. financial services). Moreover, SGEIs compensations constitute a new important stream of revenues/profits as they can include a reasonable rate of return as prescribed by the methodology to determine compensation.[21]

Table 5 below recaps the amounts of the compensations for the years 2018–2019 for both USP. It is worth nothing that these are substantial financial benefits for an USP and could significantly contribute to reach and maintain its economic equilibrium.

To better assess the effective economic relevance of these SGEIs for the USPs, we considered that it could be possible to imagine a hypothetical basic scenario where these USPs keep the same operational infrastructure – as the assets exploited to deliver the SGEIs are essentially those of the USO- with the same size and range of services offered but without any State compensations. In fact, if one subtracts the financial contributions for the SGEIs to bpost or La Poste EBIT or net profit, for the years 2018 and 2019, they will decrease substantially, even reaching negative grounds. Specifically, for bpost, in 2018, net profit would go to 0 and, in 2019,

Table 4 La Poste's SGEIs

SGEI – years 2018–2022	Compensated services provided	Aim	State funds in M€	Asset exploited
Press distribution	Distribution of recognized newspapers and periodicals	Develop pluralism	111.5 (2018); 103.8 (2019); 95.9 (2020)[a]	Delivery network
Retail network	Territorial presence	Provide a full territorial presence and proximity	174 (2018; 2019)[b]	Improvement of assets (more post offices)
Banking accessibility	Provision of a saving product ("Livret A")	Provide a basic saving product to all citizens	320 (2018); 300 (2019); 280 (2020)[c]	Post office

Source: CdE

Note: [a]The State compensations for the years 2021–2022 are not specified in the contract

[b]The following years will be defined in the next "territorial presence" contract

[c]The following years will be defined in the next agreement

[21] The net avoided cost methodology includes a reasonable rate of profit.

Table 5 La Poste and bpost's State compensations

State compensations in € million	2018	2019
La Poste	606	578
Bpost	263	260

Source: bpost European Commission Decision SA.42366 (2016/N) – Belgium, La Poste CdE

would be strongly negative (−105 mln€); while for La Poste net profit, in 2018, would fall by 76% and in 2019 by about 70%.[22,23]

4 The SGEIs' Future

The entrustment of SGEIs can improve social welfare overcoming situations of market failure without distorting competition. As highlighted above, SGEIs are flexible instruments that can be used to tackle a large variety of market failures. With respect to the cases discussed, the statement of the Vice President of the European Commission, Margrethe Vestager, about the compensations granted to La Poste for its territorial coverage mission is revealing:[24] "Today's decision enables La Poste to receive compensation so that it can continue performing its fundamental social and economic role and important public-service mission, without unduly distorting competition".

Regarding bpost State aid case, an EC press release represents that "Belgium organized a public consultation that confirmed the essential social and economic role of the public services entrusted to bpost."[25] With regard to bpost, in the past, Almunia declared,[26] "Today's decision allows bpost to receive adequate compensation for the provision of essential public services to Belgian citizens, while ensuring that such services are delivered in an efficient and cost-effective manner".

[22] bpost Group in 2018 reported a EBIT of 393 mln€ and a net profit of 264 mln€ (bpost, Annual report 2018). In 2019 the EBIT was equal to 290 mln€ and the net profit was 155 mln€ (bpost, Annual report 2019).

[23] Group La Poste in 2018 reported a EBIT of 892 mln€ and a net profit of 798 mln€ (La Poste, Consolidated Financial Statements 31 December 2018). In 2019 the EBIT was equal to 889 mln€ and the net profit was 822 mln€ La Poste, 2019 Annual Financial Report Le Groupe La Poste.

[24] Press Release of European Commission, (2018), State aid: Commission approves compensation granted by France to the French post office for its territorial coverage, IP/18/2843.

[25] Press Release of European Commission, (2016), State aid: Commission clears Belgian postal service compensation for bpost, IP/16/2034.

[26] Press Release of European Commission, (2013), State aid: Commission endorses public service compensation for Belgian post, IP/13/390.

It emerges that the entrustment of SGEIs to a USP can create advantages for all market actors increasing social welfare without distorting competition. Consumers will have products/services previously unavailable because of the market failure and the USP can exploit part of the postal infrastructure increasing revenues and profits. Moreover, as stated in the above press release of EC, the USP continues to "perform its fundamental social and economic role". Figure 1 below summarizes the view of the phenomenon as it emerges from our two examples.

The figure above shows the positive effects of entrusting of SGEIs to USPs can have on the community and the USPs themselves. The framework has the other remarkable advantage that it doesn't appear to cause any competition distortion,[27] with the result that no market actor is in a situation worse than the initial one (UPS with USO). Moreover, as pointed out by Fratini et al. (2019), the incumbents' networks "can play a relevant role in the public interest" when dealing with no USO services and "the postal network is confirmed as a unique asset for the purpose of the State's public interest objectives".[28] This confirms that USPs networks can become a unique transmission vehicle of different services of general public interest.

5 Conclusions

The postal industry is changing mainly due to the ongoing digitalization and the subsequent growth of e-commerce. In this new market environment, the sustainability of the USO is a crucial issue for USPs as more and more budget constraints and stagnant economic growth curtail direct subsidies.

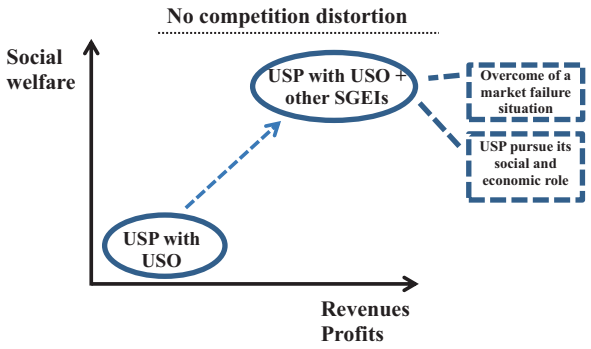

Fig. 1 The benefits of SGEIs to USP and the community

[27] The SGEIs to be compatible with the European Union Framework for State aid in the form of public service compensation (2011) (2012/C 8/03) must met the conditions from sections 2.2 to 2.10.

[28] Fratini, Pucci (2019), Beyond the USO: reflections on recent decisions on postal SGEIs, at §4.

In this context, the SGEIs may provide an interesting opportunity as they can represent a new source of revenues/profits for the UPSs. They are entrusted for services/products offered in a situation of a market failure and their notion is wide and flexible. Examining La Poste and bpost cases we showed that USPs' postal frameworks can be used to provide SGEIs exploiting the ubiquity of postal networks (the Post Office and the delivery networks). These cases represent "win-win situations" as all the market actors receive benefits and competitors are not damaged. The USPs can continue to perform their "fundamental social and economic role"[29] increasing revenues and profits and the social welfare will be improved as well by the provision of services/products that present a situation of market failure. Moreover, public resources won't be wasted as the State aid rules foresee that services are provided in "an efficient and cost-effective manner".[30]

Moreover, the study requested by the TRAN committee of the European Parliament, "Postal services in EU" (p. 52) confirms this view as it points out that "the network infrastructure can be the "retail arm of the State", delivering publicly-relevant services – SGEIs, the provision of a digital mailbox – in a more effective and efficient way than the State would itself". Hence, this would generate an optimal use of taxpayers' money and saving for the state.

Probably the provision of other SGEIs by USPs is the next natural evolution of the postal operators. The postal infrastructure may be destined to provide different services continuing to "serve the country" while USPs further develop their natural social role. Rural and remote areas could benefit from the provision of other SGEIs as they often are in a situation of market failure in the availability of certain services. In this way the social cohesion would be preserved as a fundamental value of our society.

With the Covid pandemic the SGEIs' future may become more and more important as SGEI notion may evolve and be transformed in a tool for governments to tackle social and economic cohesion issues. POs can reinforce their role as instruments to reduce the negative impact on everyday life as they can exploit their infrastructure to provide services to all citizens. A clear example is the last mile delivery of medicines carried out on voluntary basis by several European operators (e.g. Correios and La Poste) but also many other services could be implemented in the future also using European Funds (e.g. the funds allocated in the Recovery Plan for the digital and more environmentally innovative projects).

[29] Press Release of European Commission, (2018), State aid: Commission approves compensation granted by France to the French post office for its territorial coverage, IP/18/2843.

[30] The European Commission Vice President Joaquín Almunia said: "Belgium has cooperated with the Commission to ensure full compliance with our new rules on SGEI. Today's decision allows bpost to receive adequate compensation for the provision of essential public services to Belgian citizens, while ensuring that such services are delivered in an efficient and cost-effective manner." Press Release of European Commission, (2013), State aid: Commission endorses public service compensation for Belgian post, IP/13/390.

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Sustaining the USO in Canada: Toward a Case for Adapting Reserved Area Parameters in the Digital Age

Kevin Matthews and Christopher Schwartz

1 Introduction

The aim of this paper is to supplement discussion of postal regulation in the digital age, by considering whether a part of the Universal Service Obligation (USO) funding solution might be found by redefining the reserved area of monopoly postal services to match customer communications using postal services. This strategy could reinforce long-term sustainability of universal service provision.

For postal providers in Europe, the need to operate within the EU Postal Directive means accepting the opening of markets. For postal service in Canada, regulatory discussion in the European context and globally is enlightening, but the Canadian State also has a broader range of policy options before it. The reserved area in Canada has not been reduced, and opening the postal market is not a mandated priority. Canadian policy-makers still have an opportunity to assess the value of the letter mail monopoly – known in Canada as the exclusive privilege – in terms of sustaining the cost of the USO in the long term. The solution to funding the USO is sure to require multiple initiatives, including operational modernization, which is

The paper does not necessarily represent the opinions of CUPW or PSAC.

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underway; revenue diversification for the Universal Service Provider (USP), which needs time to develop and be fruitful; and the possibility of seeking greater long-term stability[1] in monopoly revenue by better alignment with the population's needs.

In light of costs associated with Canada's massive geography, Canada Post Corporation's (Annual Report, 2019) own concerns over the cost structure of the USO compared to changes in its revenue structure are particularly acute. In Canada as globally, letter mail is declining because of the convenience of digital alternatives, while parcel post contains many more urgent items, personal data, privacy-sensitive goods – like medications and electronics, and commercial valuables. The mail overall is not necessarily more or less valuable, but the value and the considerations have changed, which bears study when considering the future of the regulatory framework.

In Sect. 2, the paper advances that, along with the traditional value components of reliability and accessibility, service users have become more sensitive to privacy and security because of technological change associated with service provision (and more generally) and increased competition in postal services.

As such, if we examine the value components of the USO, we may find that some of the traditional value of the monopoly has shifted to other parts of the service range, i.e. no longer captured by the monopoly service. In this case, policymakers could justify adapting (expanding) the reserved area to serve the public benefit and recapture related revenue.

If we fail to consider this, Canada may be sliding into a postal market that is opened not by deliberate policy, but by default, as the regulatory framework's assumptions were not conceived with the effects of digital substitution and e-commerce in mind. The values that the monopoly was built on could be jeopardized for users, if the USO cost becomes unsustainable.

Section 3 considers what the COVID-19 pandemic has revealed about reliability in postal systems, their social function, and public perceptions of the vitality and importance of the USO for the future. Section 4 looks at the current parameters of the exclusive privilege and the problem of how to assess which parameters might be worth adapting in light of the current reality and foreseeable trends. Section 5 follows on this by identifying some areas that need further research to substantiate a case for adaptation and assess its potential impact. Section 6 concludes with a consideration of the outcomes of making such a policy change. Stakeholders include Canada Post Corporation itself, the State (CPC's shareholder), postal service users, social goods including environmental impact, and for competitors in the postal sector.

[1] Letter mail revenue for Canada Post has not dropped proportionally with volumes because of concurrent increases in postage. Pricing has been somewhat inelastic in the past, but as Jaag (2014) notes, there are signs that price elasticity in postage has changed in recent years. Crew and Brennan (2014), on the other hand, find that e-substition may not cause changes in elasticity. Regardless, there's no reason to expect that Canada Post Corporation could raise stamp prices time and again to prop up revenue. A large increase in 2014 brought stamp prices roughly into step with what they would have been had they increased with inflation since the beginning of the crown corporation.

2 Universal Service and Monopoly in Canada: Existing Parameters

To help define the Universal Service's value in the public interest, this section briefly reviews the history of the universal service obligation in Canada, noting the explicit value components identified in the service provider's mandate, which implicitly justify creating a monopoly service area – known in Canada as the Exclusive Privilege on letter mail. Taking uniformity of access to service as given, we identify four components of the USO's value to the public: (a) reliability, (b) accessibility – which includes price as well as points of access, (c) privacy, and (d) security. In traditional letter mail, these are integrated – all four have been achieved by the same means, which is to protect the physical integrity of the mail with secure transport and access points. If the nature and content of what is being transmitted in some products that currently fall outside the exclusive privilege is as sensitive as the content of traditional letter mail, based on the need for one or more of these factors, then we can argue that the same elegant and comprehensive solution – i.e. the exclusive privilege – would be in the public interest.

In the Canadian state-initiated *Postal Services Charter* (2009), all four are addressed, though without explicit priority and without quantified standards in each, except for clear and explicit standards for delivery time standards, and delivery frequency. So, some of these value components have been taken for granted in previous paradigms. If there is no policy intervention, the USP could find itself in an open-market situation by default, or by neglect, out of sheer imbalance between the monopoly services and the competitive segment. The USP's capacity to provide the USO would be at risk.

We identify three major eras in Canadian postal regulation, the first two distinguished by different expressions of mandate and governance structures. While we may consider the digital age to be the advent of a third era, the service's mandate has not been overhauled for the digital age. Our intent is to advance considerations that would be part of adapting the postal service to continue to serve a viable role relevant to the changing needs of the population.

2.1 First Era: Confederation

The *British North America Act* of 1867 established the Dominion of Canada, uniting three former colonies. The *Canada Post Act* of 1867 established universal service and fixed postage rates. This era, in which the government provided the postal service directly, and therefore absorbed any surplus or loss, lasted until 1981 and corporatization.

The *Act* created a Post Office Department and mandated it to provide a universal service, established uniform postage rates, and an exclusive privilege on letter mail. While it created a monopoly on only letter mail, it included packets, parcels,

periodicals, books and an extensive category of other goods in the USO. The *Act* included criminal sanctions for violating the security or the privacy of the mail, which, of course, throughout the period, was a matter of its physical integrity. It established a governance accountable directly to the elected government of Canada. Through various changes to methods and practices, this fundamental character of how the service received its mandate and its accountability structure prevailed until 1980.

2.2 Second Era: Corporatization

The *Canada Post Corporation Act* of 1980 corporatized the service, adding financial self-sufficiency to the mandate. It gave Canada Post Corporation authority to set rates and manage operations, handle complaints, and so on, reporting to a federal government ministry, currently Public Services and Procurement Canada. Corporatization followed complaints about the service, financial performance, and labour unrest, and adhered to a model of corporation earlier seen in the UK and US. It assigned responsibility for both responding to service complaints and labour relations to the new Crown Corporation. It maintained the USO that was established in the *Act* of 1867, and preserved the boundaries of the exclusive privilege, i.e. covering letter mail up to 500 g. The Corporation is also tasked with adapting its products and services in light of changes in the field of communications (*Act* part I art. 5.2.a). It is worth noting for this paper's purpose that the *Act* explicitly calls called for the Corporation to provide for the mail's security (Ibid). (In 1981, the idea of the mail's privacy may easily have been conflated into the term 'security'.)

2.3 Third Era: Service Charter

In 2009, without changing the service's basic paradigm or structure, the Government of Canada introduced the *Canadian Postal Service Charter (Government of Canada,* 2010), an additional instrument that further specified expectations on service standards (including time standards), universality (access points and affordability), security, and privacy. Since then, the corporation has reported annually on its adherence to the *Charter*, both in methods and outcomes, in the Corporation's annual reports between 2009 and 2019.

In 2009, CPC's report (Canada Post Corporation, 2010) focuses focused with great confidence on its responsiveness to the *Charter*. By 2019, the tone of the report (Canada Post Corporation, 2020) is markedly different, prioritizing universality and accessibility of the service. It is was a terse point-by-point response, affirming that each aspect of the service required by the charter has been accomplished. It is was situated within an Annual Report that headlines annual losses, despite a small profit from operations, and continuing decline in letter mail volumes

and the changing mail mix, with growth in the more cost-intensive parcel service, and declining revenue from letter mail and advertising mail. If any competitors still express concern about cross-subsidization, CPC clearly feels less urgency than in 2009 to foreground its response to these concerns, instead highlighting worries about its own financial self-sufficiency.

Sidak (1997) noted a concern, amid preoccupations about anti-competitive practices, not least that Canada Post as a whole might become a 'profit center' for the federal government. Canada Post has a record of modest profits. Certainly in 2020 it seems these concerns about anti-competitive effects from the monopoly have been supplanted by negative projections about the Corporation as a whole, and inability to rely on monopoly revenues to maintain the basic universal service, let alone cross-subsidize competitive products. Nonetheless, CPC still performs a required cost allocation study each year to comply with its regulatory responsibilities.

The *Charter* calls for a review every 5 years, which has not happened. But in 2015, after a public outcry over service cuts announced in 2013 and a change of government in 2015, there was an open public review of the postal system. That review's report was released in December 2016, including recommendations on adapting to the changing needs of users, and on increasing revenue by diversifying services, but nothing that would modify the USO or the exclusive privilege.

2.4 Summary Comments

We survey these eras in order to point out that while reliability and accessibility (including affordability) of the postal service were always explicit in the provider's mandate, privacy and security of the mail were more implicit, conflated, and probably taken for granted by users. Users today are less likely to take the privacy and security questions for granted, and offering state-backed protections of both may be growing in value, because of awareness of new risks in the digital era, combined with a growing number of items sensitive to privacy and security in the mail – medications being the most obvious example.

Both privacy and security could, especially in the first era of the service, be met by the same means. Criminal sanctions against tampering or theft were the most appropriate and applicable way to safeguard these at the same time. However today, with automation and digitization and the possibility of hybrid digital-physical products – where both physical and digital privacy could be simultaneous issues, users' privacy and security are separate concerns, exposed to different risks at different times, as the user's personal information and information about their mail is processed in parallel with the physical goods. More sophisticated protections are called for, and there is evidence that users are aware of the concerns, indicated in Thresher (2014).

Arguably, USO value is displaced, not eroded, by letter mail decline. If we shift the premise on which we describe the need for a universal service obligation, and try to capture some of the value that is slipping into the competitive sphere, we may

change the level of ambition and engage innovative thinking about the future of a crucial public service.

Based on the content, recommendations and impact of the Government of Canada's 2015 review of the postal service, an overhaul of the mandate and the USP's governance on the scale of the *Act* of 1980 is not to be expected. But the way people use the service has changed rapidly, postal work has changed rapidly, and the Canada Post Corporation has been projecting dire news for the USP's financial self-sufficiency. If we want to preserve a range of options for intervention, sooner is better, and anything to prolong financial viability is in the public interest.

In the public sphere, it is not enough for personal information and goods to be secure; there must be consumer confidence that they are indeed secure and private. We have a venerated legislative framework for the privacy and security of the mail, backed by criminal sanctions. Postal workers are public-sector workers with clear and strict guidelines on their treatment of the mail's privacy and security. Trust and peace of mind are serious and valued parts of the reliability, security, and privacy of the service.

2.5 Changing Structure of Value Components

Crew and Kleindorfer (1998) characterized the value components of the USO requirements as affordability and uniformity. The problem, they considered, in the era of digitization (spoken of more broadly as technological change in their article) is how to gain the benefits of competition but keep the USO working. Given this aim, Crew and Kleindorfer set out to determine the optimal scope of USOs and reserved areas.

They point to the fact that when the USP enjoys a monopoly that is large in scope – either by geographical area and/or by range of services – state ownership becomes more desirable than privatization, regardless of efficiency of would-be private entrants. Our extension of this argument is that in Canada, where state ownership is still prevalently viewed as optimal, there may be a case for increasing the scope of the monopoly to improve the USP's sustainability.

3 COVID-19 Pandemic Experience

During this research project, public reliance on postal systems, public appreciation for postal systems and other network infrastructure, and habits of consumption were all radically changed by the COVID-19 pandemic and measures to slow and stop its spread. COVID-19 has lessons for us about resiliency, security, privacy, and trust. The pandemic experience has either – depending on one's point of view – revived awareness of how much we depend on the universal service, and/or simply brought more particular attention to some of these constituent values. Among those,

reliability and security have apparently been the most keenly valued during periods of lockdown and self-isolation, when people are depending on Canada Post and other carriers to deliver basic necessities and to do so with punctuality.

In 2020 we saw the value of postal service increase – shown by improved reputation and by increased demand – in a time of emergency. The postal system did not break down or even come close to breakdown, while other services were overloaded and/or interrupted and some remain in deep jeopardy. The postal system is not just about transporting information and goods – security, privacy, reliability, affordability - but is about network connections touching every address in Canada with the knowledge that the shipping intermediary maintains neutral treatment of the item and no knowledge of the exact contents of the internal item.[2] The ability to mobilize this kind of network service has potential far beyond what has been tapped so far in the pandemic response.

The public has shown that some combination of the reliability and security of the service is of increased value in the pandemic. In a consumer confidence poll by Gustavson School of Business (2020), Canada Post Corporation rose to the top of the most trusted brands in Canada, at a time when overall trust was said in this report to be at an 'all-time low'. It has been some time since CPC was in the top five in the annual survey.

Such a dramatic demonstration of both the value and performance of the postal system during a time of crisis must inform our considerations of the proper regulatory framework necessary to ensure its continued vibrancy and sustainability into the future. As we contemplate the future of social services, resilience and the ability to mobilize for the public benefit must be key considerations.

4 Parameters of the Reserved Area

For this section, to help identify how well the exclusive privilege is aligned with the public interest, we ask ourselves some key questions. For instance, do the structural changes in the mail mix (growth in parcels and simultaneous declines in other services) reflect changes in the fundamental needs of users? Not necessarily. The exclusive privilege within the USO bound up reliability, accessibility, privacy and security together in a comprehensive vision of the service. What has changed radically, we'll put forward, is which parts of the USO most embody those value components.

When the USO was first codified, and still when the mandate was transferred to the Crown Corporation, letter mail – also called transaction mail – contained sensitive material including household and business financial and medical documents, while parcel goods were either person-to-person exchanges, or catalog purchases of items that were non-urgent and not locally available to the consumer.

[2] Excluding internal parcel items requiring a customs declaration.

The mail's content and function having changed so dramatically in recent decades, where might we now locate the value that was presumably in the monopoly service for over a century? In other words, if the USO and Exclusive Privilege were new ideas today, what would be the public-interest value proposition that justifies them? Would we, at the end of that discussion, expect a reserved area in letter mail to address the public needs, and support the cost of universal service?

Thresher (2014) found in market research that digital natives explicitly valued privacy and were concerned with how their personal information is protected or shared, but when presented with a trade-off between privacy and convenience, opted for convenience. They also found synergies between e-commerce fulfillment service and other postal services,

> As OIG focus groups with Digital Natives indicate, the increase in per capita parcel volume over the coming years will likely create a new ritual, as younger generations anticipate parcel delivery and ensure they continue to check their mail often. Digital Natives' excitement around parcels generates additional anticipation in checking the mail, upholding the viability of the mail channel as an advertising medium.

Thus, mail is not *losing* value – even with younger people, but value has shifted and perhaps become more complex. It will be imperative to develop services based on sound research to enhance their experience.

Letter mail service used to enjoy an economy of scale that was tacitly factored in to setting appropriate rates and managing the cost structure of the postal service as a whole. All the while, Canada Post, like most operators, has benefitted by economies of scope – in terms of the mix of services in delivery. As the economy of scale in the monopoly service falls off, it seems wise to bolster economies of scope.

For consumers ordering online, small packets (using for our purposes the Universal Postal Union (2018) definition, up to 2 kg) already accommodate many orders of medications, electronics, and personal items. Our hypothesis would be that these are the items more likely than the broader category of parcels to be privacy – and security – sensitive. For senders, small packets are more likely to be sensitive to these factors than larger parcels, but further inquiry would be justified to confirm this, as addressed below. While the USP could gain an economy of scope and thus greater long-term viability of the USO, users would gain better protection for their packets' contents. It is worth clarifying that it is the USO, not the exclusive privilege, that requires Canada Post to protect the mail's privacy and security. That is to say, bringing packet services into the reserved area would not add security or privacy protections to packets already handled by Canada Post, but it would bring all packets under the same tight legal protections.

5 Further Inquiry

Our goal must be to better understand the justifying values. Revenue from Canada Post's existing exclusive privilege may not be sufficient to fund the USO. Can we identify, then, which elements of the USO might justifiably be added to the

exclusive privilege? In order to substantiate a case for regulating packets and/or small parcels, some first-hand research would be critical. Deliberations over policy changes need to consider the full range of stakeholders, and weigh the impact on them against the revenue impact of the policy move.

5.1 Research on the Value Side

An assessment is needed to prioritize the value components of reliability, accessibility, privacy and security. Which of these are most highly valued by users, most identified as benefits of using Canada Post over other services, and which parts are associated most strongly with the factors that matter to users? In other words, which segment of parcel service would be most arguably in the public interest – is small packets in fact the right range to be considering? Rates are not contingent on contents, so it is important to establish which products are most often used for contents that are sensitive to our value factors.

These questions suggest we need a systematic overall study of postal user needs in Canada. The BIPT study, conducted in 2020, on postal end user needs (Belgian Institute for Postal Services and Telecommunications 2021) makes a critical distinction between user needs and preferences, noting as one illustration the market-created mismatch between user needs and offerings in delivery speed of parcels. The BIPT's purpose in mapping postal demand is to find an optimal match and a revision of universal service obligations, but the same need for better-defined user needs applies to our case for adapting the reserved area.

Another question would be to examine if large-volume mailers also see positive value in extending the monopoly to packets, based on their offering to receivers. How many such packets are currently handled by other carriers? Would the revenue impact be significant, and would it be stable and predictable?

In another vein, how much would the public value an enhanced social role for the postal system, and added contribution to the public benefit? *The Way Forward for Canada Post* (2016) includes many encouraging interventions and suggestions from the public in that vein, and desire for an expanded service range and public role is reflected in many of its recommendations. Consumer trust in Canada Post Corporation would also be enhanced, but these outcomes would all need market research to measure their impact and identify pitfalls. Moreover, studies on public will-to-pay would be needed, in order to find appropriate price points and evaluate the potential revenue.

Would the processing and delivery of more packets bring in an economy of scale, along with the presumable economy of scope? Would consolidating packet service under the USP bring about efficiency benefits? Would it bring ecological benefits, particularly by eliminating some redundant use of energy and resources, and reducing GHG emissions (as compared with the resource intensity of multiple operators delivering competing services to the same addresses)?

5.2 Research on the Cost/Drawback Side

A fundamental line of inquiry would be to establish how an adapted monopoly would include safeguards to avoid the possibility or the perception of rent seeking? Would such a move bring about calls for a third-party regulator, which has not so far proven desirable to the Government of Canada or Canada Post Corporation. Furthermore, the interests of large-volume mailers may prove to be a challenge, or simply to diminish the prospective marginal revenue from the additional packet business. There may also be challenging interactions with pro-competition aspects of international trade agreements, and with Canada's own *Competition Act* and related regulations. And naturally it would be useful to know what, in Canada, is the net cost of the USO, in order to be in a position to assess whether the USO cost has become enough of a burden to provoke regulatory intervention. How one might define and calculate the USO cost in Canada is another important research topic.

Finally, if there is an emerging case for parcels/packets in the USO, is there an argument that a public postal service can deliver the service better than other industry players? Is there a natural monopoly on an extended exclusive privilege, or is there a prospect of market failure?

6 Ramifications for Stakeholders

This section considers potential impacts on several postal-regulation stakeholders. For the USP (CPC), principal benefits of expanding the reserved area would be revenue to help stabilize the operations, and to help buy a longer time window for other adaptations and service expansions to take place would be a benefit, since the pace of letter mail decline is not slowing and the minimum letter mail volume and revenue is unknown. CPC would also enhance its role in the public interest and further build brand trust. For postal workers, stronger brand trust and financial performance at CPC would help protect job security, as well as the perceived value of the service they provide, which is significant in interactions with the public.

