# Economic Policies Since the Global Financial Crisis

Edited by Philip Arestis and Malcolm Sawyer

# International Papers in Political Economy

This is the fourteenth volume of the series *International Papers in Political Economy (IPPE)*. This series consists of an annual volume with a single theme. The objective of the IPPE is the publication of papers dealing with important topics within the broad framework of Political Economy.

The original series of *International Papers in Political Economy* started in 1993, until the new series began in 2005, and was published in the form of three issues a year with each issue containing a single extensive paper. Information on the old series and back copies can be obtained from the editors: Philip Arestis (pa267@cam.ac.uk) and Malcolm Sawyer (e-mail: m.c.sawyer@lubs.leeds.ac.uk).

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Philip Arestis • Malcolm Sawyer
Editors

# Economic Policies since the Global Financial Crisis

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# Preface

This is the fourteenth volume of the series of International Papers in Political Economy (IPPE). This series consists of an annual volume with eight papers on a single theme. The objective of the IPPE is the publication of papers dealing with important topics within the broad framework of Political Economy.

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The theme of this volume of eight papers is Economic Policies Since the Global Financial Crisis. The papers in this volume were initially presented at a one-day conference in Cambridge, UK (St Catharine's College), 30 March 2017. The conference was organized by the Department of Land Economy, University of Cambridge, under the aegis of the Cambridge Trust for New Thinking in Economics, entitled *Economic Policies Since the Global Financial Crisis*. The Cambridge Trust for New Thinking in Economics fully supported and financed the conference. The papers were subsequently presented at the 14th International Conference, entitled

*Developments in Economic Theory and Policy*, held at the University of the Basque Country UPV/EHU, Bilbao, Spain, 26–27 June 2017, which fully supported and funded the special sessions to which the papers included in this volume were presented. We are grateful to the organizers of the Bilbao conference and to the Cambridge Trust for all the help and funding provided.

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**Ayoze Alfageme** holds a bachelor's degree in economics and a post-graduate degree in philosophical and political analysis of capitalism both from the University of Barcelona. He is a second-year MA student in international economics at the Berlin School of Economics and Law. His research interests are in the field of classical and post-Keynesian macroeconomics, distribution issues, political economy and European economic policies.

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# Monetary Policy Since the Global Financial Crisis

## Philip Arestis

**Abstract** This chapter focuses on monetary policy since the Global Financial Crisis (GFC), and the subsequent 'Great Recession' (GR). In effect, and since the GFC and GR, monetary policy makers have abandoned the main policy instrument that had been around prior to the GFC. The pre-GFC monetary policy had focused on manipulating the rate of interest to achieve an Inflation Target (IT), the only objective of monetary policy, namely price stability. In view of the rate of interest reduced to nearly zero after the GFC, monetary policy makers introduced unconventional means to achieve their ITs, namely, Quantitative Easing (QE) along with very low, near-zero and in some cases negative, interest rates. They also introduced financial stability as a new objective, but IT is still around. We discuss these developments in the case of the main economies, namely the United States, the United Kingdom and the Economic and Monetary Union (EMU).

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# 1     Introduction[1]

The focus of this chapter is on monetary policies since the Global Financial
Crisis (GFC), and the subsequent Great Recession (GR). Since then,
monetary policy makers have in effect abandoned the main policy instru-
ment of manipulating the rate of interest to achieve price stability. This
is so in view of the rate of interest reduced to nearly zero, and below zero
in some countries, along with Quantitative Easing (QE), to still achieve
an Inflation Target (IT). In addition to these new 'unconventional' poli-
cies, financial stability has also been introduced, both microprudential
(concerned with individual financial institutions) and macroprudential
(concerned with the entire financial system) type of policies.

It is the case, though, that "bank lending to the private sector and the
broad money supply have stagnated and the recovery has been weak"
(Goodhart 2015, p. 20).[2] The initial introduction of these unprecedented
'unorthodox' measures, along with direct bailouts of banks and other
financial institutions, though, were helpful in avoiding a more serious
financial crisis; they helped to enhance the liquidity and reduce the risk
premium of the banking sector. It all helped to avoid the collapse of
the financial sectors in the relevant countries. However, the subsequent
rounds of the QE, and the near-zero/negative interest rates, proved to be
less effective in terms of producing a robust recovery. Relevant proposals
to achieve financial stability are in place. We discuss these developments
in the cases of the United States, the United Kingdom and the Economic
and Monetary Union (EMU).

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[1] I am grateful to Malcolm Sawyer for helpful comments.
[2] Not only because of poor output growth expectations but also because of the imposition of lower
leverage ratios, which means that banks could not provide more credit in view of the significant
increase in their regulatory capital ratios. Reduction of capital requirements would have been more
helpful (Goodhart 2015).

We proceed in this chapter, after this short introduction, with a discussion of the theoretical and monetary policy aspects prior to the GFC, in Sect. 2. We discuss in Sect. 3 the new monetary initiatives in view of the GFC and GR, concentrating on QE, along with low and negative interest rates. Section 4 deals with financial stability. Finally, Sect. 5 summarises and concludes.

## 2 Inflation Targeting

This section concentrates on the theoretical aspects of IT to begin with, followed by a discussion of some of its main problems.

### 2.1 Theoretical Aspects of IT

IT is the monetary policy of the 'New Consensus Macroeconomics' (NCM), which emerged after the introduction of rational expectations in the early 1970s (Woodford 2003). Galí and Gertler (2007) suggest that the NCM paradigm provides sound microfoundations along with the concurrent development of the real business cycle approach that promoted the explicit optimisation behaviour aspect. The upgrade of monetary policy and downgrade of fiscal policy, though, should be highlighted. The NCM is a framework in which there is no role for 'money and banking', and there is only a single interest rate. Two of its key assumptions are price stability is the primary objective of monetary policy, which when achieved leads to macroeconomic and financial stability; and inflation is a monetary phenomenon and as such it can only be controlled by monetary policy, this being the rate of interest under the control of the central bank. The latter should be independent with politicians and the Treasury not allowed to influence its decisions and actions. Monetary policy is thereby upgraded in the form of interest rate policy to achieve the objective of price stability. This policy is undertaken through IT, which requires the independent central banks to utilise inflation as an indicator of when to expand or contract monetary policy. However, the GFC has weakened substantially this claim. Indeed, and as King (2012) suggests, "the current crisis has demonstrated that price stability is not

sufficient for economic stability more generally. Low and stable inflation did not prevent a banking crisis" (p. 4; see, also, King 2016).

Fiscal policy should only rely on automatic stabilisers, but more importantly, it should be concerned with broadly balancing government expenditure and taxation. This downgrades fiscal policy as an active instrument of economic policy, a proposition based on the Ricardian Equivalence Theorem. Consequently, fiscal policy is ineffective as a stabilisation instrument. However, there are critiques of this theorem. Arestis and Sawyer (2003, 2004a), for example, criticise it and offer a strong and supportive view of the effectiveness of fiscal policy (see, also, Bernheim 1987). There is also empirical evidence that supports the contention that a significant proportion of consumers and firms are actually non-Ricardian in that they are not forward-looking or their behaviour is constrained. The presence of non-Ricardian households is crucial in that fiscal policy is effective under such circumstances (Coenen et al. 2012).

An important assumption is the existence of short-run nominal rigidities in the form of sticky wages and prices. It follows from this assumption that the independent central bank by manipulating the nominal rate of interest is able to influence the real interest rate and hence real spending in the short run. The role of 'expected inflation' is also important. The inflation target itself and the forecasts of the central bank are thought of providing a strong steer to the perception of expected inflation. Given the lags in the transmission mechanism of the rate of interest to inflation, and the imperfect control of inflation, inflation forecasts become the intermediate target of monetary policy in this framework (Svensson 1997, 1999). The target and forecasts add an element of transparency seen as a paramount ingredient of IT. Central banks decide on changes in interest rates in view of forecasts of future inflation as it deviates from its target along with output as it deviates from potential output. But such forecasts are not easily available, and large margins of error are evident in forecasting inflation (see, also, Goodhart 2005). The reputation and credibility of central banks can easily be damaged under these conditions. The centrality of inflation forecasts in the conduct of this type of monetary policy represents a major challenge to countries that pursue IT.

## 2.2    Theoretical and Empirical Problems of IT

The NCM model is characterised by the single interest-rate instrument, with financial markets and money excluded. This is so in view of the transversality condition that all economic agents with their rational expectations are perfectly creditworthy, and no agent would default. All debts would ultimately be paid in full, thereby removing all credit risks and defaults. Borrowing and lending are undertaken at the same riskless interest rate, and all the debts in the economy are perfectly acceptable in exchange. There is, thus, no need for a specific monetary asset to be included in the NCM model. All financial assets are identical so that there is only a single rate of interest in any period. The NCM model is thereby a non-monetary model, with the money supply treated as a residual and does not appear anywhere in the main equations of the NCM (Arestis 2011). There is the exception of the central bank rate of interest, manipulation of which would achieve price stability with macroeconomic stability thereby emerging.

The absence of banks in the NCM model has gone too far for it leads to serious problems of analysis (Goodhart 2007). Banks and their decisions play a considerably significant role in the transmission mechanism of monetary policy. Decisions by banks as to whether or not to grant credit play a major role in the expansion of the economy, in the sense that failure of banks to supply credit would imply that expansion of expenditure cannot occur (see, also, King 2016). Changes in the rate of interest, which can have serious effects through bank lending, are completely absent from any consideration. A change in the rate of interest can have an impact on the supply of credit through the so-called 'credit channel of monetary policy' in the context of imperfect capital markets (Bernanke and Gertler 1995). This channel is proposed under the assumption of imperfect capital markets, one that the NCM proponents stay away from in view of the transversality assumption.[3]

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[3] Financial frictions, namely stickiness in making transactions, though, have been introduced into the NCM model more recently. King (2012), however, argues that 'no one of these frictions seems large enough to play a part in a macroeconomic model of financial stability. So it is not surprising that it has proved hard to find examples of frictions that generate quantitatively interesting trade-offs between price and financial stability … overwhelmingly the most important objective remains stabilisation of inflation'.

In the real world, many economic agents are liquidity constrained. They do not have sufficient assets to sell or the ability to borrow. Their expenditures are limited to their current income and few assets. The perfect capital market assumption, implicit in the NCM, in effect implies no credit rationing, thereby concluding that the only effect of monetary policy would be a 'price effect' as the rate of interest is changed. Consequently, the parts of the transmission mechanism of monetary policy, which involve credit rationing and changes in the non-price terms upon which credit is supplied, are excluded by assumption. A further problem has been highlighted by King (2016) in that IT in view of its design "to mimic the behaviour of a competitive market economy" (p. 171), cannot account for 'radical uncertainty', namely the uncertainty that statistical analysis cannot tackle. This, then, produces accumulated occasional 'mistakes' on the part of households and business agents, which would require the central bank to account and target "the real equilibrium of the economy and not just price stability" (p. 172). There is also the question relating to risk and uncertainty and the assumption of a single interest rate (Goodhart 2007). The perceived riskiness of borrowers and uncertainty clearly imply that a single interest rate cannot capture reality. IT also does not pay enough attention to asset bubbles, the consequences of which can be severe as shown by the emergence of the GFC.