For the Government of Canada, the prospect of Canada Post Corporation losing financial self-sufficiency is politically difficult. Various measures that would delay or avoid this are likely to be welcomed. Bel and Calzada (2009) speak of the political cost of direct transfers to fund USOs. Conversely, there is a political benefit in avoiding them. The government would also benefit from an expanded ability to play the role of guarantor of security and privacy of goods and communications handled by the public postal service. Municipal governments might also benefit marginally from decreased externalities brought on by delivery vehicles contributing to congestion. If ecological benefits accrue, the Government of Canada could also fold this into a leadership role on greening infrastructure and services. On that token, we can also consider the environment itself a stakeholder.

For users, the benefits are in the direct value of the service and a better match between user needs and the USP's mandate – using the trusted USP, backed by state oversight, to extend universality, accessibility, privacy, and security to the delivery of more goods and communications, would demonstrate a commitment to adapt to changing needs based on public benefit. The benefits for users may also be mixed: If users are benefitting, as consumers, from competition in parcels, some of this benefit could be lost in withdrawing some of the service range from the competitive market – but this deserves closer analysis of the impact of existing competition in parcels on the customer.

For competitors in post and logistics, the picture is more complex. Part of this depends on whether current controls to prevent anti-competitive practices (cross-subsidization) would still be adequate, or adaptable. Depending on whether different market players consider current practices adequate to prevent anti-competitive practices, some might be skeptical of expanding the monopoly service.

7 Conclusion

We have outlined a basis for exploring the need, and the possibility, of adapting the reserved area to help properly support the costs of the USO. In Canada, the USO has been affirmed and further specified over time in successive systemic changes to the USP. The exclusive privilege on letter mail (reserved area) has not been reviewed or changed, and there is no direction to liberalize the market. Canada Post Corporation is corporatized but not privatized, and it's been some time since the Canadian public showed any appetite for privatization.

In light of the digital age, adaptation is needed. This is, firstly, because users' needs are changing, and people are relying on different parts of the service as digital alternatives avail. It is, secondly, because this results in different revenue and cost structures. Though further study is needed to substantiate the case, we advance this possibility to supplement the existing discourse on how to support the cost of the USO in postal systems. There may be other jurisdictions where such a move is worth considering.

In Canada at least, where the option exists, regulatory intervention seems like an important piece of the USO funding puzzle, and would likely bring various non-financial benefits too. It could offer some revenues, increased relevance in the postal service's social role, and better outcomes for users. This paper concludes that the goals of maintaining the potential of the public postal service to provide other valuable services, and protecting the shifting value of the USO, make it worth further exploration.

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Neither the Carrot nor the Stick: How to Ensure Adequacy of Traditional Postal Operators' Funding in a Rapidly Transforming Market

Emanuele Frezza

1 Introduction

The postal services market is going through a transformation that is challenging traditional postal operators' ability to meet their universal service obligation (USO). Letter mail decline and increased parcel volume are driving operational changes and costs and re-shaping consumers' behaviors. In order to stay competitive in a rapidly changing market, postal operators need to apply advanced technology solutions to the entire delivery chain while asked to increase efforts to promote sustainable deliveries and reduce environmental impact of their operations. Adapting to the new scenario requires investments in infrastructure and technology to support the delivery of growing parcel volumes and improve customers' shipping experience whilst coping with obligations related to universal service provisions.

As traditional compensation for the cost of universal service provision, as defined in the Postal Services Directive (PSD),[1] cannot sustain these type of investments,

[1] Directive 2008/6/EC of 20 February 2008 amending Directive 97/67/EC with regard to the full accomplishment of the internal market of Community postal services.

How to ensure adequacy of traditional postal operators' funding in a rapidly transforming market

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postal operators are now exploring alternative funding to support their transformation. However, the varied nature of these resources (governmental aids, private financial loans, other funds channeled by the EU recovery plan) and the complexity with respect to their use raise concerns about potential competitive distortions. In this context, it is not yet clear whether EU competition rules, including the EU's current State Aid regulatory framework, would be able to perform a comprehensive scrutiny of those funds and to assess their impact on competition within a rapidly transforming market.

The paper is organized as follows. Section 2 clarifies the relevant changes in the market, and Sect. 3 describes how postal operators are trying to adapt to those changes. Section 4 presents various new forms of financial support that postal operators are seeking. Section 5 explains how these recent developments can result in potential competitive market distortions, assess what methods should be considered to scrutinize new forms of funding for postal operators and advance recommendations to remedy distortions. Section 6 briefly concludes.

2 The Transformation of the Postal Services Market

The decrease of letter mail volumes due to on-going digitization has been continuous and steady in the last decade. At the same time, the increase in e-commerce has driven relevant growth in parcel delivery and is changing the market mix for postal services. This new scenario has two main implications for traditional postal operators: the financial sustainability of the USO becomes more difficult, while the stream of parcel revenues becomes more important to sustain overall operational activity and costs (Romito et al., 2018). Recent studies showed how postal customers' preferences have shifted from mail to parcel items delivery, leading to a gradual transition towards a more receiver-oriented postal market (ERGP, 2020).

In Europe, parcel volumes have increased by more than 30% in between 2014 and 2018. Parcel delivery differs from mail delivery, as it frequently entails more flexible delivery times to either customers' houses or proximity access points. This increase in the volumes of parcels in Europe was triggered by the surge of e-commerce, which resulted especially in a notable increase in revenues from B2C parcels. Many surveys, including one conducted by UPS,,[2] show that online shoppers value the opportunity to choose among a wide range of delivery options, and expect a seamless delivery process, including transparency and real-time updates on the delivery progress. Advanced technological solutions become therefore very important, as access to electronic delivery notifications and track and trace solutions result among most preferred delivery aspects.[3] Customers want flexible and reliable

[2] "Pulse of the Online Shopper – A Customer Experience Study", UPS 2019.

[3] "E-Commerce and Delivery", Copenhagen Economics for European Commission 2013.

solutions for their parcel deliveries and are becoming less and less tolerant when these requirements are not met.

Traditional postal operators, who have seen a progressive erosion of revenues coming from their activity as Universal Service Providers (USPs), have turned to the growing parcel market in an effort to collect additional revenues and keep sustaining their USO obligation. To stay competitive in the parcel delivery market, these operators were pushed to introduce technological innovations and increase operational efficiency in order to provide more customer-oriented delivery solutions at reasonable prices (ERGP, 2020). New strategic plans recently launched by traditional postal operators (e.g. Poste Italiane – Deliver 2022) aim to cope with the increased pressure to deliver parcels efficiently and effectively. In this context, postal operators face also another challenge: the need to deliver postal and parcel items in a more sustainable way. Calls for greener solutions for last-mile delivery to reduce CO_2 emissions are pushing towards the adoption of alternative delivery solutions or the use of alternative fuel vehicles.

Parcel delivery has become even more prominent during the COVID-19 crisis. In a time of lockdowns put in place by European countries, e-commerce has boomed even more, and in the future it is likely that online sales will remain at a higher level than before the outbreak.

3 The Adaptation Process of Postal Operators

3.1 Traditional Postal Operators Explore New Strategies to Stay Competitive

Even in a transforming market, traditional postal operators have to continue meet their USO requirements and guarantee universal service provision at affordable rates. As monitored by the ERGP (2019), letter mail rates actually increased by more than 40% between 2014 and 2018. This price increase has allowed POs to compensate for revenue losses due to declining letter volumes, but it might pose challenges to fair competition within the postal services sector if the trend continues. Significant and constant increases in letter mail rates may generate extra profits that could be used to cross-subsidize other activities, especially the delivery of e-commerce parcel volumes. The phenomenon of cross-subsidization between USO and non-USO services has been investigated in the postal services market and its potential negative effects on competition have been acknowledged.

As per article 7(3) of the PSD, EU Member States can introduce a mechanism to compensate the universal service undertaking when the USO entails a net cost and creates an unfair burden. This mechanism can consist of either a public fund (i.e., a state subsidy) or a compensation fund to be funded by service providers. Despite Article 9(3) of the PSD, which refers to potential contributors to a compensation fund as those “services which fall within the scope of the universal service”, recent

rulings of the European Court of Justice (i.e., the DHL Express Austria and Confetra cases) opened the door for Member States to make the grant of general authorizations for postal services delivery conditional on a contribution to a compensation fund.

These rulings make it possible that all postal service providers become eligible to contribute to the fund. Specifically, the PSD states that holders of a general authorization may be requested to contribute to the fund if the services they provide, thanks to such authorization, can be considered as "interchangeable" with the universal service. However, the PSD does not provide clear specifications on how to measure interchangeability between USO and non-USO services, which may raise issues for the breadth and enforcement of the compensation fund. A 2015 report from Copenhagen Economics has developed an interchangeability test that shows how the concept of interchangeability does not properly hold in the postal and delivery services market.[4]

Compensation funds represent State aid measures that can create strong competitive distortions. Fratini and Chovino (2018) indicated how compensation funds can be more distortive for competition than State subsidies, as they combine the effect of benefiting the incumbent with that of weakening its competitors. Another study from Copenhagen Economics (2018) showed how only a few EU Member States have so far introduced a compensation fund[5] and in most of these cases the State is still the main contributor to this fund. In fact, the risk for a compensation fund entirely paid by services operators to alter competition is very high. In short, compensation funds are considered as State aid and have to comply with EU State Aid rules. Their peculiar nature, however, makes it more complex to conduct the State aid assessment.

In order to stay competitive and still meet their USO requirements, traditional postal operators are also exploring mergers with other postal operators. In 2019 PostNL tried to get a license for the acquisition of rival postal operator Sandd, basically the sole other major competitor in the Dutch postal delivery market. The Netherlands Authority for Consumers and Markets (ACM) initially decided not to grant the license as it would have created a monopolist in the postal delivery market.[6] The authority also stated that even if digitization is leading to a decline in physical mail volume, this decline is occurring gradually and PostNL should continue with its postal activities under economically acceptable conditions in the short and long-term. However, in September 2019 the Dutch Deputy Minister of Economic

[4] "Study on the interchangeability of USO and non-USO services", Copenhagen Economics for the EEA, 2015.The study has marked the first concrete attempt at determining interchangeability of postal services. By departing from an SSNIP test and applying the demand-side framework for definition of relevant markets, the study develops an interchangeability test that shows how the concept of interchangeability does not properly hold in the postal and delivery services market.

[5] "Main developments in the postal sector (2013–2016)", Copenhagen Economics for European Commission, 2018.

[6] "Summary of the PostNL-Sandd Decision", Netherlands Authority for Consumers and Markets, September 2019.

Affairs granted approval of the merger under art. 47 of Dutch competition law, as the combination of the two postal networks was deemed necessary to ensure service continuity.

In Europe, the decline in letter mail deliveries and the related USPs' losses conflict also with delivery frequency requirements. Article 3 of the PSD specifies that the universal service should be guaranteed not less than five working days per week save in exceptional circumstances or geographical conditions. As regulatory obligations for services falling under the USO have remained stable over time, this requirement is now posing great challenges to traditional postal operators and there is a legitimate concern about the ability to meet it in the future.

Recent studies (Copenhagen Economics, 2018) showed that under specific market conditions, reduced delivery frequency to just 2 or 3 days per week could allow USPs to adopt more efficient operational models. This approach can generate cost savings on the delivery activity and these savings can be best reaped when lower delivery frequency is also combined with reduced delivery speed (e.g., moving from the D + 1 requirement to D + 2 or D + 3 as an alternative). However, this approach would fully comply with the current PSD.

Despite providing lower prices and more reliable services to general postal users, these measures could negatively affect those users who still need high frequency of delivery. To address this problem postal operators can also explore hybrid solutions. For instance, the Norwegian universal service provider Posten Norge has reduced its delivery frequency by requiring a standard delivery time of D + 2. It has combined this effort with subsidized express delivery services or monetary compensations to vulnerable users most affected by the frequency change.

3.2 Call for Investments in Physical and Digital Infrastructures

The transformation of traditional postal operators from mail providers into parcel delivery operators is motivated by the need to stay relevant in a postal services market that is now more competitive. New technologies have emerged and their application to the parcel segment of the postal market is playing a critical role in improving parcel delivery efficiency (ERGP, 2020). Postal incumbents have started to focus on the optimization of their operations by investing in all parts of the delivery chain, from sorting, to transport, to pick-up and delivery.

Almost all European main postal operators (e.g., Deutsche Post, Poste Italiane, LaPoste, etc.) have invested in dedicated parcel sorting facilities. These facilities are used for outbound and inbound sorting of parcels and the centralization of sortation allows an increase in the number of parcels processed per location.[7] The steady

[7] "Review of Postal Operator Efficiency", WIK Consult – Study for Ofcom, 2013.

increase in parcel volumes has justified investments into automated conveyor and sortation systems equipped with sophisticated scanning technology.

In a more customer-oriented postal market, new solutions and innovations need to be applied also to last-mile delivery options. Last-mile delivery in e-commerce has evolved rapidly thanks to data analytics, dynamic route optimization, geolocation and connectivity as well as artificial intelligence. Postal operators can now provide more flexible delivery services but the costs of last-mile delivery directly to customers are very high (ERGP, 2020). Even if customers value delivery to their premises the most, operators can achieve cost savings by delivering parcel items to proximity access points. Delivery location becomes very important for customers, together with delivery control and delivery timing.

To balance these aspects postal operators have invested also into automatic parcel lockers (APLs), usually located in public areas accessible all day long. Lockers generate savings in terms of distribution costs and allow to deliver more parcel items. This produces efficiencies otherwise not attainable via traditional delivery services (Scorca, 2018). Proximity access points can also be represented by physical local shops or small businesses. These points are usually located as close as possible to customers' premises and have longer opening hours than traditional post offices. To manage these points postal operators are investing in digital platforms that create an intermediation between the physical proximity points and the customers.

Pressure on postal operators to perform environmentally sustainable deliveries is also increasing (Borsenberger and Joram, 2020). In this case societal pressure is often linked with customers' preferences as more users value sustainability and environmental protection. Many postal operators are now using alternative fuel vehicles (electric vehicles, natural gas vehicles, e-bikes or bikes, etc.) for their last mile deliveries to reduce carbon emissions. Other investments include the use of sustainable packaging and, more importantly, significant investment in more sustainable and energy efficient buildings for distribution centers and parcel sorting facilities. To this end, postal operators are investing in solar panels for energy production, lighting upgrades to achieve energy savings, and power grids to charge e-vehicles. All these investments represent additional costs in addition to those that traditional postal operators have to already sustain to transform themselves into more effective parcel delivery operators and to keep meeting their USO. Moreover, in Europe these efforts are also motivated by the need to comply with the ambitious EU's climate targets. Indeed, through its new Green Deal, the European Union (EU) has committed to achieve carbon neutrality by 2050.

4 Beyond the Compensation Fund for USO

4.1 Alternative Funding to Sustain the Postal Transformation

The provision of financial support to USPs and the need to fund the net cost of universal service obligations (USO) are still part of a debate. The introduction of a compensation fund as an alternative to State subsidy to sustain the USO has raised different views and only one EU Member State, Poland, has so far fully implemented it. As explained by Visco-Comandini (2018), a compensation fund is a tax charged only to competitors for sharing USO costs, while a State subsidy is financed by all taxpayers and allows to share the overall burden more equally within society.

Despite its negative effect on competition, the compensation fund is allowed as a State aid measure that requires ex-ante scrutiny by the European Commission (Fratini, 2016) and whose sole purpose is to compensate the USP for the net cost of USO. The compensation fund is considered as compatible aid provided that there is no overcompensation. However, in a rapidly changing postal market postal operators are now looking at alternative funding to become relevant players in the parcel delivery segment, but the traditional forms of compensation for their USO burden are neither suited nor sufficient to sustain new required investments.

Recent developments in the French postal market provide an example of how local traditional postal operators are trying to access new alternative financial sources to support their operation, and in particular their shift towards increased parcel deliveries. In 2019, the French Minister of the Economy and Finance announced that the French USP LaPoste reached an agreement with the French State, the state-owned investment fund Caisse des Dépôts (CDC) and La Banque Postale for the creation of a large public financial group serving the territories. The creation of this general-interest public group had the goal to strengthen territorial cohesion and address the regional divide throughout the entire country via La Poste and CDC, as services operators serving citizens. The group aimed to offer banking and insurance services suited to the needs of the local public sector, corporates and individuals, thanks to the expertise of La Banque Postale, CDC as well as Bpifrance and CNP Assurances.[8]

To implement the project, both CDC and the French State transferred their respective stakes in the capital of CNP Assurances to La Poste and then to La Banque Postale. Following this transaction, La Poste is now majority owned by CDC, and La Banque Postale's stake in CNP Assurances has increased significantly. As a consequence, the French USP may now have significant additional resources to commit to further investments into the parcel segment of the postal delivery market. This example shows how USPs may obtain access to new funding by replacing

[8] "Signing of a memorandum of understanding between the French State, Caisse des Dépôts, La Poste and La Banque Postale on the project for the creation of a large public financial group", Press release, 11 June 2019: https://le-groupe-laposte.cdn.prismic.io/le-groupe-laposte%2F043294ba-cf9c-429c-9edd-51da0a26deb6_cp-signing-french-state-cdc-glp-lbp-en.pdf

direct State ownership of the aid beneficiary with new intermediary owners, that are in turn owned by the State.

While such cases should be examined under State aid rules, this does not always happen. A recent EU State aid case involving the Nordic postal operator PostNord AB and one of its fully owned subsidiaries, PostNord Logistics, provides instead an example of a situation in which the State used its parent company to contribute cash to its subsidiaries. Following a complaint from the Association for the Danish road transport of goods (ITD) in November 2018, the European Commission examined whether PostNord Logistics (PNL) had received State aid from Denmark and Sweden. PNL is based in Denmark and is 100% owned by PostNord Group (PNG). PNG is, in turn, owned by PostNord AB, whose shares belong to Sweden (60%) and Denmark (40%) while the voting rights are split 50/50. PNG has many subsidiaries of which two are the Danish postal incumbent, Post Danmark and its subsidiary PNL. According to the complaint, State aid had been granted to PNL in three different forms: (i) through the public announcement of an intended capital injection to PNL by PNG; (ii) through an actual capital injection by PNG; and (iii) through the cross-subsidisation of PNL's costs by another subsidiary in the group, Post Denmark. The latter allowed PNL to use its facilities (e.g. trucks, staff, warehouses) which were funded by the USO compensation to Post Denmark.

Per EU State aid rules, even when funds for a project do not come directly out of the State budget but from a publicly owned undertaking, such as PNG, they can still be considered to be State aid if the funds are under the control of the State and the decision to grant the funds can be imputed to the State. Therefore, in this case the Commission had to assess whether investments by a state-owned postal company, PNG, into PNL constituted investments through State resources and whether they could be imputed to the Danish and/or the Swedish states. In May 2020 the Commission concluded that no State aid had been granted to PNL because, even though PNG via its parent PostNord AB is 100% owned by the Danish and Swedish states, and this implies the use of State resources, the capital injection by PNG to PNL could not be imputed to the Danish or the Swedish states.

The Commission decision stated that a measure cannot be imputed to the state when a state-owned entity acts autonomously from the State. In order to establish that such entity acts autonomously, the Commission must examine various indicators. The indicators that the Commission must examine for determining the existence of State influence can be broadly divided into three categories: "organic and administrative links with the state, instructions issued by the state and the extent of supervision and scrutiny by the state".[9]

After examining the indicators falling under these three categories, the Commission could not find any evidence of Denmark and/or Sweden interfering in PNG's decision to grant a capital injection to PNL. With respect to the cross-subsidization complaint, the Commission explained that the complainant did

[9] State Aid SA.52489(2018/FC) – Denmark; State Aid SA.52658(2018/FC) – Sweden; Alleged State aid to PostNord Logistics: https://ec.europa.eu/competition/state_aid/cases1/202023/277215_2161570_141_2.pdf

not provide any information to sustain the allegations that Post Denmark cross-subsidized PNL's costs. The Commission also recalled that its own decision approving the compensation for the costs of Post Denmark's public service obligations included a mechanism for preventing overcompensation and that financial cross-subsidization would be possible only in the case of overcompensation. ITD has challenged this decision by the European Commission before the General Court of the European Union in case T-525/20 which is currently pending.

Another recent development concerns the ease of postal operators to get access to external funding, which is not State aid per se. In 2019, the Italian USP Poste Italiane obtained a €400 million loan from the European Investment Bank (EIB). The financing was specifically aimed at supporting and facilitating the deployment of Poste Italiane new strategic plan, called "Deliver 2022", throughout Italy..[10]The "Deliver 2022" strategy referred to the need to make the Italian postal operator a significant player in national, cross-border and international parcel delivery. Poste Italiane committed to use these resources to implement several projects, including the installation of energy-efficient solar panels in post offices and the improvement of energy-efficient standards across the postal network, the modernization of its logistics operations by increasing automated parcel sorting capacity, and the digitization of its operations. Overall, the number of postal operators trying to raise financing on competitive terms to support their growth plans is mounting in recent years.

4.2 The COVID-19 Crisis: Potential Spillovers for Postal Funding

Several discussions are taking place in the postal services market over the effects of the COVID-19 crisis. The implementation of restrictive measures, including lockdowns, have resulted in a significant increase in shipments of B2C parcel volume. The already growing e-commerce market has accelerated even more throughout 2020. However, the current crisis may also have long-term spillover effects which should be considered. In the next years, the EU will launch its NextGenerationEU plan to support Member States' recovery from the economic crisis due to the pandemic. The EU Recovery and Resilience Facility (RRF) will make €672.5 billion in loans and grants available to support investments undertaken by Member States. Traditional postal operators have an incentive to get access to these funds and use them not only to sustain their transformation into parcel delivery operators but also to fund their universal service obligations (USO).

Specifically, the EU RRF could become an appealing funding source for USPs given that almost 60% of the entire resources will be dedicated to support green

[10]Italy: Poste Italiane obtains EUR 400 m loan from EIB: https://www.eib.org/en/press/all/2019-249-poste-italiane-obtains-eur-400m-loan-from-the-eib

(37%) and digital (20%) investments.[11] Indeed, traditional postal operators' transition towards greener and more innovative technologies as well as their implementation of advanced digital shipping tools could be sustained by these forms of financing.

In addition, USPs will have most likely access to further resources via the European Green Deal Investment Plan (EGDIP). This is the investment pillar of the European Green Deal, whose main funding programs will mobilize €100 billion over the period 2021–2027 to boost sustainable investments in the EU. These resources will help the EU's transition towards a more energy-efficient economy by supporting the installation of networks of electrical vehicle charging stations as well as by funding installation of solar panels on public and private buildings, including warehouses and logistics facilities. It can therefore be expected that USPs will become increasingly active in seeking these funds.

5 Risk of Competitive Distortions

5.1 EU State Aid Rules Revisited

The mechanism so far used to fund the postal sector has been always aimed at compensating USPs for their USO-related burden. As a consequence, it is directly related to the net cost of universal service provision. Where EU Member States set up compensation funds to fund the USO, those needed to conform to the EU Postal Services Directive (Fratini, 2016). Financing of the postal sector through compensation funds has become now subject to EU State aid control and the compensation fund has been considered to constitute compatible aid. However, in recent rulings[12] the European Commission has shown awareness of the potential distortive effects of compensation fund mechanisms and has stated that any such mechanism should balance the goal of securing the USO with that of preserving fair competition in the market.

According to Article 107 of the TFEU, a measure constitutes State aid if four conditions are met: it is imputable to a Member State and granted through State resources, it gives a selective economic advantage to an undertaking, it distorts or threatens to distort competition, and it affects trade between Member States. It follows that compensation funds should be considered subject to State aid scrutiny, as clearly acknowledged by the Commission.

However, the alternative funding that USPs are now seeking to sustain their USO and support their transition to parcel delivery are not directly tied to the net cost of

[11] Recovery and Resilience Facility: https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en

[12] State Aid SA.35608 (2014/C) – Greece, Hellenic Post (ELTA) –Compensation for the financing of the universal postal service: https://ec.europa.eu/commission/presscorner/detail/en/IP_14_899

the USO. Most of these funds are instead only tied to innovation and transformation purposes. Moving forward, traditional postal operators might have an incentive in claiming that funds meant to support their transformation investments are instead essential to guarantee their USO because in that way the State support may easily be approved. Within an evolving postal services market, this new scenario could pose threats to fair competition.

As explained above, funds in the form of European loans or grants boosting the economic recovery of traditional postal services operators or financing their environmental and digital reconversion might provide undue advantages to those operators in the market. At the same time, these funds may also escape from State aid control. To better understand this, it is worth having a closer look at the EU State aid rules and principles.

Under EU State aid rules, public interventions in favor of companies are free of State aid when they are made on terms that a private operator would have accepted under market conditions. This principle is referred to as the Market Economy Operator Principle (MEOP). If this principle is violated, public interventions are considered State aid within the meaning of Article 107 of the TFEU, as they confer an economic advantage on beneficiaries that their competitors do not have. The Commission then proceeds to assess whether the aid can be found compatible with EU State aid rules. It follows that for funds such as European resources tied to economic recovery or transition, compliance with the MEOP may be more difficult to assess, leading to reduced scrutiny over the use of those same funds.

In the current COVID-19 crisis, Motta and Peitz (2020) argue that when aid is provided directly by national governments there is a high risk of a negative effect on the functioning of the Single Market. EU Member States hit by the pandemic have different fiscal positions, and there is a risk that in a given industry only some firms will receive support because only some Member States would be able to provide significant aid. This may create competitive distortions in the EU economy by altering the level-playing field within the Single Market. On the contrary, European funding programs based on common EU goals and harmonized approaches may entail lower risks of competitive distortions, by benefiting all companies operating in a specific industry and avoiding asymmetries in aid provision. Although these points seem valid, note that future EU funds like the Recovery and Resilience Facility (RRF) will be based on specific proposals made by EU Member States.

USPs in some EU countries have been already active in submitting to their respective governments project proposals to be financed by the upcoming EU recovery instruments. In September 2020, in an early version of a list of projects that was shared with the Italian government, Poste Italiane presented specific proposals to use €180 million from the RRF to fund investments for energy renovation of existing owned buildings, to install smart letter boxes and parcel lockers in rural areas far away from urban centers and to invest into proximity delivery points.

This example shows how USPs may leverage their positions as players who not only provide essential services but also own infrastructures that are essential assets for Member States' economic recovery. These arguments could be used to get access to additional European funds to finance both their strategic transformation

and their USO with possibly minimal scrutiny exerted by EU and national regulators. Indeed, the main risk regards the opportunity for USPs to divert some of these transformation-dedicated funds towards funding the USO, in a potential attempt to circumvent State Aid Rules, therefore breaching the specific requirements of the EU Postal Services Directive.

5.2 How to Monitor Competition in a Rapidly Changing Market?

Concerns over risks for fair competition trigger some questions. What legal tools are currently in place to scrutinize alternative funding for postal operators, especially when funding is coming from European resources? And how can these tools help to avoid competitive distortions? To elaborate on these questions, we should take a look at the compatibility between State aid and EU funding.

A 2018 study requested by the European Parliament Budgetary Control Committee (CONT),[13] makes a clear distinction between two types of funds: EU funds that are channeled through managing authorities of Member States and EU funds that are granted directly to undertakings without coming under the control of a Member State's public authority. For the first type, EU funds become proper state resources and can represent State aid if all criteria of article 107 of the TFEU are met. For the second type, EU funds cannot be considered as state resources and therefore do not constitute State aid.

The above distinction is very important. One necessary criterion for public aid to be considered State aid is the actual transfer of resources controlled by the state. Control of resources by the state also implies that the state has some level of discretion to determine the beneficiaries of a public aid and make resources available to them. That is why EU funds channeled through Member State's authorities can represent State aid. A clear example is represented by European Structural Funds (ESF), which are managed by Member States. Another example will be the EU Recovery and Resilience Facility (RRF), as Member States will be able to channel those funds to specific sectors and undertakings according to their own economic priorities. When instead EU funds are directly assigned to local undertakings, there is no transfer of state controlled resources and, in principle, no need for State aid scrutiny. This is the case of funds granted as loans to Member States' major economic players by the European Investment Bank (EIB) as they do not represent State aid.

As explained earlier, in the postal services market USPs are seeking additional funding through several EU financing instruments. These instruments include both

[13] "State Aid and EU funding: Are they compatible?", Analysis requested by the Budgetary Control Committee: https://www.europarl.europa.eu/cmsdata/142819/Briefing_State%20Aid%20and%20EU%20funding_Final.pdf

funds that can be channeled through Member States' authorities and funds that can be directly assigned by the EU to national undertakings. It turns out that the financing mix may increase the legal complexity of assessing potential competitive market distortions, as the impact of some funds may be subject to specific State aid scrutiny while the impact of other funds may not.