Countries that do not pursue IT policies, and do not have independent central banks in most cases, have done as well as the IT countries in terms of inflation and locking-in inflation expectations at low levels (Angeriz and Arestis 2007, 2008); in fact, and in some cases, they have done a great deal better than the IT countries. Angeriz and Arestis (op. cit.) also show that low inflation and price stability do not always lead to macroeconomic stability. The GFC provides ample evidence of this conclusion. But even prior to the GFC steady output growth and stable inflation were associated with growing imbalances, essentially in the balance sheets of households, firms and financial institutions. All these imbalances proved to have been very costly indeed in view of the GFC. Furthermore, Angeriz and Arestis (2007) argue that the NCM pays insufficient attention to the exchange rate. Nevertheless, the real exchange rate affects the demand for imports and exports, and thereby the level of demand, economic activity and inflation; but it is not included in the monetary policy rule of the IT model. Furthermore, there is insufficient evidence that the available empirical evidence (Arestis and Sawyer 2004b, 2008) validates the NCM theoretical propositions.

Despite all these problems with the NCM and its economic policy, support for it and its empirical equivalent, the Dynamic Stochastic General Equilibrium (DSGE) type of models,[4] used widely by both academics and central bankers, is still very much in place and not abandoned.[5] New policies have emerged in view of the GFC but the focus on IT is still there as shown below.

## 3 Monetary Policy Reactions Following the GFC and GR

We begin this section with the reaction of the main central banks to the GFC and GR, and then proceed to the more 'unorthodox' monetary policies pursued by them.

### 3.1 Reaction of the Main Central Banks

In early August 2007, when the US subprime crisis began to spread outside mortgage and real estate finance, there was a widespread collapse of confidence in the banking system especially so in the interbank market. The money markets became dysfunctional, which disrupted the transmission mechanism of monetary policy. That led to an unprecedented and synchronised downturn in business and consumer confidence; a significant drop in aggregate demand thereby ensued. A fully-fledged credit crunch emerged, as interbank lending was effectively frozen on the fear that no bank was safe anymore. By early October 2008, the crisis spread to Europe and to the emerging countries as the global interbank market stopped functioning.[6] The GR thereby emerged.

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[4] King (2016) suggests that the DSGE models, which are employed by central banks, 'afford little role for money or banks, a property that has been a source of embarrassment, both intellectual and practical' (p. 305).

[5] See, also, Arestis and González Martinez 2015, for a discussion of further problems with the NCM theoretical framework and its IT policy implications.

[6] A number of Asian countries managed to avoid the most serious aspects of the crisis. Precautionary measures after the 1997 Asian crisis, in the form of buildup of large foreign reserves, reduced expo-

Central banks around the world turned their attention to enhancing the liquidity of their banking sectors, as well as to restoring confidence in the financial system; also to contain the impact of the crisis on the real economy. A unique element of the reactions of policy makers in terms of the emergence of the GFC is the activist role played by central banks and Treasuries around the world. Extensive utilisation of monetary policies emerged, and in an unparalleled way in the history of similar crises; their responses became very accommodative in many countries around the globe. Central banks responded by flooding the financial markets with liquidity. The US Federal Reserve System (the Fed), the UK Bank of England (the BoE), and subsequently the EMU Central Bank (the ECB) were probably the first to commence the flooding.

The Fed began to lend through its repo (repurchase) operations; the BoE announced similar measures to address elevated pressures in the short-term funding markets; and the ECB began to lend to the EMU banks through the discount window or fine-tuning operations. In December 2007, the Fed along with the BoE, and the ECB introduced the 'Term Auction Facility' (TAF). The central banks use it to auction term funds to depository institutions under collateralised agreements. Also, the Fed under this scheme allows temporary dollar swaps to other central banks, so that the latter can pass it on to counterparties in local operations.

## US Fed Reactions

The intervention in the United States began in March 2008 with the rescue of the investment bank, Bear Stearns, by JP Morgan with funds from the Fed, was only the beginning. The rescue was justified on the argument that their exposure was so extensive to third parties that a worse crisis would have developed without the bail out. In July 2008, the Fed and the Treasury followed it by bailing out and partially nationalising Fannie Mae and Freddie Mac, in that they were crucial to the functioning of the mortgage market. In September 2008, the Fed and the Treasury allowed the investment bank Lehman Brothers to collapse in an attempt to prevent moral hazard by

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sure to foreign borrowing, and tighter controls over their banking systems, helped greatly. Some of the Latin American countries also managed similarly.

discouraging the belief that all insolvent institutions would be saved. The argument put forward to justify the collapse was that Lehman Brothers was in a very bad shape, and less exposed than Bear Stearns. Shortly afterwards the insurance US giant American International Group (AIG) was bailed out and nationalised in an attempt to avoid the impact on insurance-security contracts if it were allowed to fail. The Lehman Brothers incident turned the liquidity crisis into a confidence crisis, thereby causing panic in capital markets and a virtual freeze in global trade.[7]

The Treasury introduced the Troubled Asset Relief Programme (TARP) in October 2008, and used $700 billion to buy 'toxic' securities in an attempt to restore bank lending; and from late 2008 to early 2009, through its TARP, added $250 billion cash injection. The Fed after reducing the federal funds rate from 5.24% to 0–0.25% by December 2008, started purchasing long-term Treasury securities, mortgage-backed securities, and swaps of short-term Treasuries for longer-term Treasuries (what is called 'Qualitative Easing'; see Farmer and Zabczyk 2016) in an attempt to enhance the liquidity of the financial markets—what was QE1. By June 2010, it reached a peak of $2.1 trillion, and the Fed halted further purchases as the economy started to improve, but resumed in August 2010 when the Fed decided the economy was not growing satisfactorily. In November 2010, the Fed announced a second round of quantitative easing, QE2, buying $600 billion of Treasury securities by the end of the second quarter of 2011. A third round of quantitative easing, QE3, was announced on 13 September 2012, which amounted to a $40 billion per month, open-ended bond purchasing programme of agency mortgage-backed securities. On 12 December 2012, the Fed increased it from $40 billion to $85 billion per month. The QE ended on 29 October 2014 after accumulating $4.5 trillion assets. The Fed also increased the federal funds rate in December 2015 from 0.20% to 0.50%, in December 2016 from 0.50% to 0.75% and in March 2017 from 0.75% to 1.0%. The Fed reiterated after its March 2017 meeting that further rate increases would be gradual.

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[7] The bailout of Citigroup in the US over the weekend of 22–23 November 2008 left a 'sour taste' to those who recalled that this financial institution was a prime protagonist in the 1999 repeal of the 1933 Glass-Steagall Act (Eichengreen 2015).

In terms of the non-standard QE, the Fed has used the terms 'quantitative' and 'credit' easing. 'Quantitative' is when the Fed undertakes money injections through commercial banks. 'Credit easing' is when the Fed provides liquidity to the economy directly through purchases of private-sector assets (such as corporate bonds) and mortgage-backed securities.

## UK BoE Reactions

The collapse of the Northern Rock in September 2007, which was relatively more reliant on interbank markets rather than on retail deposits for funds, and subsequently nationalised (early 2008), was a serious blow to the UK banking system. The UK authorities injected massive liquidity into the system and guaranteed all interbank deposits. A relevant body was set up in the autumn of 2008, the UK Financial Investments, to oversee the system. The UK authorities initiated further policies: injected further liquidity into the system; and the BoE reduced the Bank rate six times beginning October 2008 to an all-time low of 0.5% in March 2009; and reduced it further to 0.25% in early August 2016. A new Banking Act came into force in late February 2009, giving greater powers of intervention to the BoE. The purpose was for the BoE to be able to give support to stricken banks for financial stability purposes. Most importantly under the New Banking Act was a new and permanent provision, the Special Resolution Regime, which gave the BoE for the first time the statutory objective to promote financial stability, working with the Treasury and the reformed Financial Services Authority (FSA).[8] It also introduced the Asset Purchase Facility (APF, 19 January 2009), a

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[8] The FSA was formed in May 1997 to supervise individual financial institutions, with the BoE retaining the overall responsibility. Following the GFC, the FSA became two separate regulatory authorities: the Financial Conduct Authority (FCA) that regulates the financial services industry and is accountable directly to the Treasury and Parliament. And the Prudential Regulation Authority (PRA), which is part of the BoE and responsible for the prudential regulation and supervision of banks, building societies, credit unions, insurers and major investment firms. PRA should also facilitate effective competition in banking and insurance. There is also the Financial Policy Committee (FPC), which is an official committee of the BoE, a new body responsible for macroprudential measures. It focuses on the macroeconomic and financial issues that may threaten long-term growth prospects. The FPC has taken over operational responsibility for managing the financial sector from the FSA, with legislation enacted in 2013. It cooperates and coordinates action with PRA and FCA.

framework that enabled the Monetary Policy Committee (MPC) of the BoE to initiate QE, which was implemented on 5 March 2009.[9]

The ultimate objective of QE is to achieve the set IT eventually via the output gap. This process involves changes in the money supply, which would have an impact on current output. The impact on output gap and on inflation expectations would achieve the set IT. The BoE introduced a £150 billion QE by buying government securities and commercial paper (£50 billion on commercial paper) over the April–June 2009 period. Subsequently (May 2009), it was increased to £125 billion (9% of annual Gross Domestic Product (GDP)), increased further to £175 billion in August 2009 and to 200 billion in November 2009. QE was paused at the beginning of 2010. In February 2010, the decision emerged that the MPC would monitor the appropriate scale of the QE and that further purchases would be necessary should the outlook warrant them. This became necessary in October 2011, when QE increased by £75 billion; another increase took place in February 2012, when QE increased by £50 billion; and in July 2012, QE increased by a further £50 billion to a total of £375 billion overall. In early August 2016, and in view of financial stability risks of the vote to exit the EU, QE was increased by a further £70 billion (£10 billion of which would be spent on nonfinancial corporate bonds, commencing on 27 September 2016) to a total of £445 billion. There was also a new £100 billion 'Term Funding Scheme' for banks and building societies, which would allow them to borrow at close to bank rate from official reserves, provided they lend it to consumers and businesses.

### EMU ECB Reactions

The ECB pursued an approach under the banner of 'enhanced credit support' or 'liquidity enhancing' policy, which "comprises non-standard measures that support financing conditions and credit flows above and beyond what could be achieved through reductions in key ECB interest

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[9] An interesting aspect of the UK APF is to avoid intrusion into the fiscal territory. The assets bought are held entirely by the Treasury with the Bank lending money to APF at the policy rate. The interest earned is returned to the Treasury under the terms of the APF dedicated account.

rates alone" (ECB 2010, p. 68). The ECB, after increasing its 'official' rate as late as mid-2008, reduced it from 4.25% to 1% (May 2009), with further decreases, and by June 2014, the rate became 0.00%; negative rates on bank deposits with the ECB were subsequently introduced. Banks could obtain all desired liquidity at the ECB's weekly tenders, if they had sufficient assets eligible as collateral in the Euro system liquidity-providing operations. The focus was on banks since in the EMU they are the primary source of financing the real economy. The ECB decided to carry out refinancing operations with a maturity of 12 months, as from 23 June 2009, applying a fixed rate tender with full allotment; also to purchase euro-denominated covered bonds issued in the euro area.[10] In addition, to grant the European Investment Bank the status of eligible counterparty in the ECB's refinancing operations. Another proposal was an EU-wide bank regulation body, the European Systemic Risk Council (ESRC), comprising all ECB governing council and other central bankers, and to be managed by the ECB. Its design would be to issue early warning signals on risk to EU's system of financial supervision from 2011. Also in June 2009, a new proposal emerged, the Pan-European Regime to regulate the financial markets and institutions, which was to be enshrined in European law. It comprised of the ESRC, which would monitor financial stability, and of European Agencies, which would police the banking, securities and insurance sectors. Neither the Council nor the Agencies would have powers to dictate fiscal action in case of financial emergency. Nor could they order governments to bail out or recapitalise banks.[11]

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[10] Covered bonds are securities issued by credit institutions, and are secured by a protected pool of high-quality assets. They are subject to regulatory authorisation and supervision. Covered bonds typically carry a 2–10 year maturity, and originated in the European bond market. As of 2009, 24 European countries allow covered bond instruments to be issued and sold.