In the midst of the COVID-19 crisis, the European Commission has also adopted a State aid Temporary Framework to enable Member States to financially support their economies by using all the flexibility foreseen under State aid rules. This was meant to guarantee sufficient liquidity to Member States' businesses during the crisis and allow continuity of economic activities. At the same time, the Commission is conducting a review of the General Block Exemption Regulation (GBER) aimed at exempting from prior Commission scrutiny those aids granted through national funds for projects supported under certain EU funding programs.

However, for the postal services market such a scenario raises concern for the future monitoring of competition. The combination of increased temporary flexibility in granting financial support to national incumbents and the relaxation of ex ante scrutiny requirements for EU funds channeled through Member States' public authorities may weaken the existing toolbox being used to avoid competitive distortions and result in undue advantages for USPs.

To balance this greater flexibility given to Member States the Commission seems oriented to require Member States to carry out more ex post assessments on aids' anticompetitive effects, but this mechanism may be difficult to enforce and have limited effectiveness, as it is unclear what could be the consequences once anticompetitive effects are identified.

5.3 Remedies Recommendations

In an evolving postal services market, the issues of USO definition and USO compensation remain very challenging and are becoming even more complex. The ability to compensate the USP for the net cost burden of the USO should remain in place, but if this does not come directly from national governments, resorting to other forms of compensation may entail anticompetitive effects. As described, the risk of competitive distortion can be high in case of the introduction of a compensation fund to be paid by other postal market operators.

The fact that EU State aid rules would apply to compensation funds may provide a guarantee against serious market distortions. The risk of anticompetitive effects, however, is even greater when looking at the many alternative sources of funding that USPs are now exploring. Indeed, USPs may seek these funds to finance their on-going transformation and then divert them to also cover their USO costs, and as these resources include especially a wide range of EU funds the applicability of State aid scrutiny to them cannot always be guaranteed.

The Free & Fair Post Initiative (FFPI) has proposed recommendations to remedy potential competitive distortions. One proposal is that funding mechanisms aimed

to assist the modernization of USPs as state-owned incumbents should be offset by providing proportional incentives to other postal market operators to ensure a level playing field. This could be applied in cases of both direct governmental funding and indirect funding when EU funds are channeled through Member States' authorities.

Another way to remedy potential competition distortions would be to include further provisions to promote competition within the EU Postal Services Directive (PSD). As a consultation process on the need to revise the current PSD is now undergoing, it could be useful to provide additional guidance on the provisions to adequately promote competition in the margins of the PSD review. This could be done in the form of an update of the 1998 Notice on the application of competition rules to the postal sector.[14] For instance, this update could introduce limitations to the options of Member States who may wish to privilege state-owned incumbents, either directly or indirectly.

However, these proposed remedies are not sufficient. Given the variety of funds potentially available to traditional postal operators, a comprehensive scrutiny of these funds and their effects remains very challenging. With respect to EU funds, as the Commission aims to improve the interplay between EU funding rules and EU State aid rules by relaxing ex ante scrutiny requirements, it may still be important to retain some sort of ex ante control on funds allocation. For instance, this could occur via ex ante impact assessment analysis in order to avoid relying only on the ex post observation of effects on competition.

6 Conclusions

This paper has outlined the significant transformation of the postal services market during the last decade, marked by continuous letter mail decline and increased delivery of parcel volume. These two trends are challenging traditional postal operators' abilities to meet and sustain their USO, while driving changes in operations, costs' structures and consumers' behaviors. USPs are trying to adapt by investing in new infrastructure and technology to support the delivery of parcel volume whilst coping with the obligations related to declining letter mail volumes.

In order to fund these investments, traditional postal operators can no longer rely only on compensation for the cost of universal service provision, as defined in the PSD, and are now turning to alternative funding. These new forms of financing can include ownership restructuring operations as well as access to grants and loans from national funds and EU funding programs. In particular, as a response to the current COVID-19 crisis, many additional EU resources should soon become available. This financing mix may increase the complexity of assessing potential

[14] Notice from the Commission on the application of the competition rules to the postal sector and on the assessment of certain State measures relating to postal services - (98/C 39/02).

competitive market distortions, as the impact of some funds may be subject to specific State aid scrutiny while the impact of other funds may not. USPs may have incentives to divert some of these transformation-dedicated funds towards funding the USO, in a potential attempt to circumvent State aid rules.

When focusing on EU funds, relaxation of ex ante scrutiny requirements for EU funds channeled through Member States' authorities can seriously weaken the existing toolbox being used to avoid market distortions and result in undue advantages for USPs. Proposals to avoid or remedy distortions include the provision of economic compensations to other postal operators in case of relevant state funding addressed to support USPs' modernization and also the promotion of market competition by including in the EU PSD restrictions to Member States' ability to financially support state-owned postal incumbents. However, performing a comprehensive State aid scrutiny for all available funds and their individual as well as combined effects remains a complex exercise, and it will be important to still retain ex ante control on the distribution of funds.

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Has the Covid Pandemic Accelerated the Rate of Decline in Business Letters? Some Early and Preliminary Analysis and Thoughts

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1 Introduction

The Covid-19 pandemic is having a profound impact on society and has led to the worst UK recession in modern times. Many public commentators and individuals believe that many of the old rules and habits that applied to people and business pre-Covid will be swept away as we move into a *new normal* environment.

For example, we often hear words such as those spoken by the current European Central Bank president, Christine Lagarde, in her IMF 2020 Governor Talk (IMF, 2020), that we are likely to see a permanent shift in the way we work, shop and pay, with greater use of digital solutions in each case. More specifically, with regards to challenges facing the postal industry, Lagarde said that physical retail is being significantly replaced by ecommerce, which in Europe increased by one-fifth in volume between February and June 2020, and that consumer attitudes and behavior with respect to digital payments are undergoing significant and structural changes as consumers become more confident with digital technology.

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National postal operators will recognize these observations as they reflect an acceleration in trends they have been experiencing for some time. In particular, online shopping and parcel volumes in most, if not all, countries with advanced postal networks have increased considerably since the start of the Covid pandemic. But the positive impact of growth in parcels has been offset by a very significant decline in letter volumes. An important question with respect to this phenomenon is: to what extent has the increased willingness of businesses and individuals to utilize digital technology led to changes in business and consumer behavior that differ significantly to those of the past? For example, do the very substantial increases in ecommerce and declines in letter volumes observed since the beginning of the pandemic reflect a reaction to changes in the external environment in line with historical experience or, alternatively, has a permanent and structural change occurred in the way businesses and consumers react to changes in the external environment in the manner indicated by Lagarde and others which will further accelerate the decline of letter volumes?

This chapter examines this question with respect to the demand for Commercial (mainly transactional) letter mail. In particular, we extend and advance the time series analysis and econometric modelling for UK Commercial mail reported in Veruete-McKay et al. (2011) to cover the period up to and including financial year 2018/19. The updated model is then used to provide an assessment of its forecast properties outside of the sample period including a preliminary assessment of its performance during the initial phase of the pandemic.

Section 2 provides an overview of UK Commercial mail letter traffic trends, Section 3 sets out the estimation methodology and Sect. 4 reports the results of the econometric modelling. Section 5 assesses the contribution of the main drivers of historical letter traffic trends and examines, via the use of out of sample forecasts and confidence interval estimates, whether the very steep decline in Commercial mail traffic that has occurred in the UK since the pandemic started is more than can be reasonably accounted for by movements in the model's explanatory variables (e.g. economic activity and prices). Section 6 provides a summary and some initial and preliminary conclusions on the extent to which pre-Covid estimates of the link between Commercial letter demand and economic growth and letter price elasticities can be relied upon during the initial phases of the pandemic.

2 UK Commercial Mail Trends

Commercial letter volumes in the UK, which consist mainly of transactional and other business letters, account for almost two-thirds of addressed inland letter traffic.[1] Letter volumes for this stream of traffic peaked in 2005/06 at about 45 million

[1] Commercial mail mainly consists of transactional letter items sent via Royal Mail Meter, unsorted USO Account, sorted and unsorted Business Mail, Publishing, Response Service products and a

items per working day and by 2019/20 more than halved to around 20 million items per working day, having experienced an average annual rate of decline of about 6% per annum (pa).

However, over the first 6 months of the UK financial year 2020/21(i.e. April through to September) during which a three- month Covid-19 lockdown occurred, Commercial letter volumes declined by 23% compared to the same period in 2019/20.[2] This very substantial rate of decline has raised many questions and concerns in the UK postal industry regarding the outlook for letter volumes during and after the pandemic, especially amongst those whose business operations are heavily reliant on printing, processing, collecting and delivering letter traffic. In particular, one of their most prominent concerns is whether the recent higher rate of decline heralds an acceleration in electronic substitution and shift towards a *new normal* or whether it is a temporary, albeit possibly lengthy, phenomenon that will see letter volume trends over the longer term revert back towards their pre-Covid trend.

Historically, Commercial mail volumes in the UK have tended to move in line with the economy and demographic trends, as shown in Fig. 1. However, from the early 2000s onwards this relationship became more complex and a gap, or wedge,

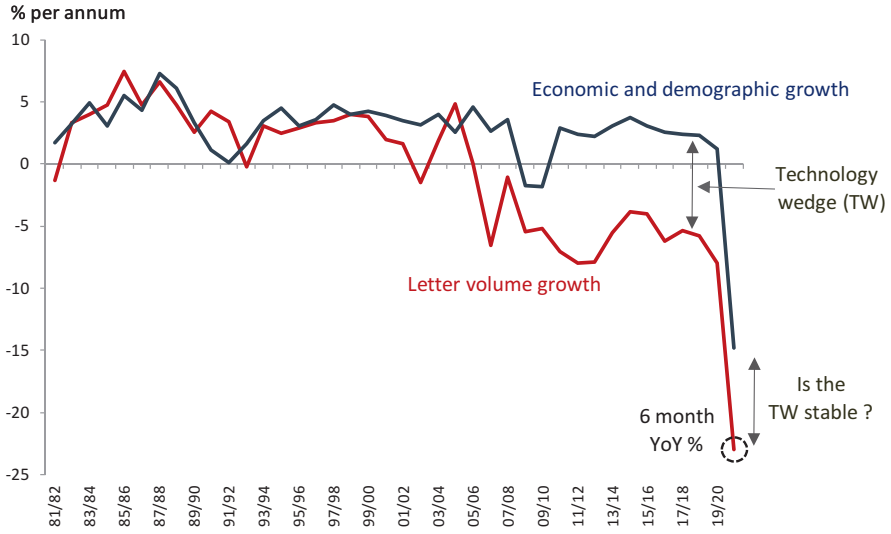


Fig. 1 Commercial letter volume trends in the UK versus economic and demographic growth *Source*: Royal Mail Group
Notes: (**1**) Traffic growth rates adjusted for the number of working days, (**2**) Economic growth refers to annual changes in GDP and demographic growth refers to the annual change in the number of households

small element of estimated non-social Stamp letter traffic (accounting for around 5% of the total). It is this measure of letter traffic that is modelled and assessed throughout the paper.

[2] UK financial years (FY) run from April to the following March. For example, FY 2020/21 covers the period April 2020 to March 2021.

emerged and averaged around −8% to −9% pa. The main reason for this has been the substitution of physical letter communications with new and different evolving electronic technologies that impact both sender and recipient communication preferences.

On the basis of the data shown in Fig. 1, the preliminary evidence suggests that this gap, or the so-called *technology wedge*[3] (TW), does not appear to have widened to date during the pandemic. However, while estimates of the TW may provide some useful information on this question, it is a highly aggregate measure that assumes a unit elasticity with respect to economic activity and demographic growth and excludes the impact of all other factors, such as letter prices and quality of service. In order to examine whether the performance of UK Commercial letter volumes during the initial phases of the pandemic has continued to follow historical trends or instead that the demand for Commercial letters has fallen significantly and moved into a *new normal* era that differs to the past, this chapter undertakes an econometric analysis of the demand for Commercial letter traffic which is the focus of the remainder of our analysis.

3 An Econometric Analysis of Commercial Letter Mail Demand

Following Veruete-McKay et al. (2011), the demand for Commercial mail was estimated using annual data and used the following general log-log specification:

$$q_t = AD_t + \Pi x_t + \sum_{k=-m}^{k=n} B_k \Delta x_{t-k} + \eta_t \quad (1)$$

The variable Q_t denotes the volume of Commercial letter volumes at time period t; X_t denotes a set of explanatory variables; lower case letters for Q_t and X_t denote logarithms of variables in time period t; and the Δ represents first differences (e.g. $\Delta x_t = x_t - x_{t-1}$).

The explanatory variables, X_t, similar to those included in Veruete-McKay et al. (2011), included economic activity (Y); the number of households (H); real letter tariff price index (P); the quality of letter service delivery (QoS) and a real telecommunication price index (TP). D_t denotes a set of deterministic variables which includes a constant, dummies and a number of time trends. Π refers to estimated long-run coefficients, A and B to other estimated coefficients and η_t is a random disturbance term.

The time series nature of the Q_t and X_t variables exhibit non-stationarity and a cointegration estimation methodology was adopted to estimate the long run coefficients Π. In particular, three different estimators were adopted. First, ordinary

[3] This definition and term, although used within Royal Mail for many years, was first referred to publicly by Hooper (2008).

least squares (OLS), such that $m = n = 0$ in expression (1); second, dynamic OLS (DOLS), which estimated models with m and n up to 2, that is, with up to 2 lags and leads for the explanatory variables chosen on the basis of statistical information criteria; and third, fully modified OLS (FMOLS), whereby OLS is applied after transformation of the dependent variable q_t and where this transformation is based on a non parametric estimator of the long run covariance matrix of the errors (see Phillips and Hansen (1990) and Phillips (1995)).

The estimated long run coefficients for Π from all three methods have been shown to be *superconsistent* when applied to a cointegrating relationship (for example, see Stock and Watson, 1993). However, generally, the asymptotic distribution of the OLS estimator for cointegrating relationships is non-standard and therefore the estimated standard errors and standard inference tests (such as hypothesis tests of the statistical significance of coefficients) are not valid. In contrast, FMOLS and DOLS provide consistent estimates for standard errors and were used in the construction of statistical tests.[4]

4 Econometric Estimates of the Demand for Commercial Letters

The long-run properties of the Commercial letter traffic model were estimated[5] using annual data over the period 1980/81 to 2018/19. The results, after setting the long run elasticity for the number of households to unity,[6] are reported in Table 1 which contains four sets of model outputs, one each for the OLS and FMOLS estimators and two for DOLS based on the preferred lag and lead structure using the Akaike information criterion (AIC) and Schwarz Bayesian information criterion (SBC). In addition, for comparison purposes, Table 1 also reports corresponding results from an earlier version of the model estimated up to 2007/08 contained in Veruete-Mckay et al. (2011), henceforth referred to as "VM".

The estimated parameters reported in Table 1 are consistent with economic theory and the goodness of fit, cointegration and diagnostic statistics suggest the models possess reasonable econometric properties. Furthermore, all the explanatory variables possess high t-statistics with the exception of the letter price elasticity

[4] The non-standard asymptotic distribution of the OLS estimator comes from the potential serial correlation in the residuals of the cointegrating relation and/or endogeneity due to long run correlation between residuals of the cointegrating relation and innovations or shocks in the explanatory variables. FMOLS and DOLS are estimation methods that take these issues into account (see Phillips and Hansen (1990), Saikkonen (1991) and Stock and Watson (1993) for technical details).

[5] The model was estimated using the econometric package EViews 9.5.

[6] The hypothesis of a unit long-run elasticity could not be rejected.

Table 1 Commercial letter traffic per household models: estimated long run parameters

	OLS[1]	FMOLS[1]	DOLS[1] (AIC: m = 2, n = 2)	DOLS[1] (SBC: m = 0, n = 1)	Veruete-McKay et al.[1,2]
Explanatory variables	Estimated coefficients and t-values				
Economic activity[3] (*Y*)	0.89 (9.2)	0.95 (13.3)	1.23 (4.0)	0.70 (7.0)	0.97 (7.5)
Letter price index[4] (*P*)	−0.27 (−2.5)	−0.24 (−3.4)	−0.14 (−0.3)	−0.55 (−5.4)	−0.19 (−1.2)
Price of telecommunications index[4] (PT)	0.16 (2.4)	0.18 (3.7)	0.38 (4.1)	0.19 (4.4)	0.10 (2.0)
Quality of service (*QoS*)	0.27 (3.9)	0.25 (5.6)	0.26 (1.5)	0.49 (8.1)	0.34 (5.4)
Time trend, 2002/03 onwards (T02)	−0.028 (−7.7)	−0.028 (−11.8)	−0.009 (−1.5)	−0.017 (−6.8)	−0.029 (−9.4)
Time trend from 2009/10 onwards (T09)	−0.049 (−9.2)	−0.050 (−13.6)	−0.078 (−6.1)	−0.049 (−11.8)	Not applicable
Constant	−11.97 (−11.8)	−12.67 (−16.3)	−16.24 (−5.3)	−10.7 (−10.6)	Not reported
Shift dummy, 1995 onwards[5]	−0.12 (−6.5)	−0.13 (−10.2)	−0.11 (−8.1)	−0.10 (−9.6)	Not reported
Goodness of fit statistics					
R^2 adj.	0.9943	0.9947	0.9951	0.9962	0.99
Reg. SE	0.0175	0.0170	0.0138	0.0132	0.014
AIC	−5.0738	na	−5.8191	−5.5127	Not reported
SBC	−4.7326	na	−4.5621	−4.8161	Not reported
Cointegration tests	**P-values**	**P-values**	**P-values**	**P-values**	
Hansen (H0: Series are cointegrated)	> 0.2	>0.2	>0.2	>0.2	Not reported
Engle-granger (H0: Series are not cointegrated)	0.001	0.001	0.001	0.001	Not reported
Phillips-Ouliaris (H0: Series are not cointegrated)	0.000	0.000	0.001	0.000	Not reported
Diagnostic tests					
Serial Correlation[6]	0.609	0.717	0.083	0.707	0.42
Data period	UK 1980/81 to 2018/19 financial year data for all models				80/81 to 07/08
Estimation period	80/81–18/19	81/82–18/19	83/84–16/17	81/82–17/18	81/82 to 07/08
Degrees of freedom	31	30	6	21	21

Notes

1. t-statistics reported in brackets
2. Veruete-McKay et al. (2011) report two very similar sets of results for Commercial traffic. This column refers to those reported in Table 3A
3. Y refers to Gross Domestic Product GDP
4. Deflated by the all items Retail Prices Index
5. Reflects a change in the methodology used within Royal Mail to calculate the number of working days
6. P-values for first order autocorrelation using Lagrange Multiplier F-tests in the case of OLS and DOLS and Q-statistics in the case of FMOLS do not reject the null hypothesis of no serial correlation using a critical region of 1% or 5%

na refers to not available

estimate using DOLS (AIC) which has an estimated elasticity of −0.14 and a low t-statistic (−0.3), in contrast to the other three estimators, which in absolute terms possess high estimated t-statistics (in the range − 2.5 to −5.4) and estimated price elasticities in the range −0.24 to −0.55. However, note that the estimated coefficients are sensitive to the DOLS lag/lead structure adopted which reduces the number of degrees of freedom used in the estimation process. In particular, relative to the OLS and FMOLS estimators, the DOLS (AIC) lag and lead structure ($m = 2$ and $n = 2$, respectively) results in the reduction of an additional 25 and 24 degrees of freedom respectively and the DOLS (SBC) dynamic structure to a reduction of an additional 10 and 9 degrees of freedom respectively, both of which reflect a loss of valuable information (especially DOLS (AIC)). This is an important point to note when estimating cointegrating relationships using a finite sample period which, despite covering a relatively long period of time and number of economic cycles, contains 39 annual observations and suggests, perhaps, that in this case greater weight could be placed on the parameter estimation results from OLS and statistical tests using FMOLS in comparison to the DOLS estimates. With regard to the estimated Commercial letter price elasticity then there is reasonable evidence to conclude that it is low but statistically significant.

Similar to the findings in VM, the elasticity of demand for Commercial letters with respect to economic activity is estimated to be close to unity, with estimates lying in the range 0.7 to 1.2, and with the simple average of the four estimates lying in the middle of this range and rounding to 0.9. A point worth noting is that the estimates from OLS and FMOLS (0.89 and 0.95) are very close to one another while the two DOLS estimates lie above and below the OLS and FMOLS estimates.

The estimated price elasticity for Commercial letters has already been commented upon, with the estimates lying in the range (−0.14 to −0.55). Again the OLS and FMOLS estimates are very close to one another (−0.27 and − 0.24 respectively) with the two DOLS estimated coefficients lying either side of the OLS and FMOLS estimated parameters. In comparison to results reported in VM (−0.19) the OLS and FMOLS estimated price elasticities in Table 1 are a little higher and possess considerably higher t-statistics in absolute terms, the latter reflecting valuable new information from the inclusion of an additional 11 years of data with substantially more variation in letter prices.[7]

The quality of service (QoS) and the real price of telecommunications variables, similar to VM, were found to be significant drivers of Commercial letter demand. The estimated QoS elasticities contained in Table 1 lie in the range 0.25 to 0.49 and are broadly similar to those reported in VM (0.34). With respect to the estimated telecommunication price elasticities, these range from 0.16 to 0.38 and, as in the case of the letter price elasticities, were somewhat higher than those in VM (0.10).

[7] In particular, prices were raised substantially in real terms, by around 10%, in both 2011/12 and 2012/13 and price changes in the UK have exhibited greater variability since the VM study was undertaken.

Similar to previous UK studies on the demand for letters the econometric analysis includes time trends to account for the negative impact of electronic or Internet related substitution (henceforth referred to as e-substitution). It would have been better to have identified directly variables associated with specific effects rather than incorporating time trend variables that reflect the net impact of all variables not included in the model, including business initiatives. However, historically, the econometric modelling of the demand for letters in the UK has included time trend variables which have tended to contain superior diagnostic statistics compared to models including a variety of electronic or technology related penetration variables.[8] This is probably due to the dynamic nature of changes in technology and their impact on individual senders and recipients of letter mail, which is unlikely to be reflected within the properties of a single variable (such as an Internet penetration variable) and is better accounted for by time trends and in particular time trend break terms[9] to reflect the complex and inter-related impacts of new and evolving technologies over time. Individually each of these technologies may have an S-shaped impact but over time they cumulate to yield something similar to a 'corrugated S-shaped' curve as advocated by Nikali (2008) and Cazals et al. (2018).

The sum of the two time trend variables (T02 and T09) reported in Table 1 suggest the estimated average per annum impact of e-substitution net of other factors since 2009 has been in the range − 6.6% to −8.7% pa.[10] It is again worth noting that, similar to the estimated GDP and price elasticities, the OLS and FMOLS estimated impacts of e-substitution net of other factors are very similar (−7.7 and − 7.8%) while the two DOLS estimates lie either side of these estimates.

To summarize, the econometric models possess reasonably good statistical properties and yield consistent results across the four estimation methodologies that have been examined. The estimates generated by the two DOLS models exhibit a greater degree of variability than those estimated by OLS and FMOLS, most likely due to the substantial loss of degrees of freedom, given the use of annual data, associated with the lead and lag structures adopted. This therefore suggests that, since the properties of all four estimation techniques yield consistent estimates with asymptotic properties, it may be preferable to give greater weight to the results generated by OLS and FMOLS which are estimated with considerably more degrees of freedom.

On this basis, it is reasonable to conclude that it is likely that the long run elasticity of demand for Commercial letters with respect to: economic activity is below but

[8] Previous UK econometric studies of the demand for letters tested a number of technology variables, such as: the number of connections and subscribers to the Internet; the index of broadband Internet connections; the proportion of adults with access to electronic banking; and the share of UK households with access to the Internet. See Veruete-McKay (2011).

[9] The timing of the time trend break terms were informed by discussions with postal industry experts and statistical information criteria, in particular the AIC and the SBC.

[10] The estimated average per annum effect from the two time trend variables is equal to the sum of the coefficients for T02 and T09 reported in Table 1. For example, the FMOLS model estimate suggests a per annum decline rate of −7.8% p.a. (= −0.028 -0.050).

close to unity; the own-price elasticity is low and in the range − 0.2 to −0.3; the telecommunication prices elasticity is around 0.2; and that of QoS is around 0.3. The results are broadly similar to those reported in VM even though these estimates incorporate a further 11 years of annual data suggesting a high degree of stability in these key elasticities over a long period of time. The main change in the estimates since the sample period was extended from 2007/08 to 2018/19 is that there has been an estimated increase in the rate of e-substitution from the earlier period in VM of about 5% pa. An examination of the different estimates for the time trend variables (T02 and T09) suggests their combined impact of e-substitution net of all other variables has, on average, subtracted around −8% pa from Commercial letter volumes since 2009/10.

5 Using Econometric Models to Assess Historical Letter Traffic Trends and Examining the Impact of the Pandemic

In the light of the sensitive nature of the DOLS estimated coefficients and the non-standard nature of OLS standard errors, this section uses the FMOLS estimates to examine two key applications of the model. The first of these is the extent to which the within sample and out of sample forecasts perform relative to the model estimated confidence intervals; and second, the importance or contribution of each of the explanatory variables in accounting for the recent decline in Commercial letter volumes.

An examination of the within sample forecast properties of the FMOLS estimated model for the period 2013/14 to 2018/19 shown in Fig. 2 indicates that the model predictions for the level of Commercial traffic over this period were very close to the outturn data and possessed a low mean absolute error of 0.6% pa as reported in the Appendix. The forecasts of necessity use initial data for GDP from the UK's Office for National Statistics which are likely to be subject to some degree of revision over time. With this caveat, the out of sample properties, as is to be expected, are less impressive but can be judged to be reasonable in terms of predictions lying within or on the upper point of the 95% confidence interval range of the model.[11] The mean absolute error over the 18 months of the post-sample period

[11] Figure A in the Appendix contains a plot of model outturn values, mean forecasts and 95% confidence intervals (CIs), as well as information on root mean squared errors and mean absolute errors, for all four of the estimated models reported in Table 1, including those for FMOLS referred to in Figure 2 and reported on in this section. Figure A shows the OLS estimates to exhibit marginally lower mean absolute forecast errors relative to the FMOLS and DOLS SBC models and that the DOLS AIC model exhibits the largest forecast errors. However, as the OLS variance covariance estimates are non-standard this was not used in the main analysis of this paper which, instead, focussed on the FMOLS estimates that are very similar in magnitude to those generated by OLS. A point to note is that in all cases the model forecasts refer to Commercial letter volumes per household (as explained in the footnote to Table A in the Appendix) and have been obtained using the forecast command in EViews 9.5.

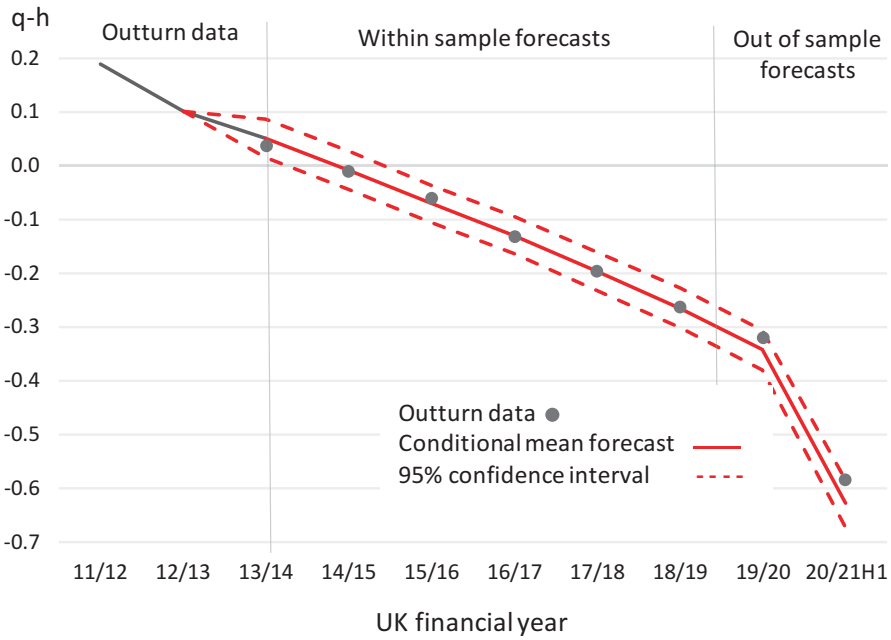


Fig. 2 Commercial letter volume forecasts and confidence intervals
Source: Royal Mail and author estimates using EViews9.5
Note: Confidence interval figures for all four of the estimated models reported in Table 1 are contained in the Appendix Figure A which also includes the above figure in the FMOLS quadrant

(within which the annual year-on-year movements of the explanatory variables for the first six months of 2020/21 have been used to assess the financial year 2020/21) has been considerably larger, with an absolute error in forecasting the level of Commercial traffic of 2.4% for 2019/20 and 4.6% for the annualized forecast for 2020/21H1.[12] It is perhaps not surprising that the model forecast error has increased in the post-sample period which has been impacted by the Covid-19 pandemic that has led to such a terrible loss of life and the biggest negative economic shock in modern times.