[11] A problem, which has arisen recently for the ECB, is in terms of the Contingent Convertible Capital Instruments (CoCos) securities—the latest version is labelled as Additional Tier1 (AT1) bonds. These are securities issued by banks, designed to enhance their capital levels in case of crises (see, for example, Ardjiev et al. 2013); and also to prevent taxpayer bailouts in the case of financial crises. CoCos are capital securities that absorb losses when the capital of the issuing bank falls below a certain level. They force losses on investors through conversion into equity or be written down, when a bank's capital falls below the relevant level, typically between 5% and 7%. Under European relative rules, large banks should raise a proportion of their total capital from AT1s to 1.5% of their Risk Weighted Assets by 2019. Recently, these CoCos have caused panic amongst investors in that the rules for CoCos are by far too complicated; and in the case of a financial crisis could undermine a bank's financial position rather than strengthen it.

The ECB at its meeting on 22 January 2015 decided to undertake QE; it would purchase €60 billion of euro area bonds and other safe financial assets, every month between March (2015) and September (2016), or until inflation is back to the ECB's inflation target. This implies total purchases worth around €1.1 trillion, equal to around 10% of the EMU's GDP.[12] The ECB started QE on 9 March 2015. On 3 September 2015, the President of the ECB promised further QE and stated that it was likely for the QE to continue beyond September 2016, should global markets tremors and the emerging markets slowdown threaten the euro area recovery. The ECB extended it subsequently, March 2017, with the €60 billion QE increased to €80 billion. In March 2016, the ECB introduced the Targeted Long-Term Refinancing Operation, which is a variation of the Long-Term Refinancing Operation, introduced in 2014. Its aim is to allow borrowing by the banks up to 30% of their non-mortgage lending, provided they expand credit to the real economy. The ECB has also increased the range of assets to buy. The relevant range now includes corporate bonds alongside government bonds, asset-backed securities and covered bonds. In March 2016, the ECB announced plans to buy euro-denominated corporate bonds as part of its QE, which ECB launched on 8 June 2016. Corporate bonds with maturities of more than six months and up to 30 years are included in this 'new' QE activity and the ECB could buy 70% of any individual bond type. Yields on euro corporate debt fell, while new issues enjoyed high demand. The ECB confirmed at the same time that it would also enter the primary, in addition to the secondary, markets; however, bank bonds should not be included. The inclusion of corporate bonds, which are generally 'buy-to-hold' assets, traded infrequently, raises the issue of whether there would be sufficient quantities for the ECB to satisfy its desired purchase of such bonds. In fact, and as it is reported in the *Financial Times* (2 September 2016), a serious problem arose in terms of shortage of supply to satisfy the ECB's bond-buying scheme, especially so in view of negative interest rates. More recently (December 2016), the

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[12] King (2016) provides relevant QE figures, '£375 billion by the Bank of England, almost 20% of GDP, and €2.7 trillion by the Federal Reserve, around 15% of GDP' (p. 183). In the case of the Central Bank of Japan with the recent 'QQE' (see footnote 13), the Bank's balance sheet is of the same order of magnitude as annual GDP.

ECB decided to reduce its QE to €60 billion after March 2017, until the end of 2017. This does not mean the end of it, for the ECB stated QE would remain active in the markets 'for a long time'.

We may note that the ECB's QE terms are 'enhanced credit support', or 'liquidity enhancing'. In the United States and the United Kingdom, it is financial markets, and not merely banks as in the EMU, that are the primary source of external financing for firms. The decision to purchase covered bonds outright by the ECB is with the specific aim to support the covered bond market, which is the major source of support of finance for the EMU banks. In the capital market-based US and UK systems, large-scale asset purchases play a dominant role, whereas in the bank-based euro area system, liquidity provision through the banks is the focus of operation.

The European Banking Authority (EPA) coordinated the 'stress test' of 51 banks across the EU, undertaken to examine how short banks' capital might be, and thereby their resilience to 'adverse economic shocks'. The latest conclusion of the tests, released on 29 July 2016, was that more work was necessary to put the EU banks in a healthy state. The EPA suggested that the recovery of the EU banking was slower than in the United States. In May 2009, the US authorities introduced the 'stress test', an exercise to identify undercapitalised banks; so that the government could make sure, they had enough capital to recover. The biggest 19 banks were examined. The outcome of the 'stress test' was that none of the banks was insolvent, but 9 out of the 19 examined needed more capital. The results of the tests and the subsequent raising of capital restored confidence in the banking system (Blinder and Zandi 2010). The BoE reassured global markets, after initial stress tests in 2014 and subsequently, that UK banks were in a strong position to weather any global financial turbulence. The 2016 BoE's third stress test revealed three banks performed poorly (but the BoE only ordered one to have more capital). However, the BoE's FPC suggested that the plans of the banking system to raise additional capital should be adequate; and in aggregate, the banking system is sufficiently capitalised to support the real economy in a severe stress scenario.

## 3.2     Unorthodox Monetary Policies

QE is one unorthodox measure but there is also the near-zero/negative interest rates type of policies introduced more recently. We discuss both in the next sub-sections.[13]

### Quantitative Easing

QE includes two types of policy: (i) the conventional unconventional type, whereby central banks purchase government securities; and (ii) the unconventional unconventional type, whereby central banks buy high quality corporate bonds and commercial paper. The purpose under both measures is to increase the money supply and liquidity, thereby enhancing trading activity in these markets.

There are the following possible channels of QE. Liquidity channel: adding to institutions' holdings of cash, which could potentially fund new issues of equity and credit; bank lending is thereby influenced, which affects spending. The purchase of high-quality private sector assets is to improve the liquidity in, and increase the flow of, corporate credit. Portfolio channel: changing the composition of portfolios, thereby affecting the prices and yields of assets, which affects both the spread of long-term interest rates over policy rates (the term premium) and the required return on risky assets relative to risk-free assets (the risk premium); thereby affecting asset holders' wealth. This also affects the cost of borrowing for households and firms, which influences consumption (also affected by the change in wealth) and investment. Expectations management channel: asset purchases imply that, although the Bank Rate is near zero, the

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[13] Asian central banks from China to Singapore and India also pledged more than $685 billion in QEs, with similar attempts in Latin America. The Bank of Japan introduced QE in March 2001; in April 2013, QE was changed to the acronym 'Quantitative and Qualitative Easing' (QQE). It is QQE since this framework intends to change the asset composition of the Bank of Japan's balance sheet and thereby affect asset prices. QQE was changed to 'QQE with a Negative Interest Rate' (February 2016), −0.1% on current accounts that financial institutions hold at the Bank. Again changed in October 2016 to 'QQE with Yield Curve Control' for the specific aim to strengthen monetary easing (keep the short-term rate at −0.1% and at zero the ten-year government bond interest rate); the aim is to achieve the price stability target, 2% of CPI. Japan's interest rates have been extra-low for a long time; they hit zero for the first time in February 1999 to fight deflation.

central bank is prepared to do whatever is needed to keep inflation at the set target; in doing so, the central bank keeps expectations of future inflation anchored to the target.

The success or otherwise of QE to achieve healthy economic growth and reach the set IT, depends on four aspects. What the sellers of the assets do with the money they receive in exchange from the central bank; the response of banks to the additional liquidity they receive when selling assets to the central bank; the response of capital markets to purchases of corporate debt; and the wider response of households and companies, especially to attempts at influencing inflation expectations. There are doubts in terms of its effectiveness in view of the combination of QE and extremely low interest rates. For it is the case that when interest rates of all debt maturities are zero, "then money and long-term government bonds become perfect substitutes (they are both government promises to pay, which offer zero interest), and the creation of one by buying the other makes no difference" (King 2016, p. 183). Under such circumstances, it is highly unlikely for productive investment to materialise for investors prefer to hold more cash than investing in view of poor growth expectations and uncertainty. A further problem is that if QE funds flow into the real estate market, and if mortgage rates remain low, expansion in buy-to-let lending and property investment could follow, along with upward pressure on house prices, thereby producing the precursor of financial crises.[14] However, one advantage is clear: QE has made it easier for governments in terms of their fiscal policies because there is a ready buyer for government debt. Without this facility, there would be difficulties and may force governments to contain the degree of their fiscal initiatives.

There is another relevant proposal, which is similar to Friedman's (1969) 'helicopter drop' of money (see, for example, Bernanke 2016; Turner 2015). The current proposal refers to the case where the financing of lower taxes or higher government expenditure is by the central bank printing money rather than the government increasing its debt. It does not require increasing borrowing to work; therefore, the propo-

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[14] In the case of the United Kingdom, the FPC of the BoE has been given new powers to curb buy-to-let lending. The relevant announcement was on 16 November 2016 to commence early 2017. Under this regulation, banks and building societies must ensure they do not lend more than 15% of residential mortgages at more than 4.5 times a borrower's income.

nents argue, such policy does not increase future tax burdens, thereby providing greater impetus to household spending, which would generate the urgently needed aggregate demand and higher inflation. A further advantage is that a helicopter drop would avoid the distributional consequences of QE in that it would reach every household, unlike the QE, which enhances only the value of the owners of the relevant assets.[15] The problem with this approach is governance in that who decides and how to proceed with 'helicopter money' is a very important question. Close coordination of monetary and fiscal policies would be necessary, which would put at risk the central bank independence – if independence is desirable. If such coordination is not possible, there is the subordination of monetary policy to fiscal policy, and the possibility of abandoning monetary policy forever. In addition, stubbornly low interest rates and QE may produce the end of central-bank independence; this would be so in view of their inability to generate strong growth. In addition, because of their monetary financing of government debt, this is an objective contrary to that of an independent central bank.[16]

There is also the 'People's QE', which is different from the QE already undertaken by central banks. It would support infrastructure, whereby the government undertakes the relevant financing via borrowing the necessary

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[15] The Bank of England (2012) report shows that its QE programme increased the value of the relevant financial assets by 26% with 40% of the gains having gone to the richest 5% of holders. The QE has also caused share prices to increase by 20%, which enhances the wealth of shareowners, but may lower it if boosting of house prices occurs. This, though, has not materialised in view of the fact that the owners of the UK's shares is the richest 5%, who do not spend this extra wealth but investing it instead in the stock market to benefit from the rising stock prices. Similar results are relevant for the US economy, where the top 5% of wealthiest households own 82% of all individually held stocks and more than 90% of the individually held bonds (Hughes Hallett 2015). In the case of the EMU, Draghi (2016b) argues that the effects of the ECB QE and negative interest rates since mid-2014 have had no distributional effects 'because house prices within the euro area went up over the period, while bond prices on average rose modestly and stock prices on average actually fell'. A recent Bank of International Settlements study (Domanski et al. 2016) argues that unconventional monetary policy has contributed to rising wealth inequality in advanced economies since the GFC and GR, essentially through increasing equity prices.