[12] Table A in the Appendix contains information on the 2019/20 and 2020/21H1 Commercial letter volumes per household FMOLS mean forecasts, forecast errors and 95% confidence intervals. As noted in Table A the model forecast errors reflect differences in the level of Commercial letter traffic volumes relative to their predicted value for level of Commercial letter volumes (as the unit coefficient per household term effectively disappears when examining differences between the model outturn data and the model forecasts). A further point to note from Table A is that the 2020/21 H1 outturn lies 0.1% above the upper value of the 95% CI, which has been interpreted as rounding to being on the upper level point of the confidence interval. In the case of the three other estimated models Figure A indicates they all lie within the 95% CI.

Indeed, if very long-term historical time series data on UK GDP are approximately correct, the post-sample forecast period may be covering the largest negative economic shock since 1709 and so is considerably outside the range of variation covered by the econometric modelling. For example, the initial GDP data used in the modelling indicates that in the final month of the financial year 2019/20 (March 2020) the year-on-year decline in UK GDP was −7%, by April this had reached −25% and over the first six months of 2020/21 averaged −16%. Such declines are unprecedented in modern times and far higher than those experienced during the financial crises of 2008/09 and 2009/10 which saw UK GDP year-on-year decline rates reach −6% in early 2009.

The observation that the Commercial letter outturn is within or on the upper bounds of the 95% confidence interval in the face of the very sizeable Covid-19 shock is perhaps surprising. In terms of the key question addressed by this paper it indicates that Commercial letter volumes have not declined by more than historical relationships would suggest and, indeed, the point estimate from the model projects an even greater decline in traffic than occurred in the first half of 2020/21. However, it is too early to conclude that this will remain the case; for example, it uses an initial data set on UK GDP and it may be that there are time lags between changes in the volume of Commercial letters sent and the slow changing nature of the sender-recipient relationship that underpins the demand for letters. In particular, if dynamic terms are important in explaining the short term demand for letter mail, as Jarosik et al. (2013) concluded, it may be the case that the full impact of the negative effects of the unprecedented negative shock from Covid-19 have not fully worked their way through and the positive outcome to date may erode over time.[13] This therefore suggests that it will be necessary to update this analysis on a regular basis to properly examine if this short term result holds up against the test of time, or whether it erodes in strength.

In terms of trying to quantify the relative importance of the different drivers of the demand for Commercial letter traffic before and since the beginning of the pandemic, the FMOLS estimated coefficients reported in Table 1 can be used to provide an indicative assessment. Table 2 contains the results of such an exercise, in which the average year-on-year percentage change in Commercial letter volumes are examined for three time periods: the five financial years up to and including 2018/19; the financial year 2019/20, which is the first full-year outside of the estimation period; and FY 2020/21 H1, which includes the 3 months of full lockdown during April to June 2020. With regard to the last of these, the long run nature of the estimated coefficients and the availability of only 6 months of data for the explanatory variables for 2020/21 suggests the results for this period should be considered with a high degree of caution and which could change as a result of data revisions at some point in the near future.[14]

[13] Section 4 of the Jarosik et al. study compared the forecasting properties of total letter demand models using annual and quarterly data and concluded that the latter performed better due to the inclusion of dynamic terms in the estimation process.

[14] In particular, the 2020/21 H1 initial GDP data point will almost certainly be subject to some degree of revision in the future and, in addition, the year-on-year percentage movements for the

Table 2 Estimates of the contribution to Commercial letter volume growth per annum

		Annualized change in volume (%)		
		Within sample	Out of sample	
		Five year period 2014/15 to 2018/19	FY 2019/20	FY 2020/21 H1
1.	Estimated average annual contribution to letter volume growth using long-run parameters[1]			
	a Economy and demographic factors	2.7%	1.2%	−14.1%
	Economic activity	*1.9%*	*0.5%*	*−14.7%*
	Households	*0.8%*	*0.7%*	*0.7%*
	b Letter prices[2]	−0.2%	−1.2%	−0.7%
	c Quality of service	−0.1%	0.2%	−4.2%
	d Net impact of e-substitution	−7.9%	−7.4%	−7.3%
	Historical time trend impact[3]	*−7.8%*	*−7.8%*	*−7.8%*
	Price of telecommunications[2]	*−0.1%*	*0.5%*	*0.5%*
2.	**Mean estimated change in Commercial letter volumes using long-run elasticities and parameters, % per annum (=1a + 1b + 1c + 1d)** [4]	**−5.7%**	**−7.2%**	**−24.3%**
3.	Outturn	−5.1%	−4.9%	−22.7%
4.	**Outturn minus model estimate using long-run elasticities and parameters (=3–2)**	**0.6%**	**2.3%**	**1.6%**

Notes
1. The annualised change in volume figures are calculated by multiplying the FMOLS parameter estimates by the average annual changes corresponding to each of the explanatory variables. For example, over the 5 year period economic activity increased by 2.0% pa which is multiplied by 0.95 from Table 1, which yields 1.9% pa
2. Deflated by the all items Retail Prices Index
3. Equal to the combined impact of the time-trend coefficients reported in Table 1
4. The total impact of the individual contributions is obtained by successively multiplying the impact of each individual variable and not adding the individual impacts

The results reported in Table 2 suggest that, on average, over the period 2014/15 to 2018/19, all the model drivers of Commercial letter volume growth, except economic activity and the number of households were exerting downward pressure on letter demand. In particular, there seems to have been three major sets of factors at play: first, a set of upward pressures from economic activity and household growth accounting for, on average, traffic growth of around 2.7% pa; second, postal industry factors relating to letter prices and QoS that account for a small and close to zero negative impact of about −0.3%; and third, competition from electronic and Internet

full financial year may differ quite considerably to the first half.

related technology net of all other factors, including business initiatives, subtracting around 7.9% pa. The total impact of the individual model components yields an estimated average annual rate of decline of −5.7% pa for the 5 year period under examination which is 0.6% pa lower than the actual outturn of −5.1% pa.

Table 2 shows that the first full annual out of sample period, 2019/20, Commercial letter volume forecast relative to its previous 5 year trend deteriorated by −1.5% (from −5.7% to −7.2%) due to two key factors. First, the slowdown in GDP (due to a deterioration in business and consumer confidence related to Brexit, the testing political climate which led to an early General Election and the very significant negative impact of the Covid-19 lockdown in the final few weeks of the financial year) is estimated to have contributed to a decline of −1.4% (that is, from 1.9% to 0.5%) while, second, the relative impact of postal and telecommunication prices, along with some improvement in quality of service largely cancelled out the impact of the slowdown in GDP. However, in contrast to the model prediction of a decline in Commercial letter volumes of −7.2% in 2019/20, the outturn for that year was −4.9% due in part to a more than 1% uplift in letter volumes from election related mailings, which have been increasing in popularity in recent times.[15] The election related mail uplift in 2019/20 explains half of the 2.3% difference between the econometric model year-on-year prediction[16] and the Commercial letter volume outturn reported in Table 2 and excluding this effect would have resulted in a smaller model error of around 1%.

The 2020/21 H1 projection contained in Table 2 is informed by annual year-on-year percentage changes in the majority of the explanatory variables[17] and an assumption that the impact of e-substitution net of all other variables remains unchanged from its recent trend. The model forecast for this period is for a very substantial year-on-year decline of 24.3% for the first 6 months of 2020/21. This is only 1.6% below the actual outturn of −22.7%, despite a number of the explanatory variables displaying quite significant movements,[18] especially the very large

[15] In particular, 2019/20 Commercial letter volumes benefitted from candidate mailings sent via the Royal Mail Business Mail letter product range in the run up to the European Election in May 2019 and the unexpected General Election in December 2019.

[16] Note that the 2019/20 year-on-year model forecast error of 2.3% reported in Table 2 is very close to the 2.4% EViews9.5 model forecast error reported above.

[17] The only exception to this is the QoS variable which is set equal to the observed values in H1.

[18] Note that the cumulative prediction error over the two forecast periods reported in Table 2 is 3.9% (=2.3% + 1.6%) and this is close to the 4.6% EViews model forecast error. The reason for the difference is that Table 2 uses a simple approximation to help provide clear and valuable insights on the relative importance of the individual explanatory variables (see footnote 1 of Table 2) which is at the expense of a little more accuracy that could be obtained from examining the EViews forecasts by cumulatively varying the explanatory variables one at a time. This would yield a more precise total letter volume prediction but the magnitude of the individual variables would be dependent on the order in which the exercise was undertaken and would provide very little gain in terms of clarifying the relative importance of the individual variables compared with the results reported in Table 2.

contraction of economic activity, which has been commented on earlier. The model forecast is therefore not only close to the outturn but also lower than this, such that Commercial letter volumes declined by slightly less than projected by the model. The results reported in Table 2 suggest that the key factors contributing to the very substantial deterioration in Commercial letter volume since the first of the pandemic lockdowns began have been the steep decline in GDP and QoS variables, whereby the latter measures the percentage of letter mail delivered on time and has been negatively impacted by higher than normal rates of absenteeism during the Covid-19 crises.

In particular, of the −18% decline in the YoY growth rate between 2019/20 and 2020/21 H1 (that is, moving from −4.9% to −22.7%) the econometric forecasts suggest that −15.2% (from 0.5% to −14.7%) can be accounted for by changes in economic activity and a further −4.4% due to QoS with the 1.6% model error accounting for most of the difference. The magnitude of the impact of the QoS variable on the demand for Commercial letter volumes has surprised Royal Mail product and sales managers who are not aware of any large transactional customer mailings being deterred on the grounds of Royal Mail's QoS performance over the period examined. In fact, their feedback suggests the opposite may be the case, in that the concerted effort that postal workers have made to keep the flow of mail going during the pandemic and has helped to support mail volumes, which is especially true for fulfilment related mailings. A potential explanation for the negative effect of the QoS variable in the forecast is that it has historically helped to account for a reduction in business mailings during periods of industrial unrest within Royal Mail and here it may be acting as a proxy variable for the industrial upheaval being experienced by UK businesses which are correlated with higher than normal rates of absenteeism within Royal Mail due to the pandemic.

It is worth emphasizing that the FY2020/21 H1 Commercial letter model forecast for letter volumes reported in Table 2 is 1.6% lower than outturn traffic rather than higher (that is, the FMOLS model forecast a decline of −24.3% whereas the actual decline was less at −22.7%). This therefore suggests that during the initial phase of the pandemic the UK has not seen an acceleration in the rate of decline in Commercial letter volumes relative to what would be expected on the basis of historical behavior. This very preliminary evidence to date suggests instead, that at least for now, sender and recipient behaviors are probably reflecting reactions to changes in the external environment in line with historical experience.

6 Summary and Conclusion

The Covid-19 pandemic has tragically led to a significant loss of life worldwide since early 2020 and the worst economic recession in the UK for three centuries. The fact that Covid-19 has had an immediate and considerable negative impact is undeniable. However, the extent to which it will affect the longer term and how it will do so is highly uncertain.

A number of public commentators and individuals believe that many of the pre-Covid rules and habits that applied to people and business will be swept away as we move into a *new normal* environment. The significant increase in digital communications since the start of the pandemic has led to an acceleration in trends that national postal operators have been experiencing for some time. Online shopping and parcel volumes have increased considerably and there has been a very significant decline in letter volumes. An important question with respect to this phenomenon is: to what extent has the increased willingness to use digital technology led to changes in business and consumer behavior that differ significantly to those of the past? For example, do the very substantial increases in e-commerce and declines in letter volumes observed since the beginning of the pandemic reflect a reaction to changes in the external environment in line with historical experience or, alternatively, a permanent and structural change in the way businesses and consumers react to changes in the external environment.

This chapter examined this question with respect to the demand for Commercial (mainly transactional) letter mail. In particular, time series econometric modelling for UK Commercial letter mail that was completed prior to the start of the pandemic (that is, up to and including the UK financial year 2018/19) was used to assess the extent to which letter volume declines since the start of the pandemic differed from those expected to have occurred using pre-Covid econometric historical relationships. More specifically, the results from the econometric modelling were used to generate post-sample forecasts and statistical confidence intervals in order to assess the extent to which the substantial increase in the use of digital technology during the pandemic in the first half of 2020/21 resulted in a decrease in letter volumes that was over and above what would be expected from a historical perspective.

In fact, the evidence available to date suggests that Commercial letter volumes have not declined to a greater extent than historical econometric relationships would lead us to expect. Indeed, the econometric results suggest the opposite outcome and that Commercial letter volumes were somewhat higher in the first half of 2020/21 than might have been expected based on these results. However, this conclusion should be viewed as being highly preliminary in nature as it is based on 6 months of annualized information using econometric analysis that has been undertaken using annual data. For example, it is quite possible that there may be time lags between the increased adoption of digital communications and new ways of working impacting on senders' and recipients' willingness to substitute physical letters for electronic modes of communication.

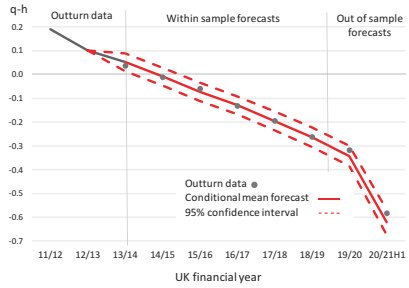
Clearly then, these preliminary results should be updated in the light of new information before firmer conclusions can be reached on the extent to which the pandemic has, or has not, led to a change in the historical relationships that underpin the demand for Commercial letter volumes. In the meantime, it remains a moot point as to whether our early and preliminary conclusion of there being an absence of an acceleration in the decline of letter mail volumes relative to historical relationships will stand the test of time, or instead be overturned as sender-recipient behaviors adapt to whatever the *new normal* environment looks like. With regard to this last point, we remain cautiously optimistic that the most important drivers of letter

mail, which according to our econometric modelling are economic activity and e-substitution, will underpin a marked improvement from the very large recent decline in Commercial letter volumes over the short term as economic growth recovers. Over the medium term, if the economy performs reasonably well and our model results continue to hold, it is quite likely that the decline rate for this stream of traffic will approach historical trends, while if as suggested by PwC (2019) e-substitution were to slow down over the longer term, it is possible that the trend rate of letter volumes could improve to an even greater extent.

Appendix: A Comparison of Outturn Data and Econometric Model Confidence Intervals

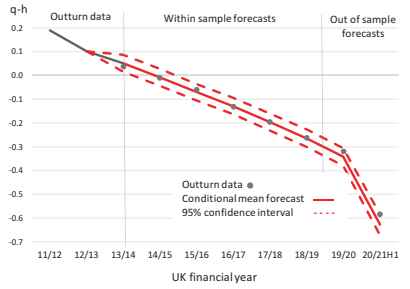
Figure A provides confidence interval charts, similar to Fig. 2, for all four of the Commercial letter volume models reported in Table 1 and Table A contains the FMOLS reported values for 2019/20 and 2020/21H1 that are referred to in Sect. 5.

OLS



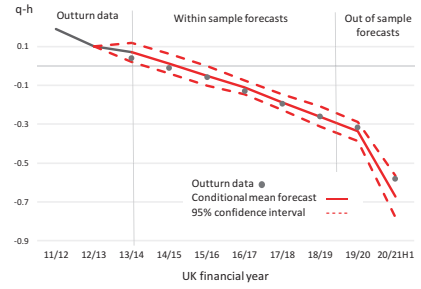
Root mean squared error: 0.0173
Mean absolute error (MAE): 0.0121
Within sample MAE: 0.0058 Out of sample MAE:0.0309

FMOLS



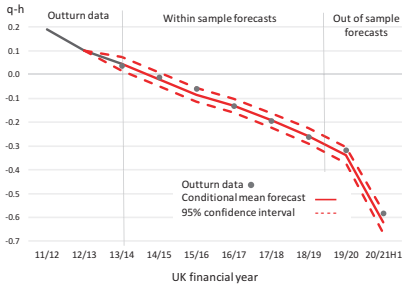
Root mean squared error: 0.0195
Mean absolute error: 0.0133
Within sample MAE: 0.0061 Out of sample MAE:0.0349

DOLS, AIC (2,2)



Root mean squared error: 0.0355
Mean absolute error: 0.0241
Within sample MAE: 0.0144 Out of sample MAE:0,0533

DOLS, SBC (0,1)



Root mean squared error: 0.0182
Mean absolute error: 0.0132
Within sample MAE: 0.0080 Out of sample MAE:0,0288

Fig. A Commercial letter volume forecasts and confidence intervals, 2013/14 to 2020/21 H1. (*Source:* Royal Mail and author estimates using EViews9.5)

Table A Commercial letter FMOLS forecasts and confidence intervals, 2019/20 and 2020/21 H1

	Outturn	Mean forecast	Forecast error	95% confidence interval
	$q_t - h_t$[a]	$\hat{q}_t - h_t$	$q_t - \hat{q}_t$	
2019/20	−0.3185	−0.3427	0.0242	−0.3799 to −0.3054
2020/H1	−0.5825	−0.6280	0.0456	−0.6722 to −0.5839

Source: Royal Mail and author forecasts using EViews9.5

[a]As noted in Sect. 3, lower case letters in expression (1) reflect natural logarithms for variables included in the econometric modelling. That is, q_t refers to $\ln(Q_t)$ and h_t to $\ln(H_t)$. The hypothesis that the estimated coefficient for h_t (that is, the elasticity of Commercial letter demand with respect to the number of households) is equal to unity was tested and accepted and the dependent variable effectively became q_t-h_t, (that is, $\ln(Q_t/H_t)$ which is the natural logarithm of Commercial letter volumes per working day (in millions of items) per number of households (in terms of millions of units). Therefore for 2020/H1, where $Q_t = 15.732$ and $H_t = 28.168$, $q_t - h_t = \ln(15.732/28.168) = -0.5825$

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A Method to Assess the Impact of the Universal Postal Service Obligation

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1 Introduction

The first EC Postal Directive established a preference for meeting the universal service obligation (USO) through the designation of universal service providers (USPs). The USO refers to the provision of a defined minimum set of services to all end-users at an affordable price. As defined by the first EC Postal Directive, the aim of universal service in the postal sector is to "offer all users easy access to the postal network through the provision, in particular, of a sufficient number of access points and by ensuring satisfactory conditions with regard to the frequency of collections and deliveries."[1]

The minimum service requirements imposed by the USO may entail costs for the designated USP. The *net cost* of the USO is "any cost related to and necessary for

[1] European Parliament and Council (1997, 2002).

The views expressed in this paper are those of the authors, and do not necessarily reflect those of the organizations they work for and/or are affiliated with. We thank Beatrice Lombardi, who provided valuable insight and expertise that greatly assisted the research. All remaining errors are our own.

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the operation of the universal service provision."[2] The costs referred to typically relate to the net losses associated with running post offices in remote or not particularly profitable areas, to set uniform prices at the national level, and to ensure a given frequency and regularity of service, including in less populated areas. The USO can also lead to revenues that the USP would not otherwise have, if it did not provide a universal service. For example, the provision of the USO typically allows USPs to generate revenues from selling financial services to a wide public, as is the case for the Italian and French Postal Operators. The *net cost* of the USO is computed by taking into account the net effect of the USO in terms of associated revenues and costs. Potentially, the *net cost* of the USO could be also negative.

Related to the *net cost* of the USO is the notion of *unfairness* of the net cost—that is, whether the USO represents an unfair financial burden for the USP. This concept was introduced by the first EC Postal Directive and subsequently confirmed in the second and third Universal Service Directives of 2002 and 2008 respectively. It has also been discussed in two judgments of the Court of Justice of the European Union (CJEU).[3]

The regulatory framework stipulates that the financial burden resulting from the USO must be deemed unfair in order for the USP to be compensated for bearing the cost of providing the USO. Importantly, the EU regulatory framework does not lay out the specific criteria to determine whether the burden of the USO is unfair. It is up to the national regulators to determine how the assessment should be undertaken.[4] In this context, *unfairness* is not meant in an ethical sense, but rather it refers to the idea that the provision of the USO should not cause a financial burden on the USP, in line with the definition introduced by the EC Postal Directives previously mentioned. The specific concept applied here is that if a USP were to become significantly less profitable than its competitors because of the USO, then it should be appropriately compensated.

A review of the methodology used by a number of national postal regulators reveals that the assessment of the unfairness of the burden of the USO often lacks objectivity and rigor.[5] In most cases, European regulators assess the financial unfairness of the USO simply on the basis of whether certain revenue or cost ratios are above or below a chosen threshold. This method significantly depends on thresholds that are arbitrarily defined by the regulator.

The main objective of this paper is to provide an analytical framework for the assessment of the difference in profitability across postal operators, taking into account the impact of the provision of the USO, and the fact that postal operators often provide also non-postal services. Our aim is to help national regulators reach more rigorous conclusions on the unfairness of the USO, stepping away from the use of arbitrary thresholds. To this end, we set out a method that is mainly focused

[2] European Parliament and Council (1997, 2002).

[3] Court of Justice of the European Union (2010a, b).

[4] Court of Justice of the European Union (2010a).

[5] European Parliament and Council (2008)

on assessing the significance of the loss in profitability due to the provision of the USO.

To better define the scope of our paper, it is worth noting that our aim is neither to compute the net cost of the USO, nor to assess its unfairness from the perspective of the USP. The net cost of the USO is typically calculated by the USP for the purpose of reporting to the regulator, so it enters our analysis as a given amount. Unfairness is judged by the regulator, so its assessment is beyond the scope of our analysis. Our contribution is to provide regulators with better tools for assessing the unfairness of the USO, while taking the cost of the USO as a known quantity.

Our method consists mainly of comparing the net cost of the USO against the difference in profitability observed between a postal operator with the USO and a set of comparator firms. In most cases, the USO lowers the profitability of the postal operator compared to similar firms without the USO. The question that the regulator should ask when assessing the unfairness of the USO is whether the profitability of a USP with USO is such that it does not enable it to earn a fair rate of return, so as to warrant external funding (e.g., a reimbursement by the national authorities and/or a compensation fund). In other words, we find that burden of the USO would not be unfair if the USP is earning enough profits in other businesses to cover the net cost and leave it with a fair rate of return.

A key aspect, then, is the determination of what constitutes a fair rate of return. In some contexts, the fair rate of return can be captured by the cost of capital established by the regulator; in other contexts, it may be necessary to look at comparators. In the latter case, the main challenge in this decision lies in the correct identification of the comparator set. Correctly identifying the comparator set is particularly difficult when the USP has a diversified business model that goes beyond the simple provision of postal services and includes other products, such as financial services.

Italy offers a good example of some of the complexities that can be involved in assessing the unfairness of the USO where a USP has a diversified offering, including postal and financial services. AGCOM—the Italian national regulatory agency in charge of the postal sector—has concluded that the USO assigned to Poste Italiane resulted in an unfair financial burden for the postal operator (for the years 2011–2016). One aspect that emerged as part of AGCOM's analysis was about the relevant perimeter for the calculation of the net cost of the USO—whether or not the analysis should include both postal services in the USO and postal services outside the USO, as well as financial services.[6]

Our paper is structured as follows: in section 2, we provide an overview of the relevant regulatory framework and describe the approaches that are currently adopted by a number of national regulators to assess the unfairness of the USO. In section 3, we present an approach to assess the unfairness of the USO based on the comparison between the profitability of the USP and the profitability of comparator firms. This approach can be applied either by means of a non-parametric

[6] AGCOM (2014), AGCOM (2017), AGCOM (2018), AGCOM (2019).

comparison (presented in section 3.1) or via a regression approach (presented in section 3.2). Section 4 concludes.

2 Literature Review and Methodologies Currently Employed by Regulatory Authorities

While there is quite a comprehensive academic literature on the funding of the USO,[7] there has been little discussion on the techniques that can be used to assess the unfairness of the financial burden of the USO.

Similarly, Jaag (2011) develops four criteria to assess the unfairness of the financial burden of the USO: (i) according to the first criterion, the USO imposes an unfair burden if it reduces the USP's profit compared to a situation without the USO; (ii) according to the second criterion, the USO imposes an unfair burden if the USP's economic profit is negative; (iii) according to the third criterion, the USO imposes an unfair burden if the USP's profit is lower than that of its competitors; and (iv) according to the fourth criterion, the reduction in profits by the USP due to the USO would need to be higher than the reduction in profits incurred by the USP's competitors as a result of their participation in the compensation fund.

Finally, Jaag et al. (2014) argue that the assessment of the financial burden of the USO, although based on the evaluation of the profit level of the postal operator and its comparison with relevant competitors, should also take into account the cost associated with the difference in regulatory demands between the postal operator and its competitors ("Regulatory Delta").

In summary, academic research has based the conceptual assessment of the unfairness of the financial burden of the USO on whether the postal operator delivering the USO is capable of achieving a reasonable profit. However, academic research has not yet developed a clear methodological framework to assess whether the financial burden of the USO is unfair, as considered in the European regulatory framework.

Regarding the approaches adopted by regulatory authorities, a number of regulators in Europe—including those in Austria, Belgium, the Czech Republic, Hungary, Italy and Portugal—have assessed the financial unfairness of the USO on the basis of ratios obtained by dividing the net cost of the USO by either the revenues or the costs incurred by the USP. If the ratio is higher than a given threshold, the USO may be deemed as an unfair financial burden. Table 1 provides an overview of the metrics used by various national regulators.

The criteria illustrated above have the advantage of being easy to apply. However, since the thresholds are chosen arbitrarily, the methodology is inherently judgmental and lacks robust economic foundations; as such, it should not be used in isolation.

[7] For example, Gautier A., Paolini, D. (2010).

Table 1 Metrics used by a selection of European regulators to assess the unfairness of the net cost of the USO in the postal sector

Country	Metrics based on cost thresholds	Metrics based on revenue thresholds
Austria	Net cost of the USO > 2% of the total costs of the USP	N/A
Belgium	N/A	Net cost of the USO > 3% of the revenues of the USP from universal services
Czech Republic	Net cost of the USO > 1% of the total costs of the USP	N/A
Hungary	Net cost of the USO > 1% of the costs of the USP from universal services	N/A
Portugal	N/A	Net cost of the USO > 3% of the revenues of the USP from universal services
Italy	A combination of the above	A combination of the above

Source: AGCOM (2017)

In the next section, we introduce a more rigorous methodology in which the earnings before interest and taxes (EBIT) margins of the USP are compared with those of appropriate comparators. The EBIT margin metric, for example, was adopted by Ofcom (2011b, 2012) for assessing the commercial rate of return in the UK postal sector.

3 A more Rigorous Approach: Profitability Benchmarking

A benchmarking approach based on profitability analysis has been considered by Ofcom, the UK's communications regulator, in relation to Royal Mail's regulatory framework. To assess whether the provision of the USO was financeable, Ofcom (2011b, 2012) compared the EBIT margin of Royal Mail with the EBIT margin of a hypothetical comparator, which was estimated using a sample of selected comparators.

At the time of the analysis, Royal Mail was mainly active in the mail delivery business, as well as in related logistics and delivery activities. As such, Ofcom identified a number of comparators of Royal Mail that were either providing similar services to those offered by Royal Mail, or facing structural changes or dealing with a unionized workforce, just like Royal Mail was at the time when the assessment was undertaken. The comparators used by Ofcom are described in Table 2.

While reviewing the regulation of Royal Mail, Ofcom (2017) decided to retain the approach of measuring the financial sustainability of the USO based on Royal Mail's return-on-sales until 2022. In particular, Ofcom considered that the 5–10% EBIT margin identified in 2012 remained an appropriate benchmark for the competitive level of returns in the market.