[16] An interesting recent survey, has been conducted by the Centre for Macroeconomics and the Centre for Economic Policy (available at: http://cfmsurvey.org/surveys/future-central-bank-independence) and canvassed the views of 70 European economists. The survey notes that raising inflation might require active fiscal policy, which could effectively reduce independence. In addition, the new responsibilities taken by central banks, since the GFC, require cooperation with other public authorities, which could influence independence.

amount of money from the central bank. The distinction between people's QE and ordinary QE is as follows. QE involves swap of one set of financial assets for another while infrastructure QE involves the use of real resources. In addition, whether governments or central banks have control of the monetary process is another distinction. 'People's QE' ends the operational independence of central banks since it is governments, not central banks that would decide whether to increase the money supply. There is, however, a further problem with this proposal. This is that in effect it amounts to an explicit monetisation of government debt. For although a powerful effect on public's expectations may very well materialise, the risk is that markets may destabilise in view of the temptation by the fiscal authorities to continue using it in a way that may cause instability. However, whether the markets appreciate or not the impact of such policies on growth is an interesting question.

## Zero and Negative Interest Rates

Another recent unconventional monetary policy is that of near-zero and negative interest rates. As central banks pursue QE, options for further QE diminish; thereby near-zero and negative interest rates become a new toolkit of monetary policy. Indeed, a number of central banks have pushed their interest rates into near-zero or negative territory, in an attempt to increase inflation expectations and raise inflation rates to the set targets, as well as enhance growth rates. In June 2014, and again in September 2014, the ECB became one of the first major central banks to venture interest rates below zero on the commercial bank deposits with the ECB. The ECB changed rates again on 10 March 2016, charging banks 0.4% to hold their cash overnight. Rates below zero have never existed before in an economy as large as the euro area.[17] This monetary policy experiment would be successful if banks are encouraged to expand credit. Its introduction, though, has produced doubts as to whether it can be successful in view of widespread volatility in financial markets, stagnant economies and thereby poor economic growth, and especially poor

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[17] German and Dutch politicians try to persuade the Governor of the ECB to abandon the policy of negative interest rates. This is not surprising because the citizens of these countries have a great deal of savings accounts and aversion to borrowing; low and negative interest rates is anathema for these citizens.

expectations for future growth. A problem when interest rates of all debt maturities are near-zero, is that those who rely on bonds for their income, such as banks, insurance and pension companies suffer substantially.

Policy makers view negative interest rates as part of their strategy to raise worryingly low inflation rates and downward pressures on inflation expectations. They also expect negative interest rates to drive down borrowing costs for business and consumers, and thereby redirect capital into higher-return investments; and to persuade savers to spend. Furthermore, lower interest rates might potentially weaken the country's currency, thereby stimulating growth through more competitive exports. Such results would also increase inflation rates towards the central banks' IT targets (see, also, IMF 2016b). In the case of the EMU, though, negative interest rates, despite having produced a situation where half of the euro area sovereign debt trades with negative yields,[18] have not been helpful in terms of the inflation front (the ECB inflation target is below but near to 2%). It was minus 0.2% in April 2016, from zero in March 2016 and 1.1% in December 2016 (Eurostat, January 2017).[19] The President of the ECB (Draghi 2016a) has an interesting interpretation of the low inflation rate and the poor growth rates: "it matters for monetary policy whether fiscal policy is steering aggregate demand in the same direction, and how strongly". This, however, has not happened in the EMU case; Draghi (op. cit.) went further to suggest that it is true that "in a context of disrupted transmission that has led to a slower return of output to potential than if fiscal policy had been more supportive". It is also the case that other central banks have followed similar economic policies in terms of negative interest rates, but in some cases for different reasons from those of the ECB's policy of negative interest rates.[20]

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[18] Sovereign debt with negative yields below the −0.4% interest rate is excluded from the ECB's QE. This is to avoid losses for the ECB.

[19] Inflation that does not include energy and food prices was 0.9% in December 2016.

[20] The Swiss National Bank set its deposit rate below zero in December 2014 in view of currency appreciation pressures; and pushed its deposit rate further down in January 2015 for similar reasons. The Danish National Bank, in July 2012, set its deposit rate below zero in response to rising capital inflows; and, following the ECB, reduced its rate further in September 2014. Other central banks set negative rates for similar reasons to ECB's. The Japan Central Bank adopted negative interest rates in February 2016 (see, footnote 13). The Swedish Central Bank introduced negative interest rates in February 2015, and even lower in May and September 2015. The National Bank of Hungary introduced negative interest rates in March 2016. On 11 February 2016, Janet Yellen, the US Federal Reserve Chair, stated at a Congressional hearing that negative rates would be possible in the United States under 'very adverse' conditions.

A problem with negative interest rates is that where there is a strong 'savings culture' they can hurt savers and smaller banks that rely heavily on interest income for profits. Negative interest rates can also hurt life insurers and pension funds in view of their liabilities having a longer maturity than their assets. In fact, they can put financial institutions, and investors/savers, under strain.[21] It is indeed possible to force savers, in view of low returns on their savings, to save more, rather than spend and stimulate the economy, in an attempt to increase savings to make up for what may be permanent loss of returns. This would lead to lower consumption and lower GDP growth as a result, thereby making the negative interest rate policy counterproductive. This would be especially so for those savers who are not able to accumulate the necessary returns they need for retirement. It is also the case that negative interest rates can cause disruption by jeopardising the insurance companies and pension funds sectors through lowering their incomes. Under such circumstances, both insurance companies and pension funds may shift the composition of their portfolios to risky assets, thereby adding to asset price bubble pressures.

A further serious concern is the impact of negative interest rates on the rather fragile banking sectors, especially in the EMU. Those institutions that are unable to pass the costs of negative interest rates on to their depositors face a serious squeeze on their profits with severe implications on their ability to provide credit. Indeed, Carney (2016) suggests that "banks might not pass negative policy rates fully through to their retail customers, shutting off the cash flow and credit channels and thereby limiting the boost to domestic demand. That is associated with a commonly expressed concern that negative rates reduce banks" profitability' (p. 14). Indeed, a prolonged period of low and negative interest rates may discourage lending as the net interest rate merging becomes smaller, thereby leading to a contraction in the supply of credit. Negative interest rates could also produce reductions in the velocity of circulation of money. Economic agents may very well take their money out of the

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[21] The Fitch credit rating agency estimates show that $10 trillion negative–yielding government bonds cost investors annually around $24 trillion (*Financial Times*, 21 May 2016). It is also the case that German banks have accused the ECB for punishing savers and their business model with negative interest rates; and Japanese banks raised the issue of ending their sales of government debt to the central bank (*Financial Times*, 9 June 2016).

banking sector, and keep it in 'home safes', and in more general terms, money could be kept out of circulation in the economy. Such a reduction in money velocity of circulation increases deflationary pressures.

All these fragile consequences of negative interest rates have been particularly harmful in the case of Germany as reported in the *Financial Times* (21 and 22 April, 16 May and 1 June 2016). German banks resist to pass negative policy rates on to retail customers in view of the uncertainty of the latter's reaction to such a move. Banks, however, have responded by introducing quietly fees for services that were free previously (*Financial Times*, 30 June 2016).[22] Also reported in the *Financial Times* (21 July 2016), and based on data from the Bank of America Merrill Lynch, more than 50% of German bonds eligible for the ECB's QE have become too expensive (with an interest rate lower than the −0.4% ECB's deposit rate charged on bank reserves) for the Central Bank of Germany to purchase. The ECB president, however, has defended negative interest rates arguing that without them and the ECB's QE, serious deflation would have emerged along with substantially lower euro area growth. As reported in the *Financial Times* (3 May 2016), the ECB President made further statements on the necessity of negative interest rates in the euro area, in that they are a symptom of 'global excess of savings' with the result that there is lack of investment to stimulate the level and speed of economic activity. This 'global savings glut', therefore, needs negative interest rates to stimulate the demand for capital, especially so in view of low productivity in the euro area. Germany's high savings and the country's current account surplus were further reasons for the negative interest rates. It is also the case according to Draghi (2016b) that the ECB adopted a series of unconventional measures since June 2014, "to continue providing uplift

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[22] There is also evidence that negative interest rates have harmed French banks. For example, the French bank Crédit Agricole reported on 15 February 2017 (*Financial Times*, 16 February 2017) a 67% fall in their 2016 fourth quarter profits. In the United Kingdom, National Westminster Bank, Royal Bank of Scotland, HSBC, and Lloyds Banking Group are the first banks to have warned business customers at negative interest rates on current accounts could be introduced, if the BoE base rate was reduced below 0%. The building society Nationwide blamed low interest rates for a 16% fall in their 2016 profits. The Royal Bank of Scotland, however, is the first UK bank to impose negative interest rates on the deposits of corporate customers, or very wealthy people, as from 22 August 2016. Similar examples are the Bank of Ireland (as from 10 October 2016), and a couple of banks in Germany and Switzerland.

to the economy even when policy rates approach the lower bound. These unconventional measures follow exactly the same logic as the conventional ones: they make financing conditions more expansionary relative to the natural rate and in doing so bring the economy back to balance and inflation back to our objective".

The ECB President is also reported to have said that institutional reforms are necessary, especially so in terms of more euro area integration. It is the case, though, that the euro area growth seems to be bouncing back. Growth was 0.6% GDP in the first quarter of 2016, and 1.7% in 2016, with unemployment falling to 10.1 in June 2016 from 10.4% in February 2016; it also fell further to 9.6% in December 2016 (Eurostat, December 2016). The Eurostat reported on 2 March 2017 that inflation rose to 2% (due to the recovery of oil prices), although core inflation, which does not include food and oil prices, remains at 0.9%; the 2% inflation rate may therefore not be durable. There are still, therefore, problems; in addition the growth mentioned above does not amount to self-sustaining recovery. In fact, growth in the fourth quarter of 2016 was 0.5%; and the output gap in 2014 and 2015 was around −6% on average (Jarocinski and Lenza 2016). In addition, there is little sign of wage growth, which is an important element in achieving economic health. In other words, ECB policies have not helped stability and growth in the euro area.[23] Still the ECB President at his press conference after the meeting of 9 March of the Bank's Governing Council suggested that there was no longer 'sense of urgency' for more stimuli.

The World Bank (2015) study suggests that negative interest rates provoke banks to buy assets, instead of holding reserves with their central banks, thereby putting pressure on the prices of such assets and downward pressure on interest rates, including government bonds. This produces easier credit conditions, and supports higher growth. Lower government debt interest rates, though, may erode bank profitability further in view of the gap between commercial banks' lending and deposit rates is reduced (reducing the deposit rate to negative is undesirable by banks); thereby making credit conditions more difficult. Another relevant problem is that

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[23] Eichengreen (2015, p. 12) suggests that the EMU single currency does not work; what is urgently required is a single supervisor, a single deposit insurance scheme and a single resolution mechanism for bad banks. See, also, Arestis (2016a) where it is argued that a full banking union is urgently required, which would be greatly helped if political integration emerged.

negative interest rates may push the banks into excessive risk-taking in their search for positive yields, thereby creating asset bubbles. Risks for financial stability thereby emerge. The World Bank (2015) study also suggests that negative interest rates, especially in Europe, may very well promote capital flows to developing countries. A more recent World Bank study (Arteta et al. 2016) concludes that negative interest rates present complications: their effectiveness could be limited; could risk financial stability; could erode the profitability of banks and other financial intermediaries; and could produce excessive risk-taking. In addition, the spill-over effects of negative interest rates are similar in developed and developing countries.

Beck and Malkhozov (2016) warn of 'great uncertainty' if interest rates stay negative for a prolonged period. If more and more central banks use negative rates as a stimulus tool, there is concern that the policy might ultimately lead to a 'currency war' of competitive devaluations. The same authors argue that it is actually unknown how borrowers and savers react to negative interest rates. Furthermore, it is doubtful whether the channels, through which the central bank's interest rate has its effects, operate normally. Beck and Malkhozov (op. cit.) suggest on this score that banks might not pass on lower central bank rates to borrowers, and perversely might tighten their lending as their profitability suffers significantly. Indeed, and as reported in the *Financial Times* (10 March 2016), senior bankers warned the ECB about the 'perils of negative interest rates'. Their argument is that since negative interest rates cannot be passed on to the customers, there would be 'crippling effects' on their profits. They are also concerned about potential fragility of financial stability in the euro area, and thereby raise the threat of another financial crisis by forcing lenders to undertake too much risk, and thereby create the US 'financial engineering' type of problem. The response from the ECB, as reported in the *Financial Times* (24 March 2016), is that 'the banks should be more efficient' in their attempt to avoid the problems about which they are worried. The *Financial Times* (13 April 2016) also quotes the German Central Bank Bundesbank President who, in support of the ECB monetary policies, argues, "The debate does not focus enough on the broader macroeconomic consequences of monetary policy. People are not just savers: they're also employees, taxpayers, and debtors, as such benefiting from the low level of interest rates".

It is the case that none of the economies that have introduced the unorthodox negative interest rates policy measure has returned to robust growth let

alone full employment.[24] King (2016) suggests that "The failure to recognise the need for a real adjustment in most major economies, and the continued reliance on monetary policy as the 'only game in town' constitute an error as much of theory as of practice and are the cause of weak growth today" (p. 49). No wonder the IMF (2016a) study warns that the global economy is faltering from too slow growth for too long. The current recovery is too slow, muted and too fragile, with a serious risk that persistent low growth can have serious damaging economic effects on many countries. The IMF (op. cit.) study warns that the world economy is increasingly vulnerable to 'downside risks', mainly in view of the poor growth since the GFC, especially so in the EMU. Under such circumstances, it is not surprising that the IMF (2016a) calls for policy makers in large economies to identify and implement policies that would boost growth and contain risks. Such policies, in this view, should include structural reforms, fiscal support, argued to be most valuable at this stage, and monetary policy to lift inflationary expectations. Above all, of course, stimulating aggregate demand is most important, whereby expansionary fiscal policy is paramount. Indeed, coordination of fiscal with monetary policy is the best way forward (Arestis 2015).

Our discussion so far has also referred to 'financial stability', which has actually emerged as a new objective of monetary policy. This, then, requires further explanation, which we undertake in the section that follows.

## 4      Financial Stability

Discussions on financial stability had taken place prior to the GFC, but no firm propositions clearly emerged. Since the GFC, though, countries have undertaken relevant initiatives.[25] In addition, a number of

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[24] The Fed introduced the 'forward guidance' strategy in December 2008, and the BoE introduced this strategy in August 2013. The Fed announced that it would keep the federal funds rate low so long as unemployment was above 6.5%. Similarly, the BoE announced that so long as the unemployment rate remained close to 7% , its bank rate would remain low. The purpose of this policy is to increase transparency and influence expected policy rates and inflation expectations. However, by February 2014 in the case of the BoE and by December 2015 in the Fed case, announced that no longer their policies would be linked to a particular economic indicator; more general economic conditions would dictate changes in interest rates.

[25] In the United States, there is the Financial Stability Oversight Council, which monitors systemic risk; the Fed, though, lacks appropriate macroprudential powers. In the United Kingdom, there is the FPC and the PRA (see footnote 8). In the euro area, there is the European Systemic Risk Board

contributions that support financial stability policies have emerged. These contributions suggest that when potential threads to financial stability are analysed, two complementary approaches can be identified (Bárdsen et al. 2012): one focuses strictly on risk factors that originate and emerge within the financial system. Another approach focuses on risks that emanate from outside the financial system, with the financial system fragility linked to macroeconomic stability conditions. In either case, though, "there is a role for active policy for crisis prevention and management. In addition, since a monetary sector is incorporated, the interaction of both monetary and regulatory policies can be assessed" (Bárdsen et al., op. cit., p. 45). Goodhart (chapter 4 in Goodhart and Tsomocos 2012b) suggests that default is an essential element to take on board seriously, along with the relationship between fiscal policies and financial crisis management. It is also important in this view to integrate "risk margins, liquidity requirements, and an appropriate set of incentives and sanctions into a holistic approach to financial regulation" (p. 61).

The IMF (2010a) study suggests that financial stability, in the form of macroprudential policies, is important and should be introduced; interest rate policy measures should be replaced, especially so if the current low interest rates were to produce excessive risk-taking or bubbles. The IMF (2010b) study proposes that a macroprudential approach to contain systemic effects of 'too-important-to-fail' institutions, including now non-bank financial institutions, is also an important policy initiative that policy makers should consider and implement seriously.[26] Another IMF study (Lim et al. 2011) evaluates the effectiveness of macroprudential instruments[27] in reducing systemic risk over time and across institutions and markets. They conclude that these instruments are very effective in mitigating systemic risk; they are even more effective when coordinated

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with national governments having no representation on it; the ECB has no financial stability mandate.

[26] The Financial Stability Board (see footnote 29) at its May 2016 meeting proposed the introduction for the 'global systemically important banks' (30 in all) and by 2022 a ratio of at least 18% of total loss-absorbing capacity in relation to Risk Weighted Assets (RWAs); or 15% of their total liabilities.

[27] These macroprudential instruments are: 'caps on the loan-to-value ratio, caps on the debt-to-income ratio, ceilings on credit growth, reserve requirements, countercyclical capital requirements and time-varying/dynamic provisioning' (Lim et al. 2011, p. 4).

with monetary and fiscal policies. A more recent IMF study (Tressel and Zhang 2016), based on lessons and empirical evidence from the euro area, and utilising the Euro Area Central Bank Lending Survey,[28] has a relevant suggestion. Limits on loan-to-value ratios, along with its interaction with monetary policy (where monetary policy shocks are transmitted through banks by changes in their lending standards via the loan-to-value ratio), can complement macroprudential instruments that affect the cost of bank lending.

King (2016) suggests that "Macro-prudential instruments include direct controls on financial markets – for example setting limits on the size of mortgage loans relative to income – and indirect controls – such as requiring banks to use more equity finance if they increase lending to areas that are judged particularly risky" (p. 173). Macroprudential policy to prevent asset and credit bubbles than merely monetary policy is another possibility. However, it is important to emphasise that introduction of such macroprudential framework with monetary policy, an aspect that has been on the policy agenda since the GFC, should emerge. How this policy proposition could be undertaken is an interesting and relevant question. Tressel and Zhang (2016) suggest that since macroprudential and monetary policies in terms of their impact on bank capital are normally expected "to be transmitted through the same channels in the banking system as they both affect the cost of loans" (p. 5), the two types of policies should reinforce each other. However, and as Thessel and Zhant (op. cit.) suggest, the empirical evidence on this score is mixed.

Woodford (2016) discusses three alternative dimensions of central bank policy, namely conventional interest-rate policy, quantitative easing, and macroprudential policy (changes in reserve requirements). The aim is to provide economic stimulus when short-term interest rates are at the zero lower bound, in the context of a simple 'intertemporal general-equilibrium' model. The conclusion is that QE along with financial stability (i.e. macroprudential policies) is the best combination of policies. Although QE increases financial stability risk (in that it encourages risk-taking by borrowers and financial intermediaries, since the equilibrium

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[28] The Survey is undertaken on a quarterly basis by the euro area countries' central banks, and is (available at: https://www.ecb.europa.eu/stats/money/surveys/lend/html/index.en.html).

risk premium is reduced, namely the spread between the required return on risky assets and the riskless rate), a suitable tightening of macroprudential policy, is important. Such tightening is an appropriate adjustment of reserve requirements, which can have a net expansionary effect on aggregate demand with no increased risk to financial stability.

We should note that even under the presence of macroprudential regulation, monetary policy affects financial stability. A change in the rate of interest affects banks' behaviour through two channels: the profit and leverage ones, which can affect bank risk; with the direction of impact depending on the state of the financial cycle. It is, though, the task of macroprudential authority to offset the negative effects of monetary policy on financial stability. Zdzienicka et al. (2015) provide empirical evidence in the case of the United States that suggests, "Monetary policy shocks have significant and persistent effects on financial conditions and can attenuate long-term financial instability" (p. 5). In the case of macroprudential policy, it is stated that "In contrast, the impact of macroprudential policy measures is generally more immediate but shorter-lasting" (p. 5). In addition, "Monetary and macroprudential policy tightening measures tend to have larger effects than easing ones. Also, the effect of monetary policy shocks, and macroprudential policy tightening measures, tend to be larger during recessions than in expansions" (p. 5). A more recent contribution (Collard et al. 2017) raises the issue of how to combine monetary policy and macroprudential policies. It concludes that setting the rate of interest to deal with the business cycle, and imposing capital requirements to prevent risk taking by banks is the optimum set of policies. This is based on the proposition that "monetary policy affects the volume but not the type of credit, while prudential policy affects both the type and the volume of credit. This makes monetary policy ineffective in ensuring financial stability" (Collard et al., op. cit., p. 42).

A further aspect is the extent to which macroprudential supervision is necessary. Goodhart (chapter 5, in Goodhart and Tsomocos 2012b) deals with this aspect to suggest that in view of the evidence that the focus of monetary policy does not guarantee financial stability, especially asset price stability, proper supervision of the financial sector is paramount. Goodhart (chapter 2, in Goodhart and Tsomocos 2012b) discusses banking supervision and regulation historically, and ever since 1800, to

conclude that "supervision and regulation are primarily reactive", and that "Almost by definition, the existing system of supervision and regulation is held to be at fault" (p. 26). The future of banking supervision and regulation will come under pressure in view of the fact that most financial crises have been national in origin, and as such managed nationally, but spreading internationally. It is also the case that since the cross-border financial flows are becoming more volatile since the GFC, relevant financial stability measures, both microprudential and macroprudential, are necessary (Arestis 2016a). Such measures should be taken not just at the national level but also at the international level. The Financial Stability Board (FSB),[29] and in collaboration with the Bank for International Settlements and the International Monetary Fund, should cooperate and coordinate with the objective to elaborate on the practicalities and implications of macroprudential policies along with tackling domestic financial vulnerabilities in view of volatile capital flows. International organisations, which could promote the adoption of such measures by a wider number of countries, should be involved in a collaborative and coordinated manner. Such measures could potentially limit the impact of herd behaviour, excess risk taking and moral hazard.

The conclusion from this analysis is then that financial stability and monetary policy should be the responsibilities of the central bank, which means that financial stability becomes an added objective. This raises the issue of whether financial stability can be incorporated in the IT framework. An IMF (Aydin and Lall 2011) study raises this issue and investigates this possibility in an open economy DSGE model, with financial frictions. It concludes that financial stability can help smooth business cycles fluctuations more effectively than a standard IT framework. Such an additional objective, though, raises the issue of how to incorporate financial stability in the loss function of the central bank in view of the fact that it is impossible to measure such a variable. Contributions on

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[29] The FSB 'is an international body that monitors and makes recommendations about the global financial system' (http://www.fsb.org/about/). The progress reports from the FSB (available at: http://www.fsb.org/wp-content/uploads/Implementation-dashboard.pdf) outline definite improvements in stability-enhancing financial regulations in 24 of the world's largest economies; high marks are given to all 24 countries in implementing the Basel III risk-based capital requirements. However, Admati and Hellwig (2013) argue that the Basel III risk-based capital requirements are not sufficiently high.

this score are lacking with a couple of exceptions. Blinder (2010) raises the issue, along with the suggestion that "the right loss function is actually lexicographic, with financial stability logically prior to the other goals" (p. 4). Another relevant suggestion that goes beyond the issue of a loss function is coordination of financial stability with other policies as in Arestis (2016b). In this context, full coordination of both monetary and financial stability policies with fiscal policy, along with discretion in applying them, is the way forward. Such coordination has become even more relevant recently in view of the weak impact of QE and negative interest rates as argued above. The coordination aspect would be helpful if financial stability would not be located inside the central bank. This is a relevant possibility in view of the fact that too-centralised decisions in one institution may produce time-inconsistency problems in the sense that one target may be pursued more actively than the rest. Such coordination should also include debt management, which should help the central bank to influence interest rates across the yield curve.