Table 2 Comparator companies of Royal Mail identified by Ofcom

Group	Sector	Comparator companies
Group 1: Same or related business	Mail delivery	UK Mail, Deutsche Post, Post NL, Oesterreich Post, Singapore Post
	Logistics	TNT Express, Panalpina, UPS, FedEx, Yamato Holdings
	Freight forwarding	Bollore, K&S Corp, Toll Holdings, Mainfreight
Group 2: Services over a network	Transport groups	National Express, First Group
Group 3: Facing structural change	Directories	Yell Group, Pages Jaunes Groupe, Seat Pagine, Eniro
	Travel groups	Tui Travel, Kuoni
	Legacy telecoms	Belgacom, KPN
Group 4: Restructuring/ unionized workforce	Airlines	IAG, SAS, Lufthansa
	Outsourcing	Serco

Source: Ofcom (2011b)

As USPs in Europe often provide a mix of postal and non-postal services, the methodology illustrated in the Ofcom example needs to be refined to account for USPs with more diversified business models. In particular, as we explain below, the hypothetical comparator should be built to reflect the business mix of the postal operator that is in charge of providing the USO and that one wants to examine. To this end, in building the hypothetical comparator, we will use weights that are based on the percentage of revenues from each division of the postal operator in question.

3.1 Non-parametric Approach

In the spirit of the approach followed by Ofcom, the methodology that we present in this section compares the profitability of the postal operator in charge of the USO (hereafter simply referred to as "the postal operator") with the weighted average profitability of a set of comparators. We refer to this approach as "profitability benchmarking."

Our methodology differs from Ofcom's approach in that we use the relative magnitude of the revenue streams of the postal operator as weights for constructing the hypothetical comparator.

Our methodology rests upon two assumptions: (i) that the net cost of the USO reported by the postal operator, as well as by any other USPs included in the comparator group, is an appropriate account of the actual costs incurred for the provision of the USO; and (ii) that the financial contribution paid to the USPs by the national authorities covers all the costs incurred by the USPs to provide the USO. In

practice, these two aspects are often areas of discussion for the USP and the regulator.

First Step First, we compute the profitability of the postal operator, without taking into consideration any financial compensation by the national authorities for the provision of the USO. We refer to this as the "factual" profitability, because it corresponds to the actual profitability of the postal operator before receiving any compensation from the national authorities.

There are a number of metrics that can be used to assess the financial performance of a firm, such as its EBIT margin, return on capital employed ('ROCE'), and weighted average cost of capital ('WACC')). For an asset-light industry like the postal sector, the financial ratio that is most appropriate is the EBIT margin. This is consistent with the approach followed by Ofcom (2011a, 2011b, 2012, 2015, 2017) in the UK.[8]

Second Step Second, we compare the factual profitability of the postal operator against a synthetic measure of the profitability of comparable companies (the first comparison in Fig. 1), which represents the benchmark fair rate of return.

How to determine this rate is not immediately obvious, because among the comparable companies there will be both postal operators with the USO and postal operators without the USO. One possibility is to exclude from the sample of comparators all postal operators with the USO. Another option is to include in the comparator sample also the operators with the USO, *after* taking into account any financial compensation provided by their respective national authorities. This second approach is correct as long as the compensation for the USO obtained by the comparators is just enough to align their profitability with that of the operators without the USO.

Two scenarios can emerge from this first comparison: if the factual profitability of the postal operator is above (or in line with) the profitability of the comparator group, the net cost resulting from the USO is unlikely to represent an unfair financial burden for the postal operator.

To understand how this scenario may emerge, consider, for example, a situation in which the USO increases the brand value of the postal operator. The postal operator in charge of providing the USO monetizes its higher brand value by providing other services, such as financial services, at a profit. The profits from financial services may outweigh the cost of the USO. In this case, if the profitability of the postal operator is in line or above the benchmark profitability, then the postal operator does not need to be compensated for the provision of the USO.

The other scenario is when the factual profitability of the postal operator is below that of the benchmark. In this case, a more detailed assessment is required, as described in the next step.

[8] See Ofcom (2011a), Ofcom (2011b), Ofcom (2012), Ofcom (2015) and Ofcom (2017).

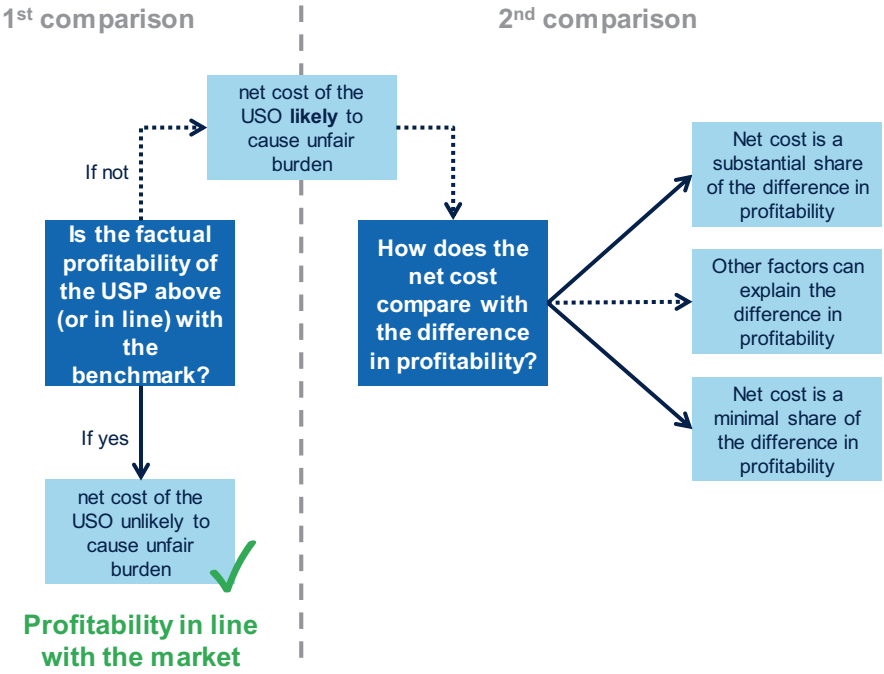

Fig. 1 Illustration of the benchmarking steps

Third Step In the third step, we compare the net cost of the USO to the difference between the profitability of the postal operator and the profitability of the comparators.[9] This is the second comparison shown in Fig. 1.

This second comparison can result in a number of possible outcomes. If the net cost of the USO is broadly in line with (or is higher than) the difference in profitability, it could be concluded that the net cost of the USO appears a likely reason for the difference in profitability. The national regulator will then need to assess whether the difference in profitability caused by the USO leads to an unfair burden for the postal operator, vis-à-vis its competitors. The difference in profitability may be reduced, or entirely disappear, if the state reimburses the postal operator for the net cost of the USO. This depends on whether the postal operator gets fully or only partially reimbursed for the USO.

Instead, if the net cost of the USO is lower than the difference in profitability, one needs to assess the materiality of this difference. For instance, if the net cost constitutes only a small share of the difference in profitability, other factors besides the USO must drive the difference in profitability between the postal operator and the

[9] In this analysis, the net cost of the USO is known from public sources, so it does not need to be calculated.

rest of the sector. These additional factors may include inefficiencies of the postal operator.

Example Suppose the postal operator has an EBIT margin of 10% and an EBIT of €100 m (without taking into consideration any financial compensation for the provision of the USO received by its home government). Assume that there are ten comparators, five of which do not carry the USO and have a profitability of 15%. The other five carry the USO and have a factual profitability of 10%. For these companies the USO is estimated to lead to a drop in profitability equal to 5%, which is reimbursed fully by the national authorities. Thus, after accounting for the reimbursements provided by the respective national authorities, all comparator firms have a profitability of 15%.

Given sales of €1bn, the EBIT of the postal operator using the average margin of the sector would be €150 m instead of the observed €100 m, thus generating a difference in gross profits equal to €50 m (i.e., the first comparison). The net cost of the USO is known (from official reports) to be equal to €45 m.

These figures suggest that the difference in profitability between the postal operator and the rest of the sector is mainly explained by the net cost of the USO. However, if we assume that the financial compensation provided by the government to the postal operator is also €45 m, the gap in profitability disappears almost entirely (i.e., the final assessment).

3.2 Regression Approach

The regression approach entails estimating the EBIT margin of the postal operator by means of a regression across a panel of firms and years.

In the regression, EBIT margins are the dependent variable and a series of firm characteristics are the explanatory variables. Additionally, fixed effects can be included in the model to account for non-observable, time-invariant differences between firms.

This methodology is conceptually equivalent to the comparator assessment described in the previous section, with the main difference being that the comparison is carried out via the estimation of a linear model. The regression approach allows us to examine whether the difference in EBIT margins depends on factors *not* included in the regression, such as the net cost of the USO.[10]

A possible specification of such a regression is provided below:

$$EBIT\ margin_{i,t} = \alpha + \beta \mathrm{X}_{i,t-1} + \tau_t\, Year\ Dummy_t + \alpha_i\, Firm\ Dummy_i + \varepsilon_{it}$$

[10] The underlying assumption here is that the other USPs used to estimate the regression are perfectly compensated for the USO. Notice that the sample of firms used in the regression may include both USPs and other firms that are not USPs.

where X represents a set of firm characteristics.

To obtain an estimate of the EBIT margin for the postal operator, we multiply the estimated regression coefficients by the values of the observed characteristics for the postal operator, as follows:

$$\widehat{EBITmargin}_{postal\ operator,t} = \hat{\alpha} + \hat{\beta} X_{postal\ operator,t-1} + \hat{\tau}_t$$

The left-hand side of the above equation represents the EBIT margin estimated for the postal operator in a given year *t*, using the estimated regression coefficients multiplied by the value of the firm characteristics of the postal operator in year *t-1*. The value thus obtained is an estimate of what the EBIT margin of the postal operator should be if the operator had performed in line with the comparator group.

The next step is to analyze the regression residual — "factual profitability" minus predicted profitability — for the postal operator. The residuals of the regression provide an indication of whether the provision of the USO puts the postal operator at a disadvantage compared to the comparator companies (i.e. the first comparison in Fig. 1).

In this case, given that the regression is estimated through a fixed-effects model, the residual should be estimated without accounting for the fixed effect of any firm included in the sample to avoid distorting the benchmark (i.e. the hypothetical comparator) with firm-specific characteristics of one of the companies in the comparator group. In addition, the EBIT margin of any other USPs included in the sample should take into consideration any financial compensation received from their respective governments for the provision of the USO.

By comparing the estimated residual (without accounting for the firm-specific fixed effects) with the net cost of the USO (i.e. the second comparison in Fig. 1) we can draw conclusions on whether the USO is the reason for the estimated difference in profitability, or whether other factors are to be considered (i.e. the final comparison in Fig. 1).

If the residual of the regression is negative, it means that on the basis of its own characteristics, the postal operator should have a higher profitability than its "factual profitability".

4 Conclusions

Although the notion of the unfairness of the burden of the USO is embedded in the regulatory framework, we observe a lack of a rigorous and robust methodology to assess unfairness by national regulators. Similarly, academic research on this subject matter has not yet developed a methodological framework to assess unfairness. Methodologies that rely exclusively on arbitrary thresholds based on ratios of revenues and costs of the USP, while easy to apply, are not supported by a clear economic rationale.

This paper aims to fill the gap by developing a methodology to identify the difference in profitability between USPs that bear the USO and their comparators. We show that this method can be applied by means of a traditional non-parametric comparator approach, and by means of a regression analysis. We also describe how one can apply this profitability benchmarking approach to USPs that do not offer exclusively (or mainly) postal services, but operate across different sectors (e.g. financial services).

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Net Costs of USP's Service Provision: Challenges for the Coming Decade

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1 Introduction

1.1 Background and Research Questions

The concept of net cost of the universal service obligation (USO) is based on the profit difference of the universal service provider (USP) with and without the USO (Panzer, 2000 and Cremer et al., 2000). In recent times, USPs have been challenged with sharp declines of letter mail and transactions in post offices and continually need to transform their operations accordingly. As a result, the counterfactual scenarios used to calculate net costs may need to be adapted more regularly. Besides, USP undergo changes in regulation within and outside the scope of the USO. In Switzerland for example, a new provision demands that Swiss Post must deliver newspapers nationwide until 12.30.[1] Such regulatory changes also affect net cost of the USO.

Net cost of the USO are not only changing over time but are also increasingly relevant for the economic equilibrium of postal service providers. Today, many

[1] Applies only at places without early newspaper delivery, which may also be supplied by other providers than Swiss Post.

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USPs face financial problems and presumably will not be able to fund the USO in the future on their own (e.g. Cape and Groves, 2017; Okholm et al., 2018). As a result, external funding and adequate measurement of net costs become more important.

In light of these developments, we ask how market and regulatory dynamics affect USO net costs and how net cost calculations can appropriately account for these developments. To answer these questions, we combine a theoretical framework to discuss practical challenges of calculating net costs associated with the observed market developments in the short-run with an empirical model from a recent study conducted for Swiss Post for the long-run analysis up to 2030.

The paper is structured as follows. In section 2, we focus on the short-run challenges of calculating net costs in times of declining markets. Based on a theoretical framework we discuss the impact on net cost due to i) altered USO-specifications, ii) new USO provisions and iii) outdated net cost parameterizations. Hereby, we will also address the question when to optimally update the hypothetical scenario that describes USP's behavior absent of the USO (counterfactual). In section 3, we investigate the long-run profit impact of selected counterfactuals to inform the development of net costs up to 2030. The analyzed elements include several options related to product range, delivery, post office network and pricing. We conclude in section 4.

1.2 Literature

USO net costs have been widely discussed in the economic literature and have informed practitioners concerned with the task of calculating net costs as adequately as possible. Among economists, there is consensus that net cost is to be calculated based on the profitability cost approach pioneered by Panzar (2000) and Cremer et al. (2000).[2] This method calculates the difference in profit with and without the USO, i.e. compares the actual profit under the USO and the profit in the counterfactual situation without the USO.

Since then, a broad range of researchers and practitioners have been investigating which dimensions are essential for USO net costs. The main drivers identified are delivery frequency, delivery speed, delivery point density, post office density, financial services and pricing (e.g. ERGP, 2014). More recent studies show that net cost calculation should also include other dimensions such as international mail at standard rates. They also show that the counterfactual scenario has changed over time and includes more pronounced service level reductions (in particular a lower delivery frequency of 2 to 3 days; Copenhagen Economics, 2017 and 2018a, b).

Regarding the dynamics of net costs, a few authors have tackled the relationship between declining mail volumes and net costs. Cuomo et al. (2013) assess the

[2] See also Haller, Jaag and Trinkner (2014).

impact of USO constraints on the USP cost structure, and thus also on net costs, assuming a declining mail market. Based on the actual profit and loss (P&L) balance of Poste Italiane, they forecast USP outcomes for different scenarios and conclude that e-substitution constitutes a severe threat to USO's financial viability. Nehrebecki et al. (2016) analyze the impact of market dynamics by explicitly modelling revenues, costs and profits for priority and non-priority mail for a hypothetical USP. They find that the substitution effect between priority and non-priority mail shapes the dynamics of net costs. Based on their model they conclude that a static policy that does not account for declining volumes will result in an unfair burden for the USP. Gottschalk (2019) investigates impacts of different policies using a microeconomic model. He finds that postal markets may soon reach a state in which mail delivery is not profitable anymore in a non-USO-world.

Little research exists on practical issues to changing regulation in and outside the scope of the USO. Postal service providers, especially when they are state-owned enterprises, sometimes face additional obligations that are not directly linked with the scope of the USO but affect their profitability. For instance, some USPs are obligated to follow social goals such as paying reasonable wages to their labor force or following environmental goals. Also, new services of general economic interest that are outside the scope of the USO (hereinafter referred as other SGEI) have been included in European regulation. For example, Belgium's delivery agents are explicitly obligated to pass time with persons who live alone and the least privileged (European Commission, 2016).[3] If additional costs exceed revenues from those services, these obligations also represent a burden that a USP would not face in an unregulated market. In that case, their net costs must also be considered when financing the USP – whether as part of financing the USO, other SGEI or separately for governance purposes.

Carslake et al. (2014) investigate potential labor market constraints departing from the USO. The authors find that net costs are incomplete if other dimensions than those explicitly defined in the USO are not considered. In particular, net cost of USO are higher if the USP without USO could modify its labor contracts to use more flexible arrangements. Borsenberger (2020) as well as Fratini and di Benisichi (2020) discuss the importance and impact of SGEI, the latter acknowledging that USP should be compensated for providing these services (see also Bacon, 2017). These contributions are very important, though they are more static in nature.

We contribute to previous literature by discussing the short and long run dynamics that result from declining volumes and changes in regulation. Thereby, we provide empirical evidence from Switzerland.

[3] The USO definition in the European regulation is fairly narrow. Other SGEI also include elements that are part of the USO in other legislations. For example, obligations regarding the delivery of newspapers are defined as other SGEI in the EU (European Commission, 2019a and 2019b), whereas they are part of the USO in Switzerland (Jaag and Maegli, 2015). Other examples of other SGEI are the maintenance of a widespread postal office network, basic banking services, distribution of electoral material, and payment of pensions (e.g. European Commission, 2014).

2 The Short Run: Keeping Counterfactuals up to Date in Dynamic Market and Regulation Environments

2.1 The General Challenge: True Counterfactuals Are Dynamic – Consequently, Regulated Counterfactuals Require Frequent Updating

From a financial market perspective, it is reasonable to assume that investors in a no-USO-world would demand a market rate of return for the invested capital in a postal service provider. In a declining market, a hypothetical postal service provider without USO would therefore dynamically optimize, that is, reduce, its provided service level (or raise rates for services with inelastic demand as long as these services exist) with the aim to keep profitability at the market rate (the Norwegian example is provided by Copenhagen Economics, 2017). The hypothetical scenario used for the calculation of net costs should reflect these dynamics to make sure that the calculated net costs (regulated net costs) adequately reflect the true net costs.

In practice, however, counterfactual scenarios are only updated occasionally,[4] and that may not be enough when the market environment changes quickly. When the counterfactual remains unaltered over a long period, the calculated net costs will likely be too low in a declining market, e.g. because fewer letter mail makes it optimal to deliver less frequently. Figure 1 illustrates the argument.

When updating hypothetical scenarios in practice, this general argument has to be applied with care, however. The need to adjust the scenario in a specific dimension depends on how the hypothetical scenario, or specific aspects of it, are calculated. Inspired by the Swiss case, the following sub-section presents selected political developments that may require adjustments of the counterfactual scenario.

2.2 Specific Cases That May Require Updates of the Counterfactual

2.2.1 Background and Considered Cases

In Switzerland, the net cost of the USO are calculated from a comparison of the actual profit of Swiss Post (status quo) with the hypothetical profit of Swiss Post without USO. In 2019, the net cost of the USO amounted to CHF 281 million (approx. EUR 260 million).

[4] The Swiss counterfactual has been established in 2013 (data base 2011) and has only been updated once since in 2016 (data base 2014). Hence, the current counterfactual is based on 6-year old data. In autumn 2020, Swiss Post formally applied for an update of the scenario at PostCom, the responsible authority for approving the scenario.

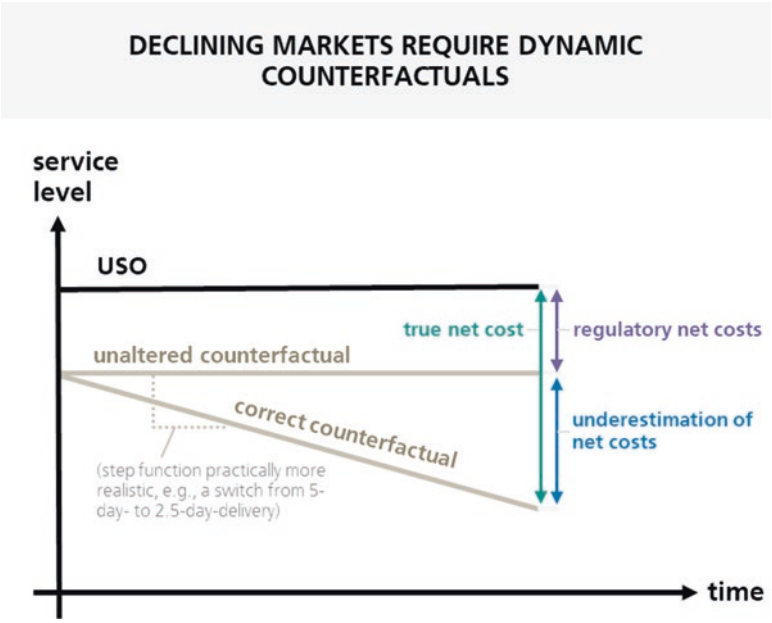

Fig. 1 The general challenge of net cost calculations in declining markets

Against the market trend, and against the trend in most countries, the Swiss USO has been subject to several legislative initiatives in recent years, with the aim to tighten specific existing provisions or adding new ones. Accordingly, the postal ordinance was amended in 2015, 2019 and 2021, including, among others, additional requirements for the accessibility of the post office network and home delivery for remote houses. Inspired by these developments, sub-sections 2.2.2 and 2.2.3 are devoted to the analysis of how two different legal USO-adjustments affect net cost calculations and whether they require changes in the hypothetical scenario.

In calculating the net costs, the hypothetical profit is compared with the actual profit of Swiss Post in the status quo (as opposed to the hypothetical profit in the *legal* status quo). This approach takes into account that in fulfilling its USO service mandate, Swiss Post not only has to follow legal requirements, but also political expectations and opportunities. Hence, when we refer to USO-requirements, we mean the legal requirements plus, possibly, additional (implicit) requirements based on political expectations. Due to changing political expectations, the status quo is, however, more volatile and dynamic than the legal status quo. And changes in the USP's status quo may lead to outdated parameterizations in the counterfactual scenario and biased net cost calculations. This is discussed in sub-section 2.2.4.

Although the following analyses are inspired by the Swiss example, we are confident that their underlying logic is applicable to the situation in other countries as well.

2.2.2 Legal Developments I: Altered USO-Specifications

The postal ordinance revision in 2019 included tightened requirements for excluding remote houses from standard delivery. The current counterfactual already assumes, however, that the affected houses are not served at standard service levels. Hence, the additional costs incurred by Swiss Post because of the new regulation are already included in net costs calculations as the additional costs increase the potential savings of the counterfactual postal service provider (i.e. increasing net costs). This is illustrated in Fig. 2 for the case of tightened regulations and additionally for the case of (moderately) relaxed regulations.

The general conclusion from this case is that as long as the USO-elements that are affected by new regulations have already been explicitly defined in the counterfactual (with respect to the service level offered by the hypothetical postal service provider), there is no need to adjust an already accurate counterfactual. The additional net costs or benefits associated with the new service level are implicitly contained in the calculated net costs as they increase the costs of the real existing USP and as a result, also increasing the savings in the counter-factual and thereby USO net costs.[5]

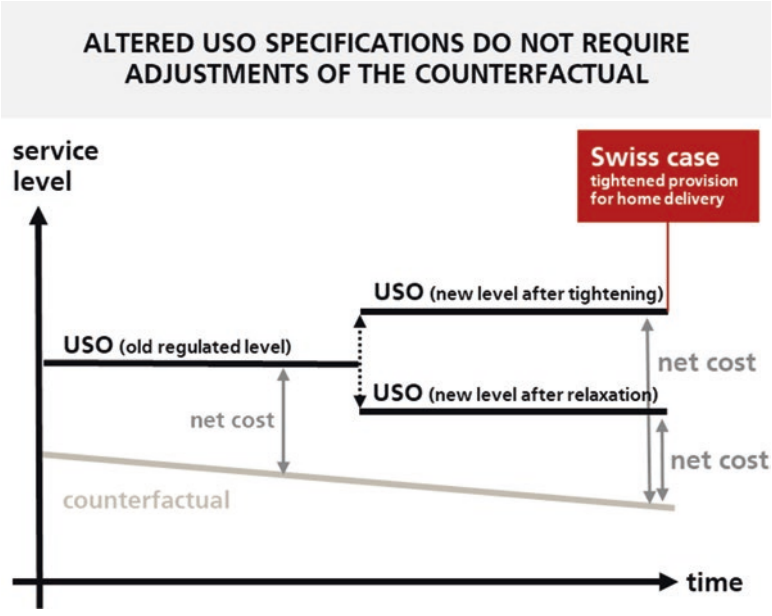

Fig. 2 The consequences of changing USO specifications for net cost calculations

[5] In case of a stronger relaxation, after which the USO level fell below the level of the current counterfactual, the counterfactual should be updated.

2.2.3 Legal Adjustments II: New USO Provisions

A new provision in the revision of the postal ordinance in 2021 demands that Swiss Post must deliver newspapers until 12.30 o'clock throughout the country (this applies only at places without early newspaper delivery, which is partly provided by other providers than Swiss Post in more densely populated regions). The current counterfactual does not refer to the delivery deadline, however; hence, net cost calculations do not reflect any potential additional cost relating to the new provision. Consequently, Swiss Post has requested that the free choice of the delivery deadline be explicitly included in the hypothetical scenario. The case is illustrated in Fig. 3.

The general conclusion from this is that when a newly regulated element of the USO imposes a financial constraint on the USP, the counterfactual behavior of the hypothetical postal service provider has to be included in the description of the counterfactual scenario. If not, the counterfactual service level implicitly equals the real, USO-regulated service level, and the net cost calculation misses the additional costs incurred by new regulations; hence the real net costs related to the new provision will not be included in the regulated net costs.

An example that may apply to several other countries is inbound international mail (or parcels), which is subject to UPU rules and a lossmaking business for some universal postal providers. Triggered by the recent boom of small goods shipments from China, several USPs have started to include financial losses incurred by international mail and shipments in their net cost calculations (see Copenhagen Economics, 2017). In the future, USP-specific environmental regulations may also represent an example of this case.

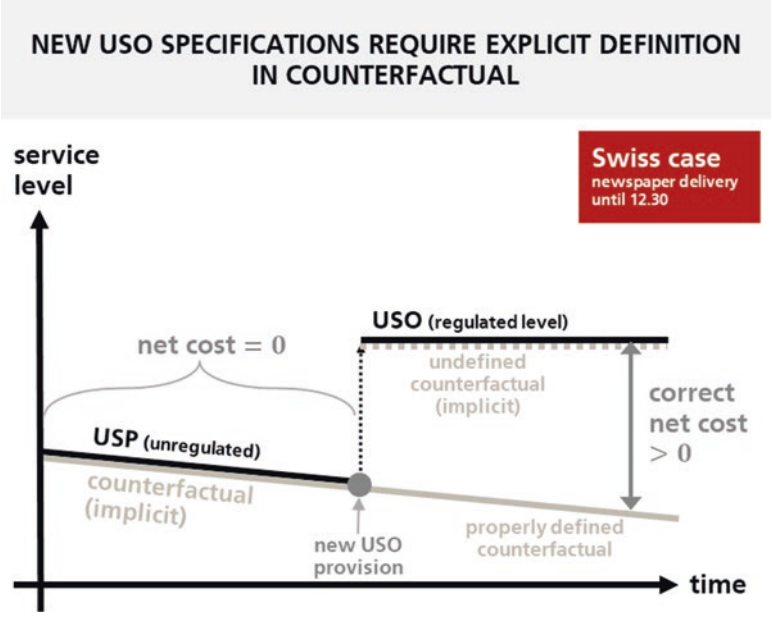

Fig. 3 The consequences of introducing new USO specifications for net cost calculations

2.2.4 In a Dynamic Status Quo, Parameterizations May Become Outdated

A particular problem of Swiss Post's current counterfactual scenario is that certain parametrizations, which are used to calculate volume differences of various products sold through the post office network between the real and the counterfactual postal service provider, become outdated when not updated regularly.

Figure 4 shows how this works with respect to the number of payment transactions in the post office network (basic financial services are still included in the Swiss USO). For the current counterfactual scenario, it was calculated with data from 2014 ("parameterization"), that the number of transactions in the hypothetical scenario was 58% below the status quo. This value then has been used from 2016 onward to determine the number of payment transactions in the hypothetical scenario. Each year, this was done by subtracting 58% of the payment transactions from the respective status quo (see Fig. 4). The difference in the payment volume between the real and the counterfactual scenario is eventually used to calculate lost revenues and avoided (variable) costs in the counterfactual scenario with respect to payment transactions (the same is done for a many other products that all have specific parameter values).

This approach is dynamic in that the number of payment transactions is determined each year in relation to a dynamic status quo. It is also static, however, in that the value that was parameterized in a certain year (−58% in 2014) remains unaltered for several years. When the status quo changes relative to the counterfactual, the static nature of this approach can result in an outdated parameter value, and following biased net cost estimates. As lost revenues are typically larger than avoided variable costs, net costs are overestimated when the true parameter is above 58% (because then the counterfactual postal service provider is assumed to lose less profit than she actually does); and net costs are underestimated, when the true parameter is below 58%.

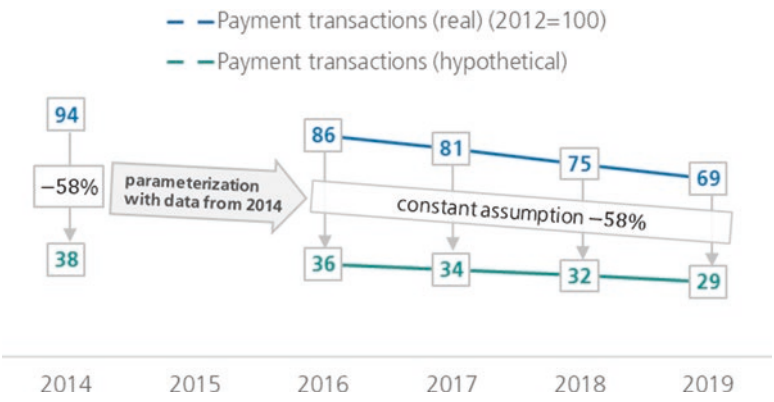

Fig. 4 Real and hypothetical payment transactions in Switzerland 2016–2019

In the Swiss case, there are indications that the latter is what actually happened with respect to payment transactions since 2016, as illustrated in Fig. 5. The assumption about the relative reduction of payment transactions (58%) was derived from a comparison of the post office networks in the status quo and in the hypothetical scenario in 2014. Then, Swiss Post operated 1557 branches compared to a low number of self-operated branches in the counterfactual scenario. In 2019, Swiss Post, had only 981 branches (−576 compared to 2014), whereas the counterfactual was unchanged compared to 2014. The relative difference between the real and the hypothetical postal network had decreased, suggesting that the relative reduction of payment transactions had also decreased. Yet, this was not reflected in net cost calculations due to the static nature of the assumption about the relative reduction of payment transactions of 58%. The consequence is a potential underestimation of net costs.

Figures 6 and 7 display the argument in a more general way. Fig. 6 shows that at the time of parameterization, say, t_0, the volume decrease between the status quo and the hypothetical scenario amounts to $\frac{l_0}{(l_0 + r_0)}$, where l_0 is the volume lost in the counterfactual compared to the status quo, and r_0 is the remaining volume. When volumes in the status quo decrease faster than in the (true) counterfactual, then at some point of time in the future, say, t_1, we have $\frac{l_0}{(l_0 + r_0)} < \frac{l_1}{(l_1 + r_1)}$. Hence, when

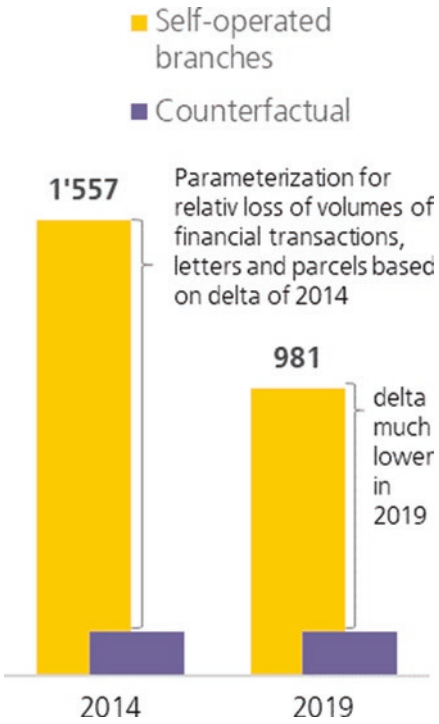

Fig. 5 Difference between status quo and hypothetical scenario 2014 and 2019 in the Swiss postal network

the regulated counterfactual uses $\frac{l_0}{(l_0 + r_0)}$ to determine the volumes in the counterfactual, net cost will be underestimated. This is illustrated in Fig. 7. The practical implication of this analysis is that the parameterizations used to determine volumes in the counterfactual should be updated regularly, and more often, the more the status quo changes.

Over several years, these differences can accumulate to significant deviations from the true net costs. An update will then have significant effects and thereby threaten the time consistency of the net costs time series, although it makes net cost calculations more adequate. In line with these theoretical considerations, an update of the parametrization for the reduction in payment transactions by Swiss Post in 2020 (with data from 2019) yielded a result of −43% instead of −58%. While this seems much compared to the former −58%, the difference amounts to a decrease of only 3 percentage-points per year on average, which seems reasonable regarding the significant changes in the status quo since 2014.

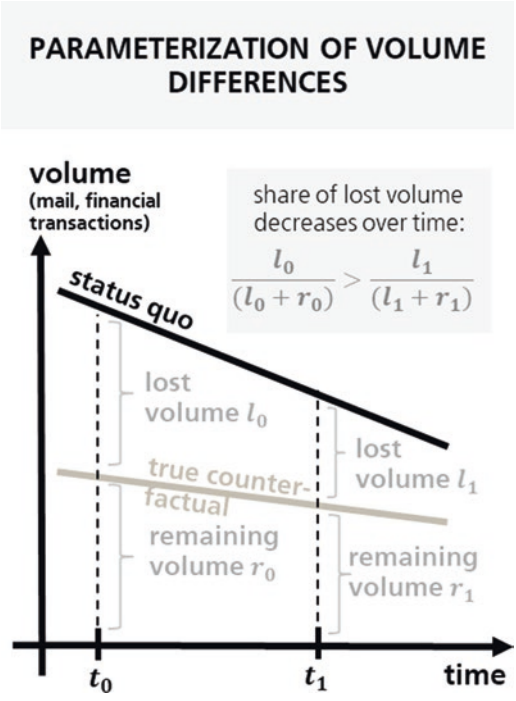

Fig. 6 Parameterization of volume differences: the general case

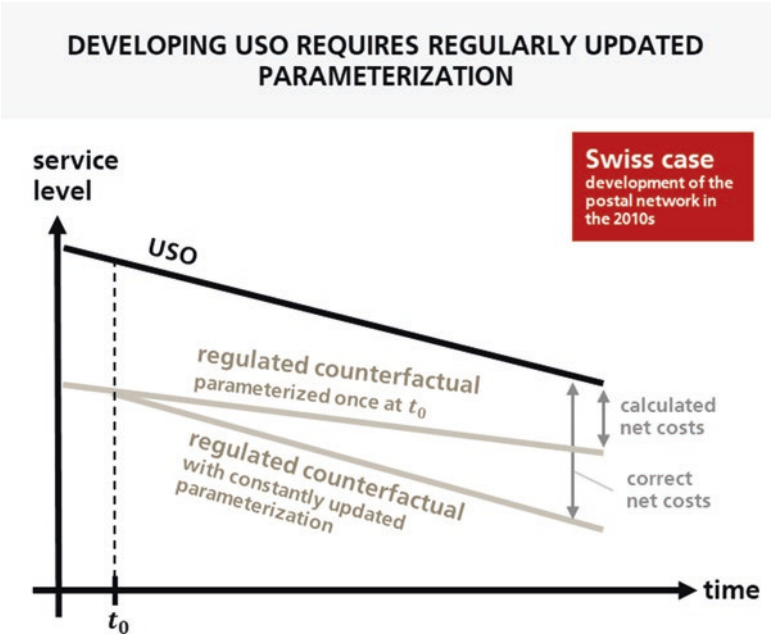

Fig. 7 The need a regularly updated parameterization of volume differences

3 The Long Run: Evidence from Switzerland

To get an understanding of the long run dynamics of defining hypothetical scenarios, we present calibrated long-run results of an analysis of different counterfactual scenarios for the Swiss case up to 2030.

3.1 Long Run Modelling

The model was developed in 2019 and it is described in detail in Trinkner et al. (2019).

The granular cost model covers all logistical processes of Swiss Post, allocating costs and volumes along 161 processes and 431 products. On the cost side, variable and fixed costs components are separated, allowing to perform a comprehensive cost modelling, e.g. of expected volume impacts. In total, a cost base of about CHF 4 Billion is reflected on a disaggregated basis covering the letters, parcels and post office network divisions of Swiss Post. Revenue is broken down to individual (sub) products.

To forecast cost, revenue and ultimately profits up to 2030, a series of parameters can be calibrated per (sub) process and per (sub) product. The main parameters on the process side are input price inflation and efficiency improvements. For products,

volume development, price-elasticities (iso-elastic or linear demand specification with point elasticities), diversion ratios in case of post office or agency closures can be set individually either in average over the time-period or individually for every simulated year.

In its base version, the model allows for all sort of simulations with different demand and cost assumptions, e.g. to analyze the impact of different degrees of e-substitution, efficiency improvements, inflation measures or pricing strategies.

To assess more refined and USO-relevant counterfactual scenarios, the model features built-in cost models to assess variations of (i) home delivery and (ii) number of post offices and agencies. To estimate route times for different home delivery schedules, traveling salesman algorithms similar as in Haller et al. (2014) are applied. The approach allows for variations of delivery days, speed, and places of delivery.

This granular model is calibrated according to Swiss Post's long run forecasts up to 2030. The forecasts predict volume increases in all parcels segments. For letters and financial transactions, most product categories are estimated to face significant decreases of over 5% per annum.

3.2 Results

Figure 8 presents the key results of the model simulation for a stylized calibration representing the Swiss situation. The figure shows the relative financial impact in 2021 and 2030 for seven counterfactuals. The first four are differing in the number of delivery days. The counterfactuals and results can be described as follows:

(i) In the first counterfactual, **economy mail is slowed down** to D + 5 in order to deliver economy mail only once per week. Priority mail is still delivered every day from Monday to Saturday. The counterfactual might represent a situation as today observed in Denmark. The results show that in 2021, the counter factual would reduce profits, i.e. cost economies are smaller than revenue losses caused by deteriorated quality of economy products (that are partially recovered by shifts to priority mail volumes). This means that the measure should not be implemented in 2021 even in absence of any USO requirements. In 2030 the situation is reversed and the counterfactual is profit-increasing, as continuing e-substitution is eroding the negative financial effects, in addition more savings can be achieved in priority mail home delivery (more often, costly households do not get mail, reducing daily delivery times).

(ii) In contrast, **slowing priority mail** by one day from next day delivery to D + 2 appears much more favorable for profit. The model is seen in the Nordic countries (Norway, Sweden, Finland). Cost economies are significant, as routes have to be served every second day only. The savings exceed both anticipated negative revenue effects (loss of contribution margins) as well as additional costs to still enable daily newspaper and parcels distribution in remote areas.

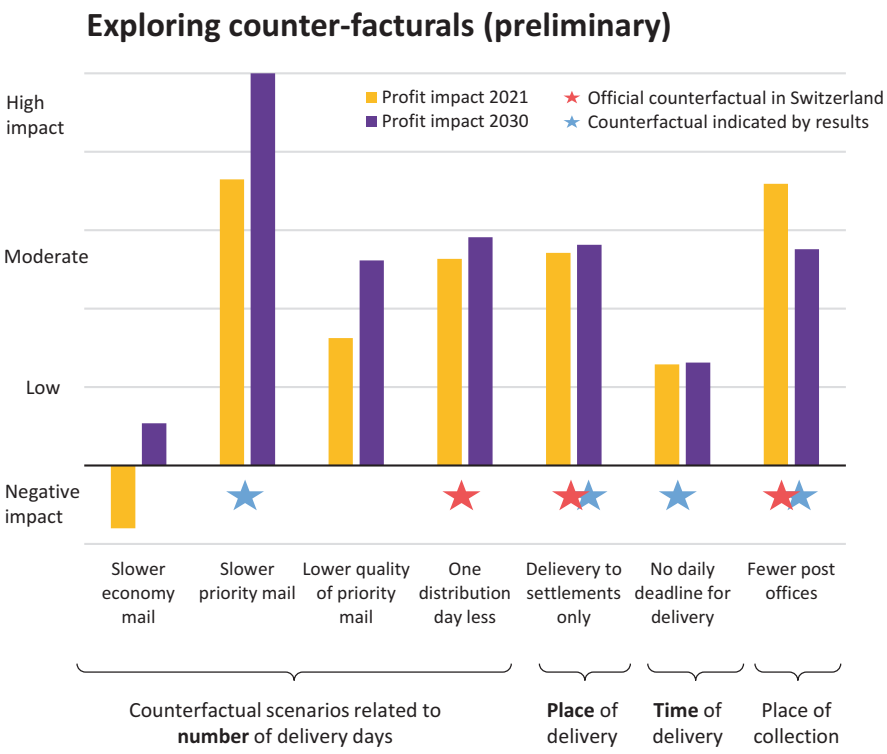

Fig. 8 Profit impact of counterfactuals in 2021 compared to 2030

Again, revenue losses are over time eroded by e-substitution, hence the financial impact of the counterfactual is getting even more relevant toward 2030 where it is clearly the most effective measure related to the number of delivery days.

(iii) In the third counterfactual, **quality of priority mail is lowered** to about 80%, i.e. only 80% of priority mail items reach their destination on time (compared to 99% as of today). Real world examples are Italy and Germany. Thereby, quality is deteriorated for households with high incremental route costs, i.e. households with small incremental route costs still receive high quality service. The results reveal that as in (ii), simulated savings are larger compared to revenue losses caused by the deterioration of quality. Also, the effect is larger in the long run – again e-substitution is diluting the negative revenue effects.

(iv) The fourth counterfactual represents the current official counterfactual in Switzerland, i.e. **one delivery day less**, in place of the example already in the Netherlands. The financial effects are somewhat better compared to (iii), in particular as revenue effects are comparatively small, which also means that the effects in 2021 and 2030 do not differ too much. Interestingly, the anticipated financial effects are strictly dominated by (ii) from 2021 up to 2030,

which means that the official counterfactual might be outdated and should be replaced by (ii).

(v) The fifth counterfactual – also part of the official net cost counterfactual – does not change today's products of Swiss Post per se, but **changes the place of delivery for the most costly households**. Revenue effects are considered very small, in addition, in 2030 cost savings from houses that need no daily service are small (as the most expensive households are already getting mail in cheaper delivery places). Both effects mean that the difference between 2021 and 2030 is rather small. The counterfactual can be freely combined with (i) – (iv), however, the savings are particular lower in (ii), as there, every house is served only every other day and hence the savings can be achieved every other day only. We conclude that (v) should be maintained, however, we have not yet investigated whether it would be optimal to change the delivery location of even more households.

(vi) The sixth counterfactual reflects the financial impact of **releasing the delivery deadline for newspapers** (and thereby also for letters in remote regions). The measure enables larger routes, ceteris paribus. In addition, sequencing use can be more pronounced, both leading to higher efficiency. As volume effects are small in the scenario, the impact does not change much up to 2030.

(vii) The last counterfactual shows the effect **of restructuring the post office network** (i.e. replacing post offices by agencies). In contrast to all other counterfactuals, savings are higher in 2021 than in 2030. Again, e-substitution is diluting the negative revenue effects from post office restructurings, however, in addition, also in the factual USO scenario, post offices are expected to be closed over time in selected cases, thereby reducing the effect.

Summing up, in general counterfactuals related to home delivery are likely to become more relevant in the future, this relates in particular to scenarios with important negative revenue effects such as (i) to (iii), as these negative revenue effects are in part diluted by increasing e-substitution. Overall (ii) is likely to have the most important impact also in the long run. Counterfactual (vi) confirms that, as theoretically argued above, additional USO requirements lead to higher net costs. Comparing optimal counterfactuals with the current official Swiss counterfactual reveals that the latter might require an adjustment in at least two dimensions.

3.3 USO Net Costs When Letters Are Not Profitable Anymore

As a side result, the model reveals that profits of letter mail will continue to decrease up to 2030. The decline is indicated Fig. 9 for the base scenario and a more pronounced decline ("double pace").

In the future, increasing prices might be limited because of (i) consumers switching to competitors and (ii) consumers switching to alternative electronic means and platforms. If so, not only the USO factual scenario might inhibit a negative profit,

but also the best counterfactual scenario (under operation) might end in a loss making financial situation. In such a case, the optimal counterfactual might be stopping letter services completely, or using the parcels network (if still allowing profit-making prices). The correct (best) hypothetical scenario is then not to provide the services at all, hence USO net costs converge to the deficit of USO services.

4 Conclusion

Postal markets and postal regulation are developing with significant dynamics and will continue so in the coming decade. Our paper shows that net cost calculations must take these dynamics into account in order to achieve results that can adequately guide policymakers, regulators and USPs in their strategic decision-making.

An analysis inspired by recent developments in Switzerland discusses some practical challenges of calculating net costs in the short run in times of market decline: (i) legal adjustments of existing USO-provision do usually not require adjustments of the counterfactual; (ii) the introduction of new USO-specifications may require adjustments; (iii) outdated parameterizations used to determine volumes in the counterfactual due to changes in the status quo may also require adjustments. The take-away is that in order to guarantee adequate net costs calculations in times of technological and regulatory change, universal service providers and regulators should have a basic consensus that dynamic markets require dynamic regulatory measures; they have to make sure that the counterfactual scenario remains up to date by adjusting it on a regular basis, and that the calculations use up-do-date parametrizations. This need to regularly update hypothetical scenarios somewhat contrasts the practice in Switzerland to update hypothetical scenarios only occasionally.

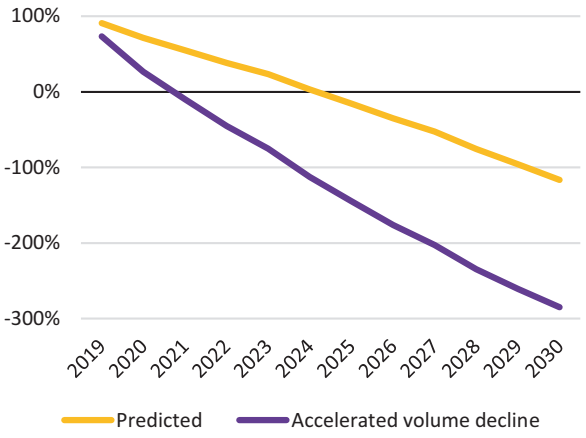

Fig. 9 Economic profit of Letters

The long-run analysis based on the behavior of the net costs of different elements of the USO reveals that some counterfactuals (e.g. slowing down non-priority mail) may become relevant in the future but are not profitable and therefore reasonable today. In addition, the model indicates that some counterfactuals such as slowing down priority mail will – if this is not already the case – likely become the dominating net cost driver in the future and should therefore be addressed adequately in Switzerland.

The practical challenges in implementing these adjustments may differ from country to country as different market and regulatory developments require different conceptual answers.

Overall, we conclude that for adequate net costs calculations providing the relevant information to the public, USPs and regulators should have a basic consensus that dynamic markets require dynamic regulatory measures. They have to make sure that the counterfactual scenario remains up to date by adjusting it regularly and quickly.

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The Climate Challenge: What Role Postal Operators Are Going to and Could Do to Mitigate It?

Claire Borsenberger and Denis Joram

1 Introduction

As the world is facing an unseen health crisis leading to an economic crisis, global warming is one of the major threats to society and the economy that also requires strong actions, now. Limiting global warming to well below 2 degrees Celsius requires reductions of 45 percent in CO_2 emissions by 2030, and reaching carbon neutrality by 2050 worldwide. However, despite the 2015 Paris Agreement – the first-ever universal legally binding global climate change agreement – greenhouse gas emissions are still rising (if we put aside the lockdown periods linked to the COVID-19 pandemic[1]), fossil fuels continue to dominate the global energy mix and the price of carbon remains definitely low. The transition to a low-carbon economy implies a massive transformation of the economy. Such a revolution is unlikely to happen through the market alone, due to various market failures. Consequently, there is a clear case for policy action.

In December 2019, the European Commission announced a new Green Deal initiative, a package including legislation to enshrine the goal of climate neutrality by 2050 in European Union law (European Commission, 2019). The 2050 target would mean a transformation of the EU economy affecting everything from transportation and agriculture to energy production and the design of cities. The Commission plans to introduce measures to decarbonize energy-intensive industries and develop the circular economy. To avoid carbon leakage, it plans to introduce a

[1] The shutdown in economic activity as a result of the COVID-19 crisis has resulted in a temporary decline in global carbon emissions.

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carbon border tax. All these measures will undoubtedly have strong impacts on the whole supply chain of goods, from the production to the delivery. Recently, at the EU level, the spotlight was turned on the impact of e-commerce driven transport and parcel delivery on air pollution and CO_2 emissions.

The objective of this paper is to give insights into the challenges but also the opportunities faced by postal operators as logisticians on the first- and last-mile and as actors who have a real impact on the territories in which they are involved through their commercial activities but also through the services of general interest they provide. Section 2 draws lessons from economic theory to mitigate the climate challenge. Section 3 presents some initiatives that could be taken to reach the objective of carbon neutrality. Section 4 deals with the role postal operators have to play, in order to contribute to this crucial issue. Section 5 concludes with some regulatory recommendations.

2 The Ways to Mitigate the Climate Challenge According to the Economic Theory

2.1 A Story of Public Goods and Negative Externalities

The climate change issue brings into play two "goods" climate and Greenhouse Gases (GHGs) emissions – rather a "bad" for the second one - that have particular characteristics from the economic theory point of view. First of all, climate is what economists define a global public good: climate is freely accessible to everyone (do not belong to anyone) and one person's enjoyment of the climate does not diminish the capacity of others to enjoy it. Economic theory suggests that a common good shared jointly by many users is likely to be overexploited in the absence of some kind of access rationing (Ostrom et al. 2002); this is the "tragedy of the commons". Without well-defined property rights, nobody has the incentive to exploit in a reasonable or sustainable way environmental resources and to protect the climate and environment.

Secondly, GHGs emissions – the main cause of climate change – are what economists name a negative externality.[2] They are a by-product of the production process of numerous goods that has a negative impact on others (or all) economic agents' welfare. The problem is that producers do not take into account this negative

[2] A classic example of a negative externality involves two firms, a factory located on the banks of a river that discharges its waste into the river and a fish hatchery located downstream that need clean water to breed fishes. By itself, the factory has no incentive to reduce its pollution (the quantity of waste discharged in the river) since this means either a fall in its production level or the need to invest in costly process to clean up the polluted water (implying in both cases, a fall in its profits, all other things being equal). Consequently, in the absence of regulation, the pollution costs are borne by the fish hatchery that is obliged to clean up the polluted water, suffering the negative externality created by the polluter.

externality – do not internalize it – in their economic decisions. And since the full costs of GHG emissions, in terms of climate change, are not borne by the emitters, they face little or no incentive to reduce them. Hence, due to the feature of public good of the climate and the negative externalities generated by GHG emissions, the market fails to allocate the resources efficiently, justifying a public intervention to achieve the optimal level of GHG emissions.

2.2 The Classic Solutions to Mitigate Negative Externalities…

Since the seminal work of Pigou (1920), the classical way to solve problems due to externalities is to introduce a tax based on the marginal damages caused by the externality, i.e., in our case, setting a carbon price that reflects the damage caused by CO_2 emissions.[3] The appropriate tax should be equal to the social cost of CO_2 emissions at the point where it is equal to the marginal abatement cost. As explained by Rennert and Kingdon (2019), the social cost of carbon (SCC) is an estimate of the economic damages that would result from emitting one additional ton of greenhouse gases into the atmosphere. The SCC puts the effects of climate change into economic terms to help policymakers and other decision-makers understand the economic impacts of decisions that would increase or decrease emissions. Facing the full social cost of their emissions, the emitters would be incentivized to produce the socially optimal level of pollution, that is, that internalizes the negative consequences of pollution. Indeed, to avoid paying this tax, the emitters have an interest to invest in low-carbon alternatives and switch away from high-carbon goods and services, reducing their polluting emissions.

Another way to put indirectly a price on an externality like CO_2 emissions is to impose quantity restrictions that limit the volume of emissions produced, using a 'command and control' approach. Many experts and economists plead for policies that set a carbon price and leave consumers and businesses to freely determine the least-cost way to reduce the environmental damage taking into account their own cost structure and constraints. Command-and-control regulation are generally considered to be less cost-effective. They tend to force all firms to take on equal shares of the pollution burden whereas polluters do not face the same pollution abatement costs and allow little flexibility in compliance efforts. Moreover, they do not encourage polluters to abate more than is requested (if they abate more, they run the risk of being subject to stricter standards in the future). CO_2 emission performance standards for cars and vans are an example of this kind of instruments. Since 2009, EU legislation sets mandatory emission targets for new cars and since 2011 also for new vans. If producers do not comply with these standards, they are considered as lawbreakers and submitted to financial penalties or other sanctions.

[3] The focus is on this specific GHG throughout the chapter but our remarks are relevant for other GHG and any pollutant.

Rather than taxing the carbon emissions or command-and-control, a third solution consists of allocating property rights among those causing the externality and/or those affected, as demonstrated by Crocker (1966) and Dales (1968). In such a system, rights to emit pollutants would be distributed to stakeholders but could then be sold. Market negotiations between potential permit buyers and sellers would occur and result in the reallocation of these permits across the stakeholders. The efficiency of what later was to be called the "cap-and-trade" approach to air pollution abatement was first demonstrated in a series of micro-economic computer simulation studies between 1967 and 1970 for the National Air Pollution Control Administration (predecessor to the United States Environmental Protection Agency's Office of Air and Radiation) by Ellison Burton and William Sanjour (1967, 1968, 1969, 1970a, b). A cap is set on the total amount of air pollutants emitted by all the installations covered by the system. It is reduced over time so that total emissions fall. The limit on the total number of allowances available ensures that they have a value and the price of carbon or any other pollutant is established by the trading of allowances among firms (by the meet of offer and demand for this "good" – or "bad"). The U.S. Clean Air Act Amendments of 1990 initiated the first large experiment in the use of market-based regulation to control environmental problems with the introduction of an emissions trading program for sulfur dioxide emissions (SO_2). Later that decade the second large trading program began for control of nitrogen oxide emissions (NO_x). Today, there are active trading programs for several air pollutants and in various geographic areas around the world. The United States has a national market to reduce acid rain and several regional markets in nitrogen oxides. The largest GHG trading program is the European Union Emission Trading Scheme (EU-ETS), the Californian scheme trades in California Carbon Allowances, and the New Zealand Emissions Trading Scheme in New Zealand Units.

In theory, whatever approach is taken,[4] the key aim of climate-change policy is to ensure that those generating GHGs face a marginal cost of emissions that reflects the damage they cause in a way that market forces alone cannot reach. By changing the costs and benefits of alternative actions open to economic agents, these policies modify the behavior of economic agents. By making environmentally preferred action financially more attractive and GHG-intensive goods and services more expensive, they encourage emitters to invest in alternative, low-emitting technologies, and consumers to change their spending patterns.

[4] As explained by Weitzman (1974) who deals with the question of whether it would be better to control certain forms of pollution by setting emission standards or by charging the appropriate pollution taxes, from a strictly theoretical point of view absent uncertainty there is really nothing to recommend one mode of control over the other: no matter how one type of planning instrument is fixed, there is always a corresponding way to set the other which achieves the same result when implemented. He nevertheless admits that in any particular setting there may be important practical reasons for favoring either prices or quantities as planning instruments. These reasons might involve ideological, political, legal, social, historical, administrative, motivational, informational, monitoring, enforcing, or other considerations.

2.3 … Are Unfortunately Not Totally Relevant to Reduce CO_2 or GHG Emissions

Effective in theory to deal with externalities, the application of these various instruments to mitigate the climate change meets some difficulties. As argued by Stern (2006), climate change has a number of features that together distinguish it from other externalities and could explain why it is more difficult to deal with it.

Firstly, climate change is global in its causes and consequences: the incremental impact of a ton of GHG on climate change is independent of where in the world it is emitted. Secondly, the impacts of climate change are persistent and develop over the long run: the climate system is slow to respond to increases in atmospheric GHG concentrations; there are lags in the environmental, economic and social responses to climate change. Thirdly, there are uncertainties that prevent precise quantification of their economic impacts (both about the size, type and timing of negative impacts and about the costs of fighting climate change).