Still it is important to explain further the argument that financial stability is a necessary extra tool; the events leading to the GFC testify to this important requirement. The focus of financial stability should be on proper control of the financial sector so that it becomes socially and economically useful to the economy as a whole and to the productive economy in particular. Banks should serve the needs of their customers rather than provide short-term gains for shareholders and huge profits for themselves (see, also, Turner 2015). With the objective of financial stability, the central bank would become more like a Central Financial Agency (CFA). It would be responsible for policies, which seek to influence the credit and lending of the full range of financial institutions. Re-establishing a system designed to meet the needs of the real economy and the users of financial services, rather than to benefit merely financial intermediaries themselves is paramount. An interesting development has emerged from the BoE's FPC in its assessment and implementation of financial stability tools. It begins by suggesting that it is important to assess "the outlook for financial stability by identifying the risks faced by the financial system and weighing them against the resilience of the system. In doing so, its aim is to ensure the financial system can continue to provide essential services to the real economy, even in adverse

circumstances" (Bank of England 2016). As a result of the risks in the UK banking sector (especially so in view of bank equity prices, which fell significantly and a high proportion of banks traded 'below book value'), the FPC decided at its 25 May 2016 meeting to increase the UK counter-cyclical capital buffer rate.[30] This would ensure that banks could 'provide lending and other essential banking services in times of financial stress' (Bank of England, op. cit.). The countercyclical buffer would apply to "all UK banks and building societies and to investment firms that have not been exempted by the Financial Conduct Authority. Under European Systemic Risk Board rules, it will apply to branches of EU banks lending into the United Kingdom. The FPC will work with other authorities to achieve reciprocity, consistent with its own policy of reciprocity" (Bank of England 2016). However, the Governor of the BoE announced on 5 July 2016 (at the launch of the BoE's financial stability report) that the countercyclical capital buffer imposed on the UK commercial banks would be relaxed by the FPC (from 0.5% to 0% until at least June 2017) to boost lending to business and households (estimated to be £150 billion). This became necessary because of financial stability risks in view of the UK vote to exit the EU.

As highlighted in Arestis (2016a) a number of proposals are in place to strengthen financial stability. These include the US Dodd-Frank Act of 2010, the UK Vickers Report, the European Liikanen Report, the IMF and the Basel III proposals. Whether these proposals contain radical measures for financial stability and avoid another crisis, similar to the GFC one, is an interesting question. Arestis (op. cit.) concludes that "it would appear that financial stability remains unresolved and elusive" (p. 18) despite these proposals. A good example is the case of the 'Volcker Rule' of the US Dodd-Frank Act of July 2010. The 'Volcker Rule' was thought to be one of the key provisions of the July 2010 Act. It took five years to enact it—in 21 July 2015. The aim of the rule is to prohibit banks from indulging in speculation. But it could be that despite this rule, bank trading may very well shift to the unregulated 'shadow banking' sector,

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[30] Countercyclical capital buffers, or systemic risk buffers, are part of a bank's capital, which is held separately from their other operations and to be utilised in the case of financial shocks. They can help banks to continue lending even in times of stress, thereby maintaining stability in the financial system.

especially so when the activities of commercial banks and the risk-taking investment banks are together, along with absence of strict regulation of the financial services industry.[31] It would thereby produce a situation whereby financial risks become harder to identify.[32]

Another relevant case is the Basel III proposal, which has failed to achieve agreement on its key risk measure. The countries involved could not agree at their meeting of 28/29 November 2016 on the ratio of equity to risk-weighted assets (RWAs). Another postponement took place subsequently of a relevant and planned meeting on 7/8 January 2017. Their disagreement was on the definition of the RWAs. In terms of the UK Vickers Report, the regulators are concerned that banks may fail to meet the 2019 deadline of their 'ring-fencing' retail operations from their investment banking activities. Vickers (2016), who chaired the Vickers Committee, argues that the BoE has not adopted the recommendation of the banks ring-fencing extra capital equivalent to 3% of their RWA, the systemic risk buffers. The BoE suggests that 1.3% would be sufficient. There are similar problems with the other proposals referred to above. King (2016) suggests that although all these proposals "have made banks more resilient by reducing their leverage and limiting their ability to put highly risky assets on the same balance sheet as deposits from households", they still "have not changed the fundamental structure of banking" (pp. 40–41). Another relevant contribution is the study by Sarin and Summers (2016), which provides evidence that suggests these new 'regulatory approaches' have worsened the bank risks, and financial institutions are not safer than prior to GFC. Sarin and Summers (op. cit.) suggest that the new measures of regulatory bank capital are flawed. The risk measures accounted for include volatility as a measure

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[31] It is actually the case that US shadow banking between the years 2002 and 2007 not only did it increase in size but also became larger than the traditional banking sector in terms of gross assets. The main reason was because it was free, and still is, of most of the regulations that apply to the banking sector (King 2016).

[32] The new President of the United States has repeatedly suggested that the Dodd-Frank will be repealed. This, in this view, is simply because the Act has stopped banks to provide credit where is needed. In fact, the President ordered a review of Dodd-Frank in early February 2017 with a relevant report expected by early June 2017. The Governor of the Fed defended the Dodd-Frank during a testimony to lawmakers on the 15th of February 2017, arguing that there was no evidence that it had hurt banks (*Financial Times*, 16 February 2017).

of bank risk, the probability of a major fall in stock prices, a measure of equity risk, the cost of protection against a default, price-earnings ratio of banks, preferred stock price and yields, and systemic risk. Using these risk measures, the authors undertake a comparison between the pre-crisis period (2002–2007) and the post-crisis period (2010–2015) to conclude that financial firms became more risky in the post-crisis period.

Goodhart and Tsomocos (2012b) suggest that central banks' record in terms of achieving financial systemic stability has not been successful; it is "indeed lamentable" (p. 1). The reason, according to Goodhart and Tsomocos (op. cit.), is the "failure to establish a theoretical basis for financial regulation. Regulation in this field has mostly come as a pragmatic reaction to past crises, not on the basis of rigorous theory" (p. 1; see, also Goodhart et al. 2012b). The authors argue that it is difficult to model financial stability in view of its main determinants, which are default and failure of one or more institutions. They also argue that default is discontinuous, but it is paramount for macroeconomic models to account for it, along with liquidity. Goodhart and Tsomocos (2012a, b) argue that most macroeconomic models assume that default never occurs—see, also, sub-sect. 2.2 above. In view of the importance of default, it is not surprising that such macroeconomic models were so unhelpful in terms of the GFC.

Goodhart and Tsomocos (2012a, b) provide two contributions that attempt to incorporate default into 'macro-financial general equilibrium' models. In Goodhart and Tsomocos (2012a), a 'technical and theoretical' model is put forward with the important assumption of heterogeneity amongst economic agents along with default and liquidity. In Goodhart and Tsomocos (2012b), 'a less technical and more-policy oriented' approach is adopted. A general equilibrium model of an economy with incomplete markets, along with money and default present, which incorporates "contagion and financial fragility as an equilibrium phenomenon", produces financial fragility "when the aggregate profitability of the banking sector declines and default in the non-bank and banking private sectors increase" (p. 2). The model is empirically validated using time-series data, and calibrations, of the UK banking system (see Goodhart et al. 2012a). The analysis of the two contributions of Goodhart and Tsomocos (2012a, b), and the relevant macroeconomic models proposed, contain

significant policy implications. These are summarised as follows: macro-prudential regulations are vital; holding interest rates stable is preferred to monetary quantity; all banks should be required to halt dividend payouts in a crisis; property price fluctuations and bank credit are important explanatory variables in terms of the fragility of the banking systems for the main banks of the OECD countries. Moreover, they suggest that perceived risks of financial regulators decline in prosperous times and rise in downturn periods, especially in times of crises.

Still, though, not much progress is evident. It is difficult to disagree with the IMF managing director (Lagarde 2014) in terms of her suggestion that "the behaviour of the financial sector has not changed fundamentally in a number of dimensions since the financial crisis". Indeed, "The bad news is that progress is still too slow, and the finish line is still too far". Arestis (2016b) suggests, "More effective financial stability policies are desperately needed" (p. 19). It is also difficult to disagree with King's (2016) suggestion, "The strange thing is that after arguably the biggest financial crisis in history, nothing much has really changed in terms either of the fundamental structure of banking or the reliance on central banks to restore macroeconomic prosperity. Real interest rates have fallen further. Capital has continued to flow 'uphill'. Industrial economies have struggled to recover. Output, even if growing slowly, is well below pre-crisis" (p. 40).

# 5 Summary and Conclusions

We have discussed and focused in this chapter on relevant monetary policy initiatives since the GFC and GR. Monetary policy since then has abandoned the main policy instrument, namely manipulation of the rate of interest to achieve the central bank's IT. This was the main policy instrument to achieve the only policy objective, namely price stability, which had been very fashionable prior to the GFC. In view of the rate of interest reduced to nearly zero in many countries after the GFC, and has stayed there ever since in most cases, monetary policy makers introduced unconventional means to achieve still an IT. QE has been introduced along with near-zero and negative interest rates in some cases. A new,

and additional, objective has been introduced, namely financial stability, but IT is still around to be achieved through the new 'unorthodox' instruments of monetary policy, namely QE and near-zero, even negative, interest rates. We have discussed financial stability to conclude that not much real progress is evident. We have discussed these developments in the case of the main world economies, namely the United States, the United Kingdom, and the EMU.

Our main conclusion is that the unorthodox instruments have not been effective in terms of achieving their objectives, especially that of inflation targetry. In terms of financial stability, although proposals are there to achieve it, not much is evident in terms of implementing these proposals, and thereby prevent a future crisis of the GFC type. It is true, nevertheless, that central banks managed to bypass a complete collapse of their financial systems and their real economies after the emergence of the GFC and GR. Moreover, as Blinder and Zandi (2010) demonstrate, "The Great Recession gave way to recovery as quickly as it did largely because of the unprecedented responses by monetary and fiscal policymakers". However, monetary policies have been very ineffective in restoring a robust recovery. The enormous expansion of the monetary base has had little effect on the broader monetary and credit aggregates, let alone on inflation and the level of economic activity. Our suggestion on this aspect is that proper coordination of monetary and fiscal policies along with financial stability is the best and probably the only way forward to produce and maintain healthy growth in the economy (see, also, Lim et al. 2011; Leeper 2016; Draghi 2016a).