Because carbon emissions are not precisely localizable and the damages they create are currently unknown and will essentially be burdened by next generations. This lag in time between emissions and their detrimental impacts can delay awareness of the urgency of the problem. Contrary to the famous example of externality presented by Pigou in "*Economics of Welfare*" (1920),[5] it is impossible to precisely identify the causes and the consequences of the externality. The impacted people (the future generations in our case) have (until recently) no voice to protest against the damages induced by the externality and the economic consequences of the pollution are difficult to estimate whereas such evaluation is necessary to set the right level of tax.

These features impede setting a definitive price on carbon via taxes or marketable permits. Forecasts and knowledge about damages need to be constantly updated, and the right level of tax constantly revised. Uncertainty on the long-term carbon price or overall direction of policy also makes it difficult for businesses to know how to respond. There is a risk that businesses will adopt a 'wait and see' attitude, delaying their investment decisions until the policy direction becomes clearer.

Last but not least, the fact that the externalities generated by carbon emissions are global and diffuse requires coordinated answer of all countries around the world. Indeed, we are facing a typical free-rider problem: since the climate is a global commons, the benefits of emissions reductions undertaken in one country will mostly accrue outside its borders. As a result, countries acting in their rational self-interest

[5] Pigou took the example of pieces of grit that escape from the chimney of a steam locomotive (the cause) and ignite the fields of wheat the train crosses over (the effect). This clear identification of cause and consequences of the externality allow taking a corrective measure, precisely to charge a tax to the railway company, which must compensate for the loss burdened by the farmer and encourage the company to develop a technological alternative (an arrangement of the chimney which deters grit to escape).

are incentivized to minimize their mitigation efforts and free ride on those of others. The best solution to solve this problem is to design national climate programs in a manner that compels other countries to follow suit. Without binding commitments and conditions that prevent countries to transfer the burden on other countries (they decrease their domestic emissions but increase "imported emissions"), the situation formally corresponds to the model of voluntary contributions to a public good studied by Bergstrom, Blume and Varian (1986), in a famous paper in which they show that at the Nash equilibrium the level of public good is sub-optimal. As long as there is no world government or supranational body that sets a common carbon price and enforces binding commitments, all international agreements would remain "symbolic" and many countries do not honor them. Several empirical papers corroborate this theoretical conclusion. For instance, Aakvik and Tjotta (2011) find no significant effect of either the Helsinki or the Oslo agreement in reducing sulfur emissions. Aichele and Felbermayr (2012) show that Kyoto commitment has reduced domestic emissions in committed countries by about 7%, but has increased the share of imported over domestic emissions by about 14%.

3 Where Do You Stand and Where Would You Go?

According to the Carbon Pricing Dashboard of the World Bank Group,[6] as of August 1st 2020, 64 carbon pricing initiatives have been implemented, or are scheduled for implementation. This consists of 31 emission trading systems (ETSs) in regional, national and subnational jurisdictions, and 33 carbon taxes, primarily applied on a national level. In 2020, these initiatives would cover 12 gigatons of equivalent carbon dioxide ($GtCO_2e$),[7] representing 22.3% of global GHG emissions.

Clearly, these initiatives are not enough ambitious to reach the objectives of the Paris Agreement. For instance, at the European level, because of the ETS launched in 2005 and the various environmental taxes put in place by several Member States, the GHG emissions decreased by 23% between 1990 and 2018 (while the economy grew by 61%). But pursuing current initiatives would not allow to reach carbon neutrality (GHG emissions would decrease by only 60% by 2050).

3.1 A Too Low Carbon Price

According to the High-Level Commission on carbon prices led by economists Stern and Stiglitz (2017), carbon prices of at least US$40–80 per ton of CO_2(tCO_2) by 2020 and US$50–100 per tCO_2 by 2030 are required to cost-effectively meet the

[6] https://carbonpricingdashboard.worldbank.org/map_data

[7] A gigaton is a thousand million tons. A "gigaton of equivalent carbon dioxide" is a simplified way to put emissions of various GHGs on a common footing by expressing them in terms of the amount of carbon dioxide that would have the same global warming effect.

temperature targets of the Paris Agreement. Gaspar et al. (2019) estimate that to limit global warming to 2 °C or less, large emitting countries should introduce a carbon tax set to rise quickly to US $75 a ton in 2030.

Yet, less than 5% of global emissions covered under carbon pricing initiatives are currently priced at a level consistent with that required to limit global warming to 1.5° or 2 °C. Fifty-one percent of the emissions covered by carbon pricing initiatives are priced below US $10/t$CO_2$ and only few countries price carbon above US $40/t$CO_2$: Sweden (with the highest carbon tax at US $119/t$CO_2$ on April 1, 2020), followed by Switzerland and Liechtenstein (US $99/t$CO_2$), Finland (US $68/t$CO_2$ on transport fuels, US $58/t$CO_2$ on other fossil fuels), Norway (US $53/t$CO_2$) and France (US $49/t$CO_2$).

3.2 A Partial Emission Trading System

Another weakness of the current initiatives is the limited scope of the various emissions trading systems implemented around the world. For instance, the EU-ETS that currently remains the biggest emissions trading system implemented (accounting for over three-quarters of international carbon trading), covers GHG's emissions from a restricted list of sectors or companies.[8]

These restrictions were motivated by the fear that the stringency of climate change policies, lower outside Europe, will disadvantage European companies with respect to their foreign competitors and induce them to move manufacturing capacity to countries with relatively laxer policies, causing policy-induced "pollution leakage" (Levinson and Taylor, 2008). The reality of this phenomena is under debate,[9] but it is sure that the limited scope of the EU-ETS reduces its

[8] Carbon dioxide (CO_2) from power and heat generation, energy-intensive industry sectors (including oil refineries, steel works and production of iron, aluminum, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals) and commercial aviation; nitrous oxide (N_2O) from production of nitric, adipic and glyoxylic acids and glyoxal and perfluorocarbons (PFCs) from aluminum production. Participation in the EU ETS is mandatory for companies in these sectors, but in some sectors only plants above a certain size are included; certain small installations can be excluded if governments put in place fiscal or other measures that will cut their emissions by an equivalent amount; in the aviation sector, until 31 December 2023 the EU ETS will apply only to flights between airports located in the European Economic Area (EEA). In total, more than 11,000 heavy energy-using installations (power stations & industrial plants) and airlines operating in all EU countries plus Iceland, Liechtenstein and Norway, are concerned, representing around 45% of the EU's GHGs emissions

[9] In 2009, the OECD estimated that if the European Union were to act alone to cut CO_2 emissions by 50% of 2005 levels by 2050, carbon leakage would be 11.5%. According to Dechezleprêtre et al. (2018), the fear the EU-ETS would have negative impacts on the competitiveness of European firms, was unproven: they found that, contrary to what could have been expected, the EU ETS led to a statistically significant increase in revenue and in fixed assets of regulated companies located in France, Netherlands, Norway and the United Kingdom.

benefits. Dechezleprêtre et al. (2018) estimated that if all installations had received all their allowances (instead of receiving only half of their pre-ETS emissions), emissions between 2005 and 2012 would have been reduced by 25% instead of by 10%.

A way to help prevent carbon leakage is to introduce carbon border taxes but again this solution needs an international coordinated action. In addition to the technical and administrative difficulties, the issue is likely to be complicated at the diplomatic level as well. Nevertheless, the European Commission is thinking about the introduction of a "carbon border adjustment mechanism" (a proposal should be published in June 2021), as part of a wider package of laws aimed at cutting the EU's emissions by 55% below 1990 levels before the end of the decade (see under).

3.3 A Need for More Ambitious and Coordinated "Green Deals" Around the World

This summary review of the current situation shows that much remains to be done to achieve climate neutrality by 2050. Fortunately, things appear to move in the right way. The European Commission led by Ursula von der Leyen has made climate change a top priority and has proposed a "European Green Deal" that would make Europe climate neutral by 2050.[10] Like the EU, many countries have pledged to reach carbon neutrality by 2050. According to the Energy and Climate Intelligence Unit (ECIU), a British think tank, in March 2020, 121 nations have set or are proposing a goal to cut their carbon emissions down to net zero[11] in or before 2050, while they were just 15 eight months earlier when the ECIU's net zero online tracker was launched. These 121 nations represent virtually 49% of global GDP, a figure that has trebled in eight months. Recently, three major Asian economies announced targets for reaching net-zero emissions: Japan and South Korea by 2050, and China (the world's biggest emitter) by 2060.[12]

[10] To reach carbon neutrality by 2050, the Green Deal would rely on four pillars, among which a "meaningful carbon price for all sectors" and "a sustainable investment strategy that pushes firms to switch technologies and promotes behavioral change among citizens, offsetting any rising costs they face because of higher carbon prices".

[11] Net zero targets require a significant reduction in pollution and that any emissions remaining are offset with measures, such as tree planting, to reach zero overall.

[12] The new Five-Year Plan aims to reduce greenhouse gas emissions while maintaining sustained economic development by developing digital technologies and other high-tech industries with a low carbon intensity, switching to low-carbon growth models by encouraging innovation, controlling the development of energy-intensive and heavy chemical industries, and optimizing the structure of industrial investment.

The transition to a zero-carbon society requires worldwide consistent efforts (a happy transition is an utopia according to Gollier, 2019). In most cases, the measures already initiated point in the right direction, but they need to be followed through and implemented in a robust consistent and coordinated fashion in order to reduce the risk of carbon leakage and the common free-rider dilemma. The Covid-19 pandemic could be seen as an opportunity to speed up the transition toward a net zero economy. For instance, in line with the European Green Deal, EU countries have agreed to explicitly include clean energy transitions at the heart of their economic recovery, with around 37% of total recovery money targeting climate-related expenditures, including clean energy technologies.[13] But the majority of stimulus packages aim primarily to provide relief to public and private companies or consumers affected by the economic downturn without setting "green" conditions for these bailouts.

4 The Actions Already Implemented by Postal Operators to Reduce Their Environmental Impact, and Some Recommendations to Go Further

Facing the difficulties to implement a coordinated policy at the international level and to reach the right level of carbon price (it is likely to remain too low in the foreseeable future), some sectors take actions to make up the difference. In particular, for several years, postal operators (POs) did not wait for political decisions to act and have been contributing to the transition towards a sustainable society. Many are already on the path of net zero carbon emissions and thanks to their investments in environmental-friendly technologies, they help postal services' users (notably mail senders, e-retailers and e-consumers) to reduce their carbon footprint. These measures meet both the requirements of consumers and stakeholders increasingly concerned about the environment and the DNA of postal incumbents as public services' actors.

However, to tackle the climate challenge, efforts must be made by all stakeholders along the value chain – not only by postal operators. In particular, it is crucial that postal services' users make informed choices. For this purpose, postal operators could, as La Poste has recently done, develop tools that allow users to know the environmental impact of their decisions. In the following we illustrate first direct action undertaken by POs and then their possible contributions to other environmentally friendly choices.

[13] https://www.iea.org/reports/renewables-2020/key-trends-to-watch

4.1 The Postal Industry Has Taken Initiatives to Reduce Its Carbon Footprint for More Than Ten Years

In 2009, International Post Corporation[14] launched its "Environmental Measurement and Monitoring System" (EMMS), a sector-wide initiative acting to mitigate the postal industry's contribution to global warming. Nineteen participants,[15] accounting for more than 75% of global postal volumes,[16] set two targets to reach collectively by 2020: to reduce combined carbon emissions from their own operations by 20% and to achieve a target of at least 90% in carbon management proficiency.[17]

Various initiatives were implemented, going from the development of low-emissions fleets to environmental-friendly sorting center. For instance, UPS operates dozens of cargo bikes[18] in more than 30 cities after introducing them in Hamburg, Germany, in 2012. DHL Express already serves 14 cities in France by electric bicycle, and another 10 cities are expected to join them in 2020. An Post, the Irish national operator, is in the process of replacing all its diesel vehicles in the six major Irish cities (Dublin, Kilkenny, Waterford, Cork, Limerick and Galway) with electric vehicles, effectively delivering zero emission parcel delivery and e-commerce services. It currently delivers 2 million pieces of mail using a road fleet of 2800 vehicles and 1600 bicycles, and over the next four years will replace 750 diesel vehicles with electric vehicles. In February 2019, bpost opened Belgium's most environmentally friendly distribution center in the city of Mons. The building is optimally insulated and equipped with solar panels and smart energy consumption systems for lighting, heating and air conditioning. In France, Le Groupe La Poste initiated a proactive policy many years ago to reduce greenhouse gas

[14] IPC is a cooperative association of 25 member postal operators in North America, Europe and Asia Pacific. IPC engages in industry research, creates business-critical intelligence, provides a range of platforms and programs for member post CEOs and senior management to exchange best practices and discuss strategy.

[15] An Post (Ireland), Australian Postal Corp (Australia), Austrian Post (Austria), bpost (Belgium), Correos (Spain), CTT Portugal Post (Portugal), Deutsche Post DHL Group (Germany), Le Groupe La Poste (France), New Zealand Post Group (New Zealand), POST Luxembourg (Luxembourg), Poste Italiane (Italy), Posten Norge (Norway), Posti (Finland), PostNL (The Netherlands), PostNord (Denmark & Sweden), Royal Mail Group (United Kingdom), South African Post Office (South Africa), Swiss Post (Switzerland), United States Postal Service (United States).

[16] 76.8% of volumes from most recent year for 154 countries. Sources: operator annual reports, IPC member questionnaires and UPU postal statistics.

[17] Carbon management proficiency (CMP) is measured through ten management pillars considered vital for successful carbon management: Principles & Standards; Management & Strategy; Policy & Procedures; Employee Engagement; Activity; Measurement & Verification; Targets; Performance; Disclosure & Reporting; Value Chain Management. In particular, participants are required to report on their carbon emissions and other organizational data that are key to evaluating carbon performance, including electricity consumption, proportion of renewable energy used, transport modes and distances (own and outsourced), postal quantities, and numbers of alternative-fuel vehicles (see IPC (2019) for details).

[18] A cargo bike can carry 100 kg of merchandise and is as fast as a normal bike.

emissions and fully offset its background emissions. The approach followed by La Poste consists in two strands: on the one hand, La Poste is reducing its greenhouse gas emissions by using renewable energies,[19] favoring low-emission vehicles and training drivers,[20] and by recycling or reusing waste via the Recygo and Nouvelle Attitude subsidiary service offers.[21] Since 2013 the Group has already reduced its greenhouse gas emissions by 20%. On the other hand, La Poste is offsetting its remaining CO_2 emissions linked to Mail, Parcel and Express activities since March 2012, via the purchase of carbon credits generated on the voluntary carbon market.[22] La Banque Postale joined this initiative for all of its operating activities in 2018. Le Groupe La Poste's carbon offsetting program draws on various voluntary offsetting projects in developing countries and on investments in innovative carbon sequestration projects in France. With this voluntary approach, Le Groupe La Poste guarantees the total carbon neutrality of its solutions with no extra charge for its customers.

As a result of all these investments, the carbon footprint of parcel delivery[23] decreased by 14% over the 2013–2018 period (from 565.3 grams of CO_2 per item in 2013 to 485.6 grams in 2018) whereas the number of parcels delivered by EMMS participants has increased by 58.4%, from 7.4 billion parcels in 2013 to 11.8 billion parcels in 2018. Letter mail delivery efficiency has remained stable, at 36.2 grams of CO_2 per item in 2018, in a context of a strong decrease of letter mail volumes (−13.4%). Globally, posts have reduced their CO_2 emissions by 31% in 2019 (from 8,652,000 tons of CO_2 in 2008 to 5,923,000 tons in 2019), overachieving their initial targets for 2020 by 50% (International Post Corporation, 2019).

4.2 Postal Operators Help Mail Senders, E-Retailers and E-Consumers to Reduce Their Carbon Footprint and Could Promote More Informed Decisions

The environmental impact of printed mail and e-commerce is a complex issue. When comparing the environmental impacts of paper versus electronic mail or of traditional versus online retail, the product's life cycle as a whole (from cradle to

[19] The 12,000 buildings (i.e. 10 million m2) managed by Poste Immo, the Group's real estate subsidiary, are supplied with electricity from exclusively renewable sources and 48,000 m2 of photovoltaic panels are producing 6 GWh annually on 46 postal industrial sites.

[20] La Poste gets the world's number one fleet of electric vehicles with 16,260 electric vehicles in circulation (24% of the fleet, excluding bicycles and trolleys) and 22,536 power-assisted bicycles.

[21] 75% of inert site waste were recovered in 2018 on the pilot sites; 85,000 tons of matter were sent for recycling or reuse (office waste, undistributed printed materials, books, etc).

[22] This implies to have beforehand measured all CO2 emissions produced by its activities.

[23] For details about the methodologies used by EMMS participants to calculate and allocate their emissions to letter mail and parcel categories, see pages 58 and 59 of the 2019 IPC's Postal Sector Sustainability report.

grave) must be considered instead of considering only fragments of environmental impacts such as those resulting from production, use, transport or disposal.

La Poste recently published a study (Quantis 2020) that compared the environmental impact of paper-based (printed) versus digital alternatives for communication campaigns among the most representative observed on the market (ads, flyers, catalogs, invoices) by using a life cycle assessment (LCA) approach.[24] The impacts of all the stages of the product life cycle on 16 areas (including climate change, water consumption, soils acidification, impact on natural resources stock, on human health, and so on) were estimated. This study found that digital solutions are far from having no impact on the environment and, contrary to preconceived ideas, shows that paper solutions have a comparable or even more favorable impact on some dimensions than their digital equivalent. It emphasized that, whatever the medium used (paper or digital), levers exist to limit the environmental impact of companies' communication and marketing campaigns (the quality of paper and ink used, the source of energy consumed to generate and send e-mailings, the localization of data-centers, and so on).

This kind of study is crucial to help businesses and households to make informed choices regarding their production and consumption decisions. La Poste has developed carbon calculators and comparators that allow its customers to concretely measure the emissions linked to their mail and parcel shipments.[25] To support its business customers in their own carbon neutrality policy, La Poste issued in 2017 and 2018 more than 700 carbon neutrality certificates to its customers, which attest to the neutrality of their mail and parcel deliveries with regard to net CO_2 emissions.

In this context, the study launched by the European Commission in order to determine and compare the impact on the environment of e-commerce and "traditional" brick-and-mortar retail sales, is welcome (European Commission, 2020). Opinions diverge on this issue, but the environmental impact of e-commerce depends on so many factors, behaviors and private decisions taken by all the actors along the value chain, that it is impossible to arrive at a unique answer. The environmental budget depends on several factors, and it would be a mistake to spot the light only on last mile and urban freight logistics to compare e-commerce and brick-and-mortar retail.

As mentioned previously, the whole life cycle of products must be assessed. Differences between e-commerce and traditional retail could be found and evaluated in all the links of the value chain, not only in the "last mile". For instance, the origin of goods sold online and in physical shops could differ, having consequences on the "first mile": according to some studies, more online shoppers opt for local and circular economy products,[26] reducing the distance travelled by products and

[24] https://solutionsbtob.laposte.fr/sites/p8_u3/files/BROCHURE-ACV-WEB.pdf/

[25] http://ecocalculateur.laposte.fr/; https://www.colissomo.entreprise.laposte.fr; https://www.laposte.fr/particulier/eco-comparateur-colis

[26] According to Fevad (2020), 51% of French e-shopppers say favoring the purchase of products from the circular economy and 67% that they find more easily responsible trade products thanks to the Internet.

giving a second life of used products. The choices of e-shoppers regarding the speed of delivery, the frequency of their purchases and the decision to group or not orders, the choices made by e-retailers regarding the origin and the degree of "reparability" of the goods they sell, the type of packaging they use,,[27] and so on, all have huge impacts on the environmental footprint of e-commerce.

Having a prospective approach is also crucial since, beyond the efforts made by postal operators to deliver parcels with carbon-free means, more e-consumers and e-retailers take into account environmental impact of their decisions. For instance, according to an online study conducted by OpinionWay for Generix Group and the Institute of Commerce over a representative sample of 1008 French people from 21 to 22 August 2019, 49% of French people (51% of 25–34 years old) say they take into account the "green" aspect of the delivery mode when they respectively purchase online and return their purchase. 73% of French people (81% of 25–34 years old) are ready to wait for their order if delivery is made with an eco-friendly mode of transport and 34% of French people (55% of 25–34 years old) would choose an environmentally friendly mode of transport even if it was more expensive. However, 30% of French people say they have no information on the possibility of choosing a more virtuous transport when ordering, either in the absence of a proposal or for lack of information but 87% (and 90% of 25–34 years old) say they are inclined to accept a virtuous delivery method if e-merchants give them the opportunity (OpinionWay, 2019).

It is crucial to give consumers choices and all relevant information on the environmental impact of their purchase behavior. This presumes to clearly display on the e-retailers website the environmental impact of each delivery alternatives provided to consumers (according to the delivery point they choose, the delivery speed, the possibility to group orders and so on). Some companies are by themselves prone to adopt such best practices. According to the Fevad (2020), 40% of e-retailers have already implemented an internal plan to reduce the environmental footprint of their activity and 40% are in the process of doing so.

One could go a step further by imposing obligations to disclose environmental information and implementing a "green nudge" policy regarding e-commerce and parcel delivery as they do in other fields (energy, food, and so on).[28] Several economists have already proposed some nudges to induce environmentally beneficial behaviors and fight against climate change (Sunstein and Reisch, 2014; Croson and Treich, 2014; Sunstein, 2013; Lehner et al., 2016), like changing the default option ("print on both sides" instead of "printing on one side"), making information as clear and simple as possible and changing the physical environment (providing adequate parking spaces and road infrastructure for bikes can increase cycling).

[27] Using recyclable and long-standing materials for packaging allows e-shoppers to sort (77% of French e-shoppers do this) or reuse them (45% of French e-shoppers).

[28] Nudges refer to all the instruments that aim to affect the decision context and stimulate the desired behavior change. A nudge modifies the context in which individuals make decisions (the "choice architecture", i.e. the set of all possible choices available to an individual) so that individuals behave in a predictable way and make the desired choice (Thaler and Sunstein, 2009).

5 Conclusion

Humanity stands at a crossroads in its efforts to tackle climate change. As recently said by the European Commission President, Ursula von der Leyen, "the climate change is happening before our eyes. (…)The need to act has never been clearer".[29] In most cases, the measures already initiated point in the right direction, but they need to be followed through and implemented in a robust and comprehensive fashion.

If undeniably part of the solution lies in true carbon pricing, the difficulties to reach a coordinated agreement and to set the right carbon price call for instant civic actions taken by all economic agents. Postal operators can and are already playing a helpful role in reducing emissions beyond what policies so far will do. Many are already carbon-neutral and aim to become carbon-positive.

By putting environmental issues at the heart of their economic recovery efforts, governments can ensure that 2020 is not just a temporary recession-driven dip in emissions, but the start of a rapid structural decline. Well-designed policies need to support R&D and investments in new technologies (to reduce GHG emissions, improve energy efficiency, capture and store carbon, and so on) and to induce people to change their habits towards more sustainable lifestyles. Indeed, a pre-requisite for adopting new habits is to have a clear information on the impact of our behavior and the alternatives we have to do better for the planet. In the absence of relevant information, behavior change will not occur. In this regard, both private and public stakeholders have an important role to play: they must educate and raise awareness by providing information through various forms (newsletters, advertising campaigns, but also public events) as Le Groupe La Poste done by comparing the environmental impact of paper-based (printed) versus digital alternatives for communication campaigns. More globally, the disclosure of climate related data would lead to smarter decisions of all stakeholders (consumers, producers, investors and even governments) on the actions they need to take.

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The Role of Postal Operators in the Circular Economy

Antonin Arlandis

1 Introduction

The covid-19 economic crisis shows that our economic model is sensitive to external shocks. The traditional linear "take, make, dispose" economy has an economic cost and poses a problem of sustainability in the medium and long term. The transition towards a circular economy aimed at eliminating waste and the linear use of resources would limit the risks of external shocks and could be an opportunity for postal operators.

The purpose of this paper is to explain the reason why the traditional linear economic model might be not sustainable in the long run (section 2) and to show that a circular economy could provide a more sustainable model (section 3). Section 4 outlines the obstacles that a transition towards a circular economy faces. Section 5 indicates how the forthcoming regulation could accelerate the transition to a circular economy. Section 6 explains the role that might play postal operators in the transition to a circular economy. Section 7 concludes.

This paper represents the personal views of the author and should not be taken to represent the position of La Poste.

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2 The Linear Economic Model Seems to Be Not Sustainable in the Long Run

Economists have long conceived the environment as a stock of resources, which can be exhaustible (metals, fossil fuels, etc.) or renewable (water, air, biodiversity...). Hence a secular fear of "missing" was modelled by Ricardo or Jevons as early as the nineteenth century, which can be also found in the works of Meadows or in those of the Club of Rome: the growth will stumble on the physical scarcity of resources. On the contrary Robert Solow and the economists of growth argue that the wall of scarcity is constantly pushed back by technical innovation and the ability of economic actors to find substitutes for resources that become expensive because of their scarcity (De Perthuis, 2016).

According to a 2016 study of Ellen MacArthur Foundation in cooperation with Cranfield University and Deutsche Post DHL, the traditional linear "take, make, dispose" economy is proving risky business. In this model, companies extract materials from the earth, apply energy and labor to manufacture a product, and sell it to an end user, who then discards it when it no longer serves its purpose. This one-way pattern of production and consumption, historically a generator of unprecedented growth, has taken us on the track for resource depletion. For companies, this means supply disruptions, surging price volatility, and supply chain risks.[1] The linear economy which relies on fossil fuels and does not manage resources such as land, water, and minerals for the long-term, emits greenhouse gases that are causing a global climate crisis (Ellen MacArthur Foundation, 2019).

It is estimated that, since 1970, each year, the world's population consumes more renewable resources than the planet can generate.[2] According to the European Environment Agency (2016), there is evidence that some planetary boundaries,[3] which define a safe operating space for human development, may already have been transgressed. This trend is becoming more and more pronounced as the world's

[1] Oil prices have been volatile in recent years due to several effects and have generally declined over the last 10 years (in February 2011 the price of a barrel of oil was $95 compared to $65 in February 2021). The decline in prices has been made possible in particular by the extraction of non-conventional oil. According to the U.S. Department of Energy, the peak of conventional oil was nevertheless reached in 2015. The peak of non-conventional oil should also be reached in the coming years. The peak in primary copper production (necessary for the energy transition) will also be reached in the coming years. In an economy that would remain linear, the supply of raw materials should thus become lower than the demand, leading to an increase in prices.

[2] According to Global Footprint Network (2020), humans use as much ecological resources as if we lived on 1.75 Earth.

[3] Chemical pollution, climate change, ocean acidification, ozone depletion, nitrogen cycle, phosphorus cycle, freshwater use, deforestation and other land use changes, biodiversity loss and particle pollution of the atmosphere.

middle classes grow.[4] The size of the "global middle class" is likely to increase from 3.8 billion in 2020 and 5.4 billion by 2030 (OECD, 2019).[5]

Resource prices have become more volatile and are expected to rise over the long term, as consumer demand increases and easy-to-access high-grade stocks of key commodities dwindle.[6] Negative supply shocks could then lead to inflation rise that could reduce the economic growth. In the long term, the linear economic model thus increases the risk of stagflation (slow economic growth accompanied by high inflation). Right now the economy is facing deflationary effects but in the longer term the inflation risk will be higher.

We must expect significant economic consequences related to global warming. Using the results from formal economic models, the Stern Review on the Economics of Climate Change (2006) estimates that if we don't act, the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year, now and forever.[7] If a wider range of risks and impacts is taken into account, the estimates of damage could rise to 20% of GDP or more. Nordhaus (2016) estimates that the economic cost of carbon is $31 per ton of CO2 in 2010 US$ for the 2015 period. For the central case, the economic cost of carbon grows at 3% per year over the period to 2050 according to his estimation. A 2019 report by the IMF, the University of Cambridge and the University of Southern California shows that temperature increases will have a negative impact on economic growth. Barring major policy changes, the U.S. per capita GDP is expected to decline by 10.5% and European Union's one by 4.6% over the next 80 years (Kahn et al., 2019). According to other economists the impact of temperature fluctuations on GDP can be even stronger. Dietz et al. (2020) consider that leading economic estimates of the cost of climate change either ignore tipping points[8] or represent them in a highly simplified way that is impossible to calibrate. The geophysical tipping points tend to increase the social cost of carbon estimated by the leading economic studies according to these authors.