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# Lessons on Fiscal Policy After the Global Financial Crisis

## Malcolm Sawyer

**Abstract**  Immediately following the global financial crisis of 2007–2008, budget deficits rose from the operation of the automatic stabilisers and some mild discretionary actions to bolster demand in the face of the economic downturn. This was soon replaced by drives to reduce budget deficits and debt ratios even though unemployment continued to be high and output well below previous levels. The 'debt scare' behind fiscal consolidation is examined and found wanting on empirical and theoretical grounds. The nature and estimates of 'the multiplier' are examined and the consequences of the wide range of estimates considered. There has been a shift to the formulation of fiscal policy in terms of a balanced structural budget. This shift relies on discredited ideas, such as a well-defined and stable non-accelerating inflation rate of unemployment, and brings back the notion that savings and investment necessarily balance at a full employment equilibrium.

**Keywords**  Fiscal policy • Austerity • Budget deficit • Public debt • Structural budgets • Potential output

**JEL Classification**  E62

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# 1    Introduction[1]

In the immediate aftermath of the global financial crisis (GFC) of 2007–2008 in industrialised countries, there was a general acceptance of larger budget deficits arising from operation of the automatic stabilisers of fiscal policy and some mild discretionary actions to bolster demand in the face of the economic downturn. However, this was soon replaced by drives to reduce budget deficits and debt ratios even though unemployment continued to be high and output well below previous levels. Before coming to the fiscal policies pursued after the financial crises, Sect. 2 sets a little background on views on fiscal policy prior to the financial crisis. Then, in Sects. 3 and 4, a commentary on the evolution of fiscal policy in the immediate aftermath of the financial crisis (broadly of what may be deemed a Keynesian response) and then on the evolution of fiscal policy from early 2010 onwards as it takes a more fiscal consolidation direction. Section 5 notes the ways in the 'debt scare' has been used to justify fiscal consolidation. The 'debt scare' combines the notion that high debt to Gross domestic product (GDP) ratio (a figure of 90 per cent often mentioned) leads to a sharp fall-off of economic growth and that financial markets will be unwilling to fund budget deficits when the debt ratio is high. It is argued in this chapter that the empirical and theoretical support for such a scare is lacking. Section 6 discusses the ways in which estimates on the size of the multiplier vary, and specifically whether the value of the multiplier is higher in recession than in boom. It is further argued that the variations in the estimates of the multiplier makes the formulation of fiscal policy more complex, though there should be much more care in applying any reductions in discretionary expenditure (applied to offset recession) before recovery is well established. Section 7 considers the composition of deficit reduction as between tax rises and expenditure reductions. The rise of the notion of 'structural budget' and its impact on budget formulation is mapped out in Sect. 8, and its major shortcomings explored. Specifically, the problematic nature of the concept of 'potential output', the unreliable estimates of 'potential output' and thereby structural budget, are discussed. It is also argued that achievement of a balanced structural budget is often infeasible. A concluding section completes the chapter.

# 2  Fiscal Policy as Seen Before the Financial Crisis

Furman (2016) (then chair of the US Council of Economic Advisers) portrayed the prevalent perspectives on fiscal policy among academic economists in the years prior to the GFC in 'four admittedly stylized principles … [namely]:

1. Discretionary fiscal policy is dominated by monetary policy as a stabilization tool because of lags in the application, impact, and removal of discretionary fiscal stimulus.
2. Even if policymakers get the timing right, discretionary fiscal stimulus would be somewhere between completely ineffective (the Ricardian view) or somewhat ineffective with bad side effects (higher interest rates and crowding-out of private investment).
3. Moreover, fiscal stabilization needs to be undertaken with trepidation, if at all, because the biggest fiscal policy priority should be the long-run fiscal balance.
4. Policymakers foolish enough to ignore (1) through (3) should at least make sure that any fiscal stimulus is very short-run, including pulling demand forward, to support the economy before monetary policy stimulus fully kicks in while minimizing harmful side effects and long-run fiscal harm. (p. 1).

Monetary policy through inflation targeting by an independent central bank was the dominant macroeconomic policy and perceived to have brought the 'great moderation'—a perception soon dispelled by the financial crisis (Arestis 2017). Furman (2016) then argues that now "the tide of expert opinion is shifting the other way from the 'Old View' (p. 1), to almost the opposite on all four points.

Auerbach et al. (2010) summarise a set of well-worn arguments against the use of fiscal policy, starting with the lags in formulating, implementing and the effects of fiscal policy, which make the timing of fiscal policy difficult for the stabilisation of the economy. Further, "the Lucas critique which implies that a policy's stabilizing effects can be undercut by the expectations and actions of rational agents who observe the government's

policy process", and "Ricardian equivalence … would promote further skepticism about the effectiveness of fiscal policy". "Finally, the student would be reminded of the alternative tools of stabilization policy, notably the interest-rate interventions of independent central banks and the automatic stabilizers already built into the government's tax and transfer system" (p. 142). They continue by arguing that activist fiscal policy had not been totally or not practised in the period before the 'great recession'.

It should though be emphasised that the model of the economy underlying the Ricardian equivalence principle would suggest that fiscal policy is ineffectual because it is never needed. If the level of demand in the economy is stable such that the levels of employment and output are stable, then no need for offsetting fiscal policy. In a similar way, if private sector demand is (just) sufficient to ensure full employment, alternatively expressed as equality of net private savings and net exports at full employment, then appropriate budget deficit is zero.

Some of us had maintained a belief in the power of fiscal policy (Arestis and Sawyer 2003, 2004, 2006) and argued for its use. Monetary policy is set on a potentially frequent change basis (that is central banks meet to set key interest rates often on a four to six weeks frequency), and decisions can be quickly taken and implemented. In contrast, fiscal policy is subject to a variety of lags (as noted above) though monetary policy suffers from a number of lags as well, except for the decision-making lag, and the potential effects of interest rates on asset prices and financial instability have also to be reckoned with. The lags of implementation and effect make fiscal policy unsuitable for use as attempting hyper-fine tuning. These issues over lags with fiscal policy should be subject to two caveats. First, there are the automatic stabilising features of fiscal policy, which could be enhanced by adoption of a more progressive tax system (though tax systems have tended to become less progressive over time reducing the degree of automatic stabilisation). These stabilising features could be further enhanced through adjustment to tax rates (social security contributions perhaps being the easiest) dependent on the state of the economy. Second, budget decisions are generally made on an annual basis with adjustments of tax rates and public expenditure plans. Thus, there is some degree of fiscal activism, though clearly not at the frequency of monetary policy nor of that which was sometimes envisaged for 'fine tuning'.

The comments of Furman (2016) above (and more generally shared) make no mention of the average size neither of budget deficits nor of the size of the public debt. In the years before the GFC, governments generally continued to run budget deficits. For euro area countries, where national budget deficits were supposedly constrained by an upper limit of 3 per cent of GDP, with budget in balance over the cycle, and debt to GDP ratio below 60 per cent, the budget deficit averaged 2.2 per cent over the year 2001–2007 in the original 12 member states, and 7 out of the 12 had debt (on the Maastricht definition) in excess of 60 per cent of GDP. In the UK, a Code for Fiscal Stability had been introduced in 1998 with a fiscal 'golden rule'—that over the cycle government revenues will cover consumption—and to keep debt at a prudent and sensible level, which became interpreted as a debt to GDP ratio below 40 per cent, the budget deficit averaged 2.5 per cent of GDP. There were debates over whether the Code had been met—some of which concerned the dating of business cycles. In the USA after much hype surrounding the budget surplus of the late Clinton years and the forecasts of continuing surpluses leading to the elimination of government debt by 2014, deficits averaged over 4 per cent of GDP in the years 2001–2007.[2] Thus, in the years prior to the GFC, the euro area countries had, on average, significant budget deficits and many did not meet the constraints of the Stability and Growth Pact. In the UK, the 'golden rule' permitted significantly deficits to cover capital investment and it is debatable whether the rule had been strictly adhered to. In the USA, there was no deficit rule in place but budget deficits reappeared after the surpluses of the late 1990s.

Most policy discussions on fiscal policy and the government budget position ignore the national accounts relationship between budget position and the private sector's position. The well-known relationship is

$$G - T = S - I + M - X. \tag{1}$$

where $S$ is private savings, $T$ tax revenue (net of transfers), $M$ imports, $I$ private investment, $G$ government expenditure on goods and services and $X$ exports (including net income received from abroad).

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[2] Figures in this paragraph have been calculated from OECD *Economic Outlook* 2016/2 Statistical Annexe.

This relationship clearly indicates that a change in (say) budget position has to be accompanied by a set of corresponding changes in net exports and net savings. As it stands, it does not tell us anything about the causal relationships involved (e.g. does higher budget deficit *cause* higher net savings?). Further, in comparing two positions and the difference between them does not inform us of differences in the level of output involved.

The significance of Eq. (1) here is threefold. The first is that attempts to reduce budget deficit ('fiscal consolidation') can only succeed if there is some corresponding reduction of $(S - I)$ and $(M - X)$. But, if there is some reduction of $(S - I)$ and $(M - X)$—say through consumer demand boom (reducing $S$), investment boom, exports rising—then budget deficit would decline. In the latter case, it could be expected that there is an accompanying rise in income. Thus, an association of a decline of the budget deficit with rising output (which is portrayed as 'expansionary fiscal consolidation') can readily arise from the private sector stimulus. Further, a capitalist economy is inherently cyclical—in respect of private demand, and revival of investment, for example, comes from operation of mechanisms such as the accelerator. Thus, deficits will fall as the economy recovers.

The second implication is that the achievement of a balanced budget requires that the relationship $S - I + M - X = 0$ to be satisfied; a country in which there is a tendency for savings to exceed investment and/or for a current account deficit (imports exceed exports) will find difficulties in securing a balanced budget. This takes on particular significance when balanced budget requirements are imposed as attempted under the 'fiscal compact' of the Economic and Monetary Union.

A third implication, which is discussed below, concerns the debt-growth relationship, and the degree to which any causal links run from (low) growth to high debt levels.

# 3     First Responses of Fiscal Policy After the Financial Crisis

Although the first signs of a financial crisis came in August 2007 (the freezing of the inter-bank market followed by the bank run on Northern Rock in the UK), it was in September 2008 with the collapse of Lehman Brothers that the scale of the difficulties of the financial sector came to

the fore. The bail-outs of the banking and other financial institutions began in earnest in October 2008. At that time, the near global nature of the effects of the financial crisis became apparent, and the ways in which the financial crises would lead into recession. The effects, which the 'great recession' would have on budget positions and fiscal policy, were quickly revealed.

The 'great recession' in the USA has been dated as starting in late 2007: for example, The Business Cycle Dating Committee at the National Bureau of Economic Research dated the beginning of recession as December 2007. Auerbach et al. (2010) indicate that the US Federal government enacted a number of rounds of active fiscal policy. Temporary tax cuts were enacted in February 2008, followed by a tax credit for first-time homebuyers enacted in July 2008. However, "they reached a crescendo in February 2009 with the American Recovery and Reinvestment Tax Act (ARRA): a combination of tax cuts, transfers to individuals and states, and government purchases estimated to increase budget deficit by a cumulative amount equal to 5.5 per cent on one year's GDP. The fiscal stimulus continued thereafter with more targeted measures, notably the temporary 'cash for clunkers' program in summer 2009 aimed at stimulating the replacement of old cars with new ones, and an extension and expansion of the First-Time Homebuyer Credit in November 2009 and July 2010. Accompanying these fiscal efforts were the Troubled Asset Relief Program, enacted in fall 2008 to address the financial crisis, and a continuing array of interventions by the Federal Reserve Board that aimed to stabilize credit markets and stimulate the economy" (Auerbach et al. 2010, p. 141).

The fiscal responses in the UK started in November 2008. Earlier in the year in the budget statement of March 2008, the UK Treasury argued that "the economy is stable and resilient, and continuing to grow, and that the Government is meeting its strict fiscal rules for the public finances" (HM Treasury 2008a, p. 1) and the economy displayed "much improved resilience – the ability to cope with economic shocks quickly and with low economic costs – which has resulted in an unprecedented period of macroeconomic stability" (HM Treasury 2008a, p. 2). This changed in the autumn with an emergency budget presented in the Pre-Budget Report of 24 November 2008, which included a temporary reduction in value added tax from 17.5 per cent to 15 per cent (reversed at the end of 2009) and brought forward £3 billion worth of capital spending.

With the onset of recession, the estimate of public sector net borrowing (PSBR) for 2008–2009 was raised by 2.4 per cent of GDP from 2.9 per cent of GDP (in March 2008 Budget, HM Treasury 2008a) to 5.3 per cent (in the November 2008 Pre Budget Report, HM Treasury 2008b) with discretionary budget changes estimated to account for an increase in the deficit of 0.6 per cent of GDP: The eventual outturn for the PSBR for 2008–2009 was 6.7 per cent of GDP.

There were two notable features of these policy announcements. The first is that the fiscal rules under the Code for Fiscal Stability (as mentioned above) was 'temporarily suspended' until 2015–2016. In their place, the Government set a temporary operating rule designed to reduce the cyclically adjusted current budget each year, once the economy emerges from the downturn, so it eventually reaches balance with debt is falling as a proportion of GDP after the effects of global financial crisis and recession worked their way through the economy. This illustrates the difficulties of operating according to a relatively fixed fiscal rule, which depends on there being a stable macroeconomy. It also illustrates confusion (which will be further seen below) over the nature of the cyclically adjusted budget: it abstracts from the cycle so should not be impacted by the state of the cycle. As such having a balanced cyclically adjusted (current) budget should not depend on the state of the economy.

The second was that the cyclically adjusted budget deficit for 2008–2009 moved a forecast 2.7 per cent of GDP in March to 5.3 per cent in November, even though the discretionary budget changes were 0.6 per cent of GDP. The calculated level of 'potential output' had been revised drastically—the appearance of a major shift in fiscal policy was generated by 'potential output' estimates: this is an illustration of the shortcomings of the use of cyclically adjusted (or structural budgets), which is returned to below.

In introduction to OECD *Economic Outlook* 2008/2, dated 25 November 2008 OECD, Chief Economist Klaus Schmidt-Hebbel wrote that "many OECD economies are in or are on the verge of a protracted recession of a magnitude not experienced since the early 1980s. As a result, the number of unemployed in the OECD area could rise by 8 million over the next two years" (p. 7). In the event, the recession was larger than that of the early 1980s and unemployment rose more substantially. Table 1 provides a summary of the economic prospects as viewed by the OECD in late 2008, and the actual outcomes. While the OECD was

**Table 1** Projections and outturns of economic activity

| | 2008 | 2009 | 2010 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| **Real GDP growth (per cent per annum)** | Projection | | | Actual | | |
| USA | 1.4 | −0.9 | 1.6 | −0.3 | −2.8 | 2.5 |
| Japan | 0.5 | −0.1 | 0.6 | −1.0 | −5.5 | 4.7 |
| Euro area | 1.0 | −0.6 | 1.2 | 0.4 | −4.4 | 2.0 |
| Total OECD | 1.4 | −0.4 | 1.5 | 0.2 | −3.4 | 3.0 |
| **Unemployment rate (per cent of work force)** | | | | | | |
| USA | 5.7 | 7.3 | 7.5 | 5.8 | 9.3 | 9.6 |
| Japan | 4.1 | 4.4 | 4.4 | 4.0 | 5.1 | 5.1 |
| Euro area | 7.4 | 8.6 | 9.0 | 7.6 | 9.6 | 10.1 |
| Total OECD | 5.9 | 6.9 | 7.2 | 6.4 | 8.1 | 8.3 |
| **World trade growth (per cent per annum)** | 4.8 | 1.9 | 5.0 | 3.2 | −11.0 | 10.6 |
| **Fiscal balance (per cent of GDP)** | | | | | | |
| USA | −5.3 | −6.7 | −6.8 | −7.2 | −12.8 | −12.2 |
| Japan | −1.4 | −3.3 | −3.8 | −8.8 | −8.3 | −8.8 |
| Euro area | −1.4 | −2.2 | −2.5 | −6.2 | −6.1 | −4.1 |
| Total OECD | −2.5 | −3.8 | −4.1 | −8.3 | −7.9 | −6.5 |

Source: Extract from summary of projections, OECD Economic Outlook 2008/2; actual OECD Economic Outlook 2014/2 Statistical Annexe; OECD Economic Outlook 2010/1 Table 1.4

Actual figures for world trade growth uses average of OECD export and import volume growth

projecting recession in 2009 and to some degree in 2010, the extent of the recession was clearly underestimated. In a similar vein, the rise in budget deficits was projected but again underestimated.

Schmidt-Hebbel recognised that with the deep economic downturn, there was a need for additional macroeconomic stimulus. "In *normal times*, monetary rather than fiscal policy would be the instrument of choice for macroeconomic stabilisation. But these are not normal times. Current conditions of extreme financial stress have weakened the monetary transmission mechanism. Moreover, in some countries the scope for further reductions in policy rates is limited. In this *unusual situation*, fiscal policy stimulus over and above the support provided through automatic stabilisers has an important role to play" (p. 8, emphasis added). It should though be noted that monetary policy was generally intended to

target inflation and not macroeconomic stabilisation (and notoriously it did not address financial instability). Further, fiscal policy stimulus was only to be applied because of the 'unusual situation'. There is the warning that as there is clear evidence of a recovery occurring, then "it will be *necessary* to begin *promptly* to unwind the macroeconomic stimulus in place to prevent inflationary pressures from gaining a foothold. At the same time, with high public debt in many OECD economies, it will be equally important that a credible fiscal framework is in place to ensure long-run public finance sustainability, especially in the face of spending pressures associated with population ageing" (emphasis added, p. 8). There is the rather strange link between macroeconomic stimulus and inflationary pressures (which were often global in nature and intended to be addressed through monetary policy). More significantly, the obsession with the scale of the public debt should be emphasised, an issue which is returned to in Sect. 5 below.

Table 2 provides information on fiscal positions as envisaged by the OECD in mid-2009. Hence, the figures for 2006–2008 are based on actual experience whereas those for 2009 and 2010 are projections. It can be seen that countries came into the financial crisis with budget deficits, and specifically substantially underlying cyclically adjusted deficits (for the OECD area as a whole 2.4 per cent in 2006, 2.5 per cent in 2007), and with public debt to GDP ratios averaging over 70 per cent. Judged by the change in the underlying balance, for the OECD area as a whole, there was significant fiscal stimulus as the underlying deficit rose from 2.5 per cent of GDP in 2007 to a forecast 6.2 per cent deficit in 2010.

Jorgen Elmeskov, then acting head of Economics Department in introduction OECD Economic Outlook 2009/1, dated: 17 June 2009 acknowledged that automatic stabilisers and discretionary fiscal stimulus played important roles in reducing the scale of recession in the face of private demand falls. "The result has been a *dramatic*, but *unavoidable*, run-up in government deficits. Indeed, with the incipient recovery likely to be weak, it is important that decided fiscal stimulus actually be implemented in a timely manner and that the fiscal impulse not be withdrawn at a pace that jeopardizes recovery" (p. 8; emphasis added). However, the focus was placed on the eventual requirements for very substantial fiscal consolidation in many countries "Some government have already

**Table 2** Fiscal positions 2007–2010

|  | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| **USA** | | | | | |
| Actual balance | −2.2 | −2.9 | −5.9 | −10.2 | −11.2 |
| Underlying balance | −3.0 | −3.5 | −5.8 | −7.7 | −8.5 |
| Underlying primary balance | −1.0 | −1.4 | −3.8 | −6.2 | −6.8 |
| Gross financial liabilities | 61.7 | 62.9 | 71.1 | 87.4 | 97.5 |
| **Japan** | | | | | |
| Actual balance | −1.6 | −2.5 | −2.7 | −7.8 | −8.7 |
| Underlying balance | −4.0 | −3.8 | −4.3 | −5.9 | −6.0 |
| Underlying primary balance | −3.3 | −3.1 | −3.5 | −5.0 | −6.0 |
| Gross financial liabilities | 172.1 | 167.1 | 172.1 | 189.6 | 199.8 |
| **Euro area** | | | | | |
| Actual balance | −1.3 | −0.7 | −1.9 | −5.6 | −7.0 |
| Underlying balance | −1.6 | −1.4 | −1.9 | −2.6 | −3.8 |
| Underlying primary balance | 1.0 | 1.2 | 0.7 | 0.0 | −1.2 |
| Gross financial liabilities | 74.6 | 71.2 | 73.4 | 82.5 | 89.2 |
| **OECD** | | | | | |
| Actual balance | −1.3 | −1.4 | −3.2 | −7.7 | −8.8 |
| Underlying balance | −2.4 | −2.5 | −3.8 | −5.5 | −6.2 |
| Underlying primary balance | −0.5 | −0.6 | −2.0 | −3.8 | −4.4 |
| Gross financial liabilities | 75.0 | 73.5 | 78.7 | 91.6 | 100.2 |

Source: *OECD Economic Outlook* 2009/1, Table 1.6
Notes: Actual balances and financial liabilities as percentage of GDP; underlying
  balances as percentage of potential output

announced medium-term consolidation plans and others *will have to fol-low*" (p. 8; emphasis added). "Consolidation requirements clearly differ across countries, but analysis [later in the Economic Outlook] shows that even countries with large deficits in the near term can reach fiscal balance over the medium terms, or at least get a good part of the way, provided that consolidation measures are taken which are strong but not without historical precedent" (p. 8).

Why was fiscal consolidation needed? A recovery of demand from the private sector would reduce budget deficits, and a recovery back to the levels of 2007 could take the budget positions back to the pre-crisis level in the main.[3] Reversal of the temporary discretionary policy measures as the economy recovered would be involved, but no other forms of fiscal

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[3] There were some special factors in a number of countries, which may have raised tax revenues in 2006/07 thereby reducing the recorded budget deficits, including property market booms.

consolidation would be needed. In the other direction, application of fiscal consolidation and the reversal of discretionary measures before the recovery was established would threaten the recovery itself.

The OECD (OECD Economic Outlook 2009/1, p. 56) in mid-2009 estimated that for 20 countries with a fiscal stimulus package and available data, the cumulative operation of the automatic stabilisers accounted on average for about half (on an unweighted basis) of the cumulative deterioration of the fiscal balances over 2009 and 2010. The remainder was attributed to structural deterioration, which included discretionary measures in response to the financial crisis accounting for a fifth of the change. The other structural component covered the disappearance of exceptional revenues related to the asset price boom and buoyant growth in construction and financial services as well as discretionary fiscal policy measures other than those in response to the crisis. Although tucked away in a footnote (fn. 27), the OECD noted that "compared with the *Interim Economic Outlook* from March 2009, potential growth rates have been revised down because of the crisis. This implies that the decomposition of deficits into structural and cyclical parts changes, with a smaller cyclical component and a large structural component" (p. 56). As will be discussed further below, revisions such as this to estimates of potential output and the recognition that potential output and its estimates are path dependent (on the path of demand) cast some doubts on the use of measures such as cyclically adjusted and structural budgets to judge the fiscal stance.

In a relatively early summary, OECD (*Economic Outlook* 2009/1; their Table