After the coronavirus crisis, climate change is one of the possible factors that could trigger an economic slowdown and it would be even more so in the future if investments in the sustainable economy do not rise. Indeed, according to a recent study of the Banque de France (2019), global warming is generating more frequent and extreme weather events, which will significantly weaken local economic activity and lead to the erosion of asset values. Policies implemented to fight global warming could also destabilize the financial system if the transition to a low-carbon

[4] Source: Luce Beaulieu & Daniel Normandin (2016).

[5] OECD Trends Shaping Education 2019

[6] Source: McKinsey Center for Business and Environment Special edition, October 2016.

[7] In the Stern Review the costs of climate change are increasing over time. The 5% level is an average loss of GDP between the early 2000s and the year 2200. In this report the authors consider that the majority of the costs will occur after 2100 in the absence of a climate change policy.

[8] The scientists consider that nine tipping points if they are exceeded can lead to irreversible changes: amazon rainforest, arctic sea ice, Atlantic circulation, boreal forests, coral reefs, Greenland ice sheet, permafrost, west Antarctic ice sheet and part of East Antarctica.

economy were too sudden or too late; again impairing the value of financial assets. That is why supervisors and central banks are urging financial institutions to quickly implement the internal arrangements required to monitor and mitigate the risks. Pottier (2017) explains that climate change is not in the interest of firms because it can dramatically increase costs and reduce capital value in the long run. Climate change also increases the risk of a pandemic occurring, which could generate similar effects to the Covid 19 crisis.

The subprime mortgage crisis and the covid-19 crisis both have a negative impact on postal operators' profitability. However, the effects of these two crises on the financial results of postal operators are not identical. In 2009, the main European postal operators experienced in decline in sales in both the mail and parcel markets.[9] The figures for the first half 2020 demonstrate that parcel revenue of the main European postal operators increased in the first half of 2020 compared to the first half 2019 while letters revenue decreased. Meanwhile operating profit of the main European postal operators decreased between the first half 2019 and the first half 2020.[10] The coronavirus crisis revealed the fragility of the global supply chain. The coronavirus pandemic has highlighted many of the risks inherent to the linear economy (Ellen MacArthur Foundation, 2020). The take–make–dispose linear model of production generates negative externalities that could impact firms in general and postal operators as well.

3 The Circular Economy Could Provide a More Sustainable Model to Firms and Consumers

The concept of the circular economy has its roots in several schools of thought and theories that challenge the prevailing economic system based on overconsumption of natural resources. A circular economy is a system aimed at eliminating waste and the linear use of resources. Circular systems consist in reusing, repairing, sharing, refurbishing, remanufacturing and recycling to create a close-loop system, minimizing the use of resource inputs and the creation of waste, pollution and carbon emissions. The circular economy provides value creation mechanisms decoupled from the consumption of natural resources and ecosystems by using those resources more effectively. A circular economy seeks to respect planetary boundaries through increasing the share of renewable or recyclable resources while reducing the consumption of raw materials and energy.

According to a 2016 McKinsey article, three major principles govern the circular economy:

[9] This was the case for Deutsche Post DHL, La Poste and Royal Mail

[10] Swiss Post's earnings before interest and taxes (EBIT) fell sharply by 77.3% between the first half of 2019 and the first half of 2020. The operating profits of bpost, Deutsche Post DHL and Poste Italiane decreased by −25.9%, −22% and − 29.2% respectively.

– Preserve and enhance natural capital by controlling finite stocks and balancing the flow of renewable resources.
– Optimize resource yields by reusing products, components, and materials in use at the highest possible levels at all times.
– Make the system more effective by eliminating negative externalities such as water, air, soil, and noise pollution; climate change; toxins; congestion; and negative health effects related to resource use.

Based on an extensive literature review Rizos et al. (2017) identify eight circular economy processes that are further classified into three different categories, namely (i) using less primary resources, (ii) maintaining the highest value of materials and products and (iii) changing utilisation patterns. The eight circular processes are: recycling; efficient use of resources; use of renewable energy sources; remanufacturing, refurbishment and reuse of products and components[11]; product life extension; product as service; sharing models; and shift in consumption patterns.[12]

Mitchell (2015) emphasizes the importance in a circular economy of keeping resources in use for as long as possible as well as extracting the maximum value from products and materials through using them for as long as possible and then recovering and reusing them.

The circular economy has achieved a broad appeal among the academic, policy and business audiences. Many firms understand now that the take–make–dispose linear model of production will cause major challenges in the future, and show a growing interest in the circular economy.[13] A circular economy could provide significant cost savings for various industries (European Environment Agency, 2016). A 2015 report by McKinsey with the cooperation of Ellen MacArthur Foundation and Deutsche Post DHL Foundation, examines the possible impact of a switch to a circular economy in the food, mobility and built environment sectors on the European Union (EU27) economy.

[11] Remanufacturing, refurbishment and re-use are all ways in which used products are recovered after their use and are given a 'next life'. In refurbishment and remanufacturing, the products' 'core' parts are restored so as to maintain the value added of the materials. While both terms 'refurbishment' and 'remanufacturing' are used, the latter entails the idea of more in-depth process aiming to restore the product into an 'as new' condition. Refurbishment, on the other hand, is understood as referring to less in-depth restoration of a product or a component's value (Van Weelden et al., 2016). Reuse of a product is direct re-usage and/or re-sale of either the whole product or a part of it (JRC, 2011b).

[12] Technological advancements as well as improved information for consumers can result in a shift in demand patterns. For example, many consumers choose products or services that deliver utility virtually instead of materially. Examples include digital books, smart phones, music and online stores.

[13] For example, Danone has committed EUR 2 billion (USD 2.4 billion) to scaling regenerative agriculture, reducing virgin plastic in packaging, and shifting to renewable energy, and has pledged to source 100% of ingredients produced in France from regenerative agriculture by 2025. Nestlé have committed up to CHF 2 billion (USD 2.2 billion) by 2025 to shift from using virgin plastic to sourcing food-grade recycled plastic (Ellen MacArthur Foundation, 2020).

According to this study the circular-economy principles could not only benefit European Union environmentally and socially but could also generate a net economic benefit. This report tries to identify and describe major differences that circularity could bring to the European economy and offers directional quantification of the most important differences.

The analysis of McKinsey found significant economic waste in some sectors that many would consider mature and optimized. For example, the average European car is parked 92% of the time; 31% of Europe's food is wasted; and the average European office is used only 35–50% of the time, even during working hours. And use cycles are short: the manufactured assets (excluding buildings) last only nine years on average. According to this study, a circular economy, enabled by technology innovation, would allow Europe to increase resource productivity by up to 3% annually. Achieving this would require a wave of disruptive technologies and business models (such as car-sharing schemes, the development of electric vehicles, modular processes in buildings…).

At the EU level again, Cambridge Econometrics & BIO Intelligence Service (2014) used a macro-econometric model to assess the impact of different resource productivity targets for the EU. The study estimates that improving the EU's resource productivity by 2% thanks to the circular economy could help create two million additional jobs in 2030. Bastein et al. (2013) emphasize the economic dimensions of the circular economy and suggest that this transition is an essential condition for a resilient industrial system that facilitates new kinds of economic activity, strengthens productivity and generates employment. However even if the transition toward a circular economy will create jobs thanks to productivity gains it will also destroy existing jobs.

A mature circular economy could help to reduce the volatility of the price of raw materials and to secure the supply of companies and countries as well.[14] Therefore, a mature circular economy could decrease import dependency and protects the economy from external shocks. The circular economy is a more resilient business than the linear economy. After the coronavirus crisis, building a system that survives unplanned stresses, rather than buckles under them, requires many of the same principles as a functional transition to the circular economy (Kechichian & Mahmoud, 2020).

A circular economy seeks to respect planetary boundaries through increasing the share of renewable or recyclable resources while reducing the consumption of raw materials and energy and at the same time cutting emissions and material losses (European Environment Agency, 2016).

Circulating products and materials – instead of producing new ones – can help cut energy demand, by maintaining the energy that went into making them (Ellen MacArthur Foundation, 2020). According to the Ellen MacArthur Foundation & McKinsey Center for Business and Environment (2015) study a circular economy

[14] The problem of disruption and price volatility can also occur with the circular economy when it is not sufficiently mature. This has been the case with renewable energy in California, for example.

would decouple economic growth from resource use. In the three sectors examinated, the circular economy may decrease CO_2 emissions up to 48% by 2030 and up to 83% by 2050. If a circular approach were adopted in just five sectors (steel, aluminum, cement, plastic, and food), annual greenhouse gas emissions would fall by 9.3 billion tons of CO_2e in 2050, equivalent to the reduction that could be achieved by eliminating all transport emissions globally (Ellen MacArthur Foundation, 2019).

Wijkman & Skånberg (2015) use an input/output model in order to estimate the effects of the circular economy in terms of reductions of CO_2 emissions in five EU countries. Those authors consider three steps[15] towards the circular economy and develop scenarios for each step and their overall effects. Depending on the scenario, the steps are estimated to result in reductions of CO_2 emissions between 3% and 50% by 2030. However, combining these three strategies ('steps') could lead to a 66% decrease in CO_2 emissions in Sweden, 68% in Finland, 67% in the Netherlands, 66% in France and 69% in Spain.

In addition to preserving natural resources, shifting to a circular economy offers an opportunity to create new sources of wealth. The emergence of innovative models leads to collaborative dynamics across industries, cities, and communities that could reveal new fields of sustainable value creation, such as selling services instead of products, recovering resources from waste, sharing assets, and producing green supplies.[16] Innovative approaches, such as technologies and business models could stimulate the transition towards a circular economy and create more economic value from fewer natural resources.

4 The Transition Towards a Circular Economy Faces Several Obstacles

4.1 The Circular Economy Can Generate Environmental Rebound Effects

Environmental rebound effects occur when the initial environmental benefits are partly or fully offset by the impacts derived from (1) spending the income gained or freed on other goods or services (re-spending effect) and (2) failing to substitute primary production (imperfect substitution) (Makov and Font Vivanco, 2018).

This phenomenon was spotted more than a century ago, by Stanley Jevons (1865). In a well-known study on coal consumption in England, this economist found that the increased efficiency of steam engines did not reduce this consumption, but was accompanied by its increase. This phenomenon has been called the

[15] Enhancing energy efficiency, increasing the percentage of renewable energy in the energy mix and organizing manufacturing along the lines of a material-efficient performance-based economy.

[16] Source: Laurent Auguste, Senior EVP Innovation & Markets, Veolia

Jevons paradox, but it is not really paradoxical. Technical progress has had the effect, in this case, of reducing the costs of using coal (less quantity of input is now needed to produce the same quantity of output) and the price of coal, thus stimulating demand.

Despite the innovative prospects of the circular economy to guide organizations towards more sustainable development, there is still a lot of research to be done to better identify the current levers and limitations of the model and thereby increase its economic, social and environmental benefits.

4.2 The Transition Towards a Circular Economy Implies Significant Investment and Behavioral Changes

A transition towards a circular economy would involve considerable transition costs, such as R&D and asset investments, stranded investments, subsidy payments to promote market penetration of new products, services and business models (McKinsey, 2015). Moving towards a circular economy would indeed imply investments in electric vehicles, smart grids, recycling technologies, data systems, and so on.

The 2016 McKinsey article also explains that circular economy strategies imply investments that could reduce the profitability of firms in the short run but increase the profitability in the long run. Despite those investments that should be realized by several firms and countries many studies consider that the benefits are higher than the costs.[17]

Creating a circular economy requires fundamental changes throughout the value chain, from product design and technology to new business models, new ways of preserving natural resources (extending product lifetimes) and turning waste into a resource (recycling), new modes of consumer behavior, new norms and practices, and education and finance. Such a radical change entails a major transformation of our current production and consumption patterns, which in turn will have a significant impact on the economy, the environment and society. Therefore, transforming the linear economy, which has remained the dominant model since the onset of the Industrial Revolution, into a circular one is by no means an easy task (Rizos et al. 2017).

Customer behavior needs to change and in many cases this might require appropriate incentives for returning used products (Rizos et al., 2017). The Circularity Gap Report of 2020 outlines that despite some efforts and success stories, circularity's global impact is not big enough. This report estimates the total resources

[17] The 2015 McKinsey report suggests that the circular path is realistic, could improve European competitiveness and create better economic, social, and environmental outcomes than the current development path. The study of Cambridge Econometrics, Trinomics, and ICF (2018) estimates that applying circular economy principles across the EU economy has the potential to increase EU GDP by an additional 0.5% by 2030 creating around 700,000 new jobs.

entering the economy and the amount of resources that are cycled back. The total resources entering the economy account for some 100.6 billion tons. These annual material inputs into our economy are composed of extracted resources, complemented by cycled resources. In 2017, 8.6 billion tons of resources were cycled back into the global economy and extracted material inputs amounted to 92 billion tons. This study estimates that the global economy was only 8.6% circular in 2017. This report also outlines that globally extracted resources have increased by 9% between 2015 and 2017, from 84.4 to 92.0 billion tons.

Dewick et al. (2020) highlight the risk that progress towards a circular economy will be curtailed by strategic decisions based on contestable understanding, fuzzy indicators, and inadequate information. These authors call for more effective oversight before major industry actors implement international investment standards, launch innovative financing vehicles, and ramp up investment.

4.3 The Transition Towards a Circular Economy Will Generate Losers and Winners

Inter-sectoral and political tensions are likely to develop in the course of a transition, as there will inevitably be winners and losers (European Environment Agency, 2016). Wijkman & Skånberg (2015) stress that despite an estimated positive effect on total employment, some sectors will benefit from the circular transition, while others might suffer negative consequences in their economic activity and employment. Many companies may not be encouraged to develop virtuous models because they do not want to invest and internalize negative externalities like pollution, greenhouse gas emissions or negative health effects related to resource use. Internalizing those negative externalities might be seen by some firms as a cost that might affect their competitiveness. This is the theme, well known in economic analysis, of the free rider[18]: even if there is a collective benefit to reduce the negative externalities some companies considered individually would have an interest not to do so.

Unequal competition between companies that invest in the environmental transition and companies who do not may be a brake on the development of the circular economy. To address this issue some economists suggest to implement a carbon tax (see for example Gollier, 2019). The 2015 Mc Kinsey Report highlights the gap between low environmental taxes and high labor taxation in Europe. Environmental taxes can lead to a reduction in labor costs and thereby encourage labor-intensive activities such as remanufacturing and repair, thus creating a more level playing

[18] Free riders are people or firms that consume a public good (natural resources and environment in our case) without paying for it (Rittenberg & Tregarthen, 2013).

field between the innovative and traditional business models damaging the environment[19] (European Environment Agency, 2016).

5 Recent Developments Suggest That the Transition to a Circular Economy Should Accelerate

Despite the difficulties the transition towards a circular economy faces, this transition is expected to accelerate. According to Dewick et al. (2020) a recent surge of activity from policy makers, the financial industry, and other stakeholders suggests commitment and progress towards providing resources to facilitate a transition to a circular economy. Companies that rely on linear models such as large oil companies and traditional firms in the automotive sector are emerging losers from the covid-19 crisis, while energy transition companies that produce renewable energy (such as Enel Iberdrola, NextEra Energy, Ørsted or Voltalia Inc. and SpA) are emerging stronger.

The last two years have seen a steep increase in the creation of debt and equity instruments related to the circular economy (Ellen MacArthur Foundation, 2020). While no such fund existed in 2017, by mid-2020 ten public equity funds focusing partially or entirely on the circular economy have been launched by leading providers including BlackRock, Credit Suisse, and Goldman Sachs. In the last 18 months at least ten corporate bonds to finance circular economy activity have been issued with help from Barclays, BNP Paribas, HSBC, ING, Morgan Stanley, and others.

Since 2016, there has been a tenfold increase in the number of private market funds, including venture capital, private equity and private debt, investing in circular economy activities. A similar trend is visible in bank lending, project finance, and insurance. Intesa Sanpaolo launched a EUR 5 billion credit facility, Morgan Stanley launched a firm-wide Plastic Waste.

Resolution and the European Investment Bank partnered with five of Europe's largest national promotional banks and institutions to launch a EUR 10 billion loan and investment initiative dedicated to the circular economy. Insurance firms including AXA are developing new solutions for circular business models such as peer-to-peer sharing.

Governments are accelerating this shift. The circular economy is a key pillar of the European Green Deal. Recent legislation exists in countries including China, Chile, Denmark, France, and South Korea. In December 2015, the European Commission published "*Closing the loop — An EU action plan for the circular economy*", a new strategy that aims to support the transition to a circular economy

[19] The study distinguishes between linear products (inexpensive) and circular products (generally more expensive). If advanced economies lower taxes on labor, they will regain competitiveness with Asian economies, which will have to further develop their domestic market, as it is already beginning to happen in China. There would then be more local trade and a decrease in international trade.

in the EU. The action plan sets out a large number of initiatives that address all stages of the life cycle, combined with concrete targets on waste and the development of a monitoring framework in cooperation with the European Environment Agency. In this way, it takes important steps towards a circular economy in Europe.

As promised in the Communication on the European Green Deal (2019), the European Commission adopted in March 2020 a new Circular Economy Action Plan. The new Action Plan announces initiatives along the entire life cycle of products, targeting for example their design, promoting circular economy processes, fostering sustainable consumption, and aiming to ensure that the resources used are kept in the EU economy for as long as possible. It introduces legislative and non-legislative measures targeting areas where action at the EU level brings real added value. The new Circular Economy Action presents measures to:

- Make sustainable products the norm in the EU;
- Empower consumers and public buyers;
- Focus on the sectors that use most resources and where the potential for circularity is high such as: electronics and ICT; batteries and vehicles; packaging; plastics; textiles; construction and buildings; food; water and nutrients;
- Ensure less waste;
- Make circularity work for people, regions and cities,
- Lead global efforts on circular economy.

The European Commission (2020a, b) announced that it will encourage the broader application of well-designed economic instruments, such as environmental taxation, including landfill and incineration taxes, and enable Member States to use value added tax rates to promote circular economy activities that target final consumers, notably repair services.

Many countries have also taken action to develop the circular economy. In 2017 the Danish Government's Advisory Board delivered recommendations for specific efforts Denmark can promote in order to encourage the transformation into a circular economy.[20]

In France a law on the circular economy was passed in February 2020. The purposes of this law are to get out of disposable plastic, better inform the consumer, act against planned obsolescence and waste and foster reuse practices. The text provides for reduction, reuse and recycling targets to be set by decree for the 2021–2025 period and for each consecutive five-year period.

The city of Amsterdam adopted a circular strategy as the basis for its recovery from covid-19. The new model and strategy concretely aim to cut food waste by 50% by 2030, implement strict sustainability requirements in construction tenders, and reduce the use of new raw materials by 20%, also by 2030 (Kechichian &

[20] Think through the entire repetitive lifecycle before even starting to design a product or service; think the circular economy into design and production; optimize consumption and consumer habits with lifecycle perspective; recycle waste with the maximum possible value and least possible impact on the environment.

Mahmoud, 2020). South Korea has also adopted Green Deals as central pillars to its economic recovery, leveraging regenerative models and circular economy principles.

6 Postal Operators Can Play a Key Role in the Transition Towards a Circular Economy Business Models

6.1 Postal Operators Develop Circular Practices in Their Operational Process

As other companies, postal operators show a growing interest in the circular economy. Postal operators are already investing the circular economy either by implementing circular economy practices, by directly providing circular services or by delivering products of circular economy firms.

Many postal operators use recycled or reusable packages. Australia Post for example developed recently a new recycled plastic satchel range to replace virgin plastics. As one of Australia's largest businesses, Australia Post wants to provide a positive example of achieving sustainability (Australia Post, 2019). Australia Post collaborates with organizations to help accelerate circular economy business opportunities and outcomes. Australia Post is partnering with the REDCycle[21] recycling initiative: thanks to over 1800 collection points at major supermarkets around Australia, customers can ensure the responsible recycling of all satchels.

In the United States, the USPS recycles nearly 300,000 tons of wastepaper, cardboard, cans, plastics and other materials nationwide annually through a recycling and waste prevention programs.[22] USPS also purchases more than $200 million worth of recycled products each year. Many of the containers in USPS mail system are made from recycled materials, and so are the stamped envelopes, post cards, stamp booklet covers and packaging materials USPS provides. USPS implements recycling bins in its post offices. The adhesives used in USPS stamps are biodegradable, and USPS Priority Mail and Priority Mail Express boxes and envelopes are fully recyclable. Through various continued successful partnerships, USPS facilitates reuse or recovery of overstock and outdated electronic equipment, saving tons of potential landfill waste.

The purpose of the circular economy is to reduce negative externalities such as greenhouse gas emissions. Postal operators are also investing to reduce carbon emissions produced by their fleets. One way of doing this is the replacement of petrol or diesel vehicles with electric vehicles, which a range of operators are doing. Le Groupe La Poste has provided full carbon neutrality for all its services since

[21] A Melbourne-based consulting and recycling organization who has developed and implemented the REDcycle Program; a recovery initiative for post-consumer soft plastic.

[22] Source: https://about.usps.com/what/corporate-social-responsibility/sustainability/committed/

2012.[23] Since 2012 Swiss Post has sent all domestic letters carbon neutrally. There is also some evidence to suggest that consumers are actively seeking more environmentally friendly deliveries.[24] Investment for the transition to a green economy can furthermore be a useful lever of differentiation.

6.2 The Circular Economy Is a Diversification Opportunity for Postal Operators

By developing competences in the circular economy (such as product tracing), postal operators could gain a competitive edge at the global level and develop new markets. Postal operators may be key actors enabling the development of the circular economy. Postal operators should think of how they could use their logistic network to deliver the renewable primary products, organic materials and used manufactured goods in order to get further into the remanufacturing and recycling markets.

Some postal operators already start to integrate circular economy markets as a way to diversify their revenue sources Both La Poste and Swiss Post have introduced a service of recycling of coffee capsules at home in France and Switzerland in collaboration with Nespresso.

La Poste has created a joint venture (RECYGO) with the company Suez specialized in the recycling of office waste. Boxes in which the papers and other waste are inserted, are distributed to the company or the administration having subscribed to the offer. The company's maintenance staff empties these boxes into a centralized bin made available by La Poste to facilitate logistics.

Postal operators can also enter the market of energy-efficient renovation of existing buildings.[25] Postal operators having a banking subsidiary could finance the environmental transition. A recent trend indicates that the financial sector is starting to capture the circular economy opportunity (see next section).

[23] https://postandparcel.info/45592/news/la-poste-to-be-first-major-postal-operator-to-go-carbon-neutral/

[24] Source: Ofcom (2019).

[25] La Poste offers comprehensive support to households for energy-efficient renovation, which includes taking care of the administrative procedures for obtaining financial aid and advancing the amount of aid obtained.

6.3 Postal Operators Can Become the Logisticians of the Circular Economy

Postal operators are also involved in the circular economy when they develop partnerships with firms providing circular products. There are now many platforms where members exchange second-hand products. Online platforms, such as Vinted, which allow users to sell, purchase, and exchange used clothing and accessories, use postal operators' parcel delivery services to supply end consumers. These growing companies represent an opportunity for postal operators to become logisticians of the circular economy.

The 2016 study of Ellen MacArthur Foundation states that logistics is a major enabler when it comes to scaling-up implementation of circular economy approaches across industries. Just as important as forward logistics, which powers global trade through the transport of materials, goods and information from start to (literally) finish, is reverse logistics.

Logistic is a key step in capturing the value of end-of-life goods and facilitating the reuse and recycle pillars of the circular model. This covers not only the collection and transport of materials and products but value-added activities such as testing, sorting, refurbishing, recycling and redistribution. Logistics can drive the circular flow of goods, link markets and provide transparency across supply chains, no matter how complex. This makes logistics companies – especially those with a global network, infrastructure and expertise in reverse logistics – key enablers for accelerating the scale-up of the circular economy. A circular value chain requires an established return management program supported by optimized reverse logistics solutions and related infrastructure.

Ellen MacArthur Foundation's study proposes to develop a reverse logistics model allowing to understand requirements for return management and reverse logistics according to different product archetypes. For mass production products with low residual value at the end of product life cycle such as consumer electronics, the study recommends to leverage existing and under-used forward logistics network capacities to enable recovery of returned goods and waste (e.g. packaging). The study advises to establish collaboration programs to increase return volumes and to implement incentives for consumers to return products (including ease of access and transparency on drop points). For products with high residual value and relatively low return volumes such as medical equipment, the study recommends to establish forecast and inventory control for return items to enable fast redeployment or resale. The study also advises to expand transport to additional logistics services such as de/installation or packaging.

With the development of reverse logistic, delivery personnel might be able to pick up products in individual homes, in the installations of companies and public administrations or in collection points in order to later reuse and recycle those products.

Postal operators should collaborate with businesses that are starting up and producing durable goods and services for the circulating economy. Developing circular

business models with other companies implies to establish open and collaborative innovation. Collaboration is key at all levels of the circular economy, starting with driving insight and building circular capacity through knowledge sharing.

Finally, to scale-up the circular economy approach and tap future potential, further collaboration and integration of innovations is required. Return of products and recovery will be dependent on joint solutions. Thus, trends such as the Internet of Things can accelerate a transition to a circular economy. Combining intelligent assets with logistics infrastructure will enable asset tracking during the use phase and facilitate product return as well as recovery planning. By automatically and remotely monitoring the efficiency of a resource during production and at the end of its use cycle, all parts of the value chain can become more efficient (Esposito, 2017).

At present, many materials that could be recycled and that are located in private homes and corporate offices have a low value compared to many materials produced in a linear way. This gap will narrow as a result of depletion of resources used in a linear way. Recycling and the reuse of materials are related to logistics issues. The development of reverse logistic will allow postal operators who already visit private homes and corporate offices to benefit from scale and scope economies. Hence it is obvious that postal operators have an important role to play in the transition towards a circular economy.

Regulations on the circular economy will reduce planned obsolescence, undoubtedly this could have a negative impact on trade and parcel traffic of new goods produced in a linear way. However, the development of circular economy and reverse logistics will create new opportunities for postal operators. Planned obsolescence entails negative environmental impacts such as excessive use of natural resources and environmental damage. Selling the product as service, rather than the product itself may be a way to deal with this issue (Valant, 2016).[26] The development of product leases and rentals business models will positively impact parcel traffic.

The overall effect of the implantation of circular economy on postal operators will depend on their commitment. Large scale implementation of the circular economy is likely to have an overall positive impact on postal operators' activity if they can become logistics providers of the circular economy and if they fully implement circular economy strategies. In that purpose, partnerships and open innovation will be a key to the success of postal operators in order to become the logisticians of the circular economy.

[26] These concepts led the flooring company Desso to introduce a carpet-leasing service. Instead of buying carpet, customers have the option to lease carpet from the company, which takes care of installation, maintenance, and removal. This arrangement gives Desso an incentive to manage materials efficiently. Indeed, Desso has cut waste and reduced its consumption of virgin material by treating old carpet as a valued commodity. The company collects carpet from its customers and other sources, including its competitors, and removes the fibers from the backing. The old fibers are recycled into new fibers; the backing is used as an ingredient in roads and roofs.

7 Conclusion

Despite some difficulties, the transition to a circular economy is expected to accelerate. The transition towards a circular economy will create losers and winners.

As other companies, postal operators show a growing interest in the circular economy. Postal operators already develop circular practices in their operational process. For them, the circular economy is a diversification opportunity. Some operators, such as Swiss Post and La Poste, already offer recycling services.

Circularity can be implemented via practices of product life extension. Regulations on the circular economy that reduce planned obsolescence, could have a negative impact on trade and parcel traffic of new goods produced in a linear way. The expansion of circular economy and regulations related to circular economy will, however, create opportunities that postal operators should seize. The development of product leases and rentals business models will positively impact parcel traffic. In fashion for example, clothing resale is expected to be bigger than fast fashion by 2029 (ThredUP 2020 Resale Report).

The circular economy refers to logistics issues. Postal operators who are already logisticians could thus play an important role in the transition towards a circular economy. Postal operators should thus think how they could set up reverse logistics approaches in order to benefit from the spillovers of the circular economy. In order to enjoy the full benefits of the circular economy postal operators need to develop open innovations and collaborations with other companies. Collaborations with partners will be a key for postal operators if they want to develop more models in which products can be rented, reused and recycled.

Large scale implementation of the circular economy is likely to have an overall positive impact on postal operators' activity if they can become logistics providers of the circular economy and if they fully implement circular economy strategies.

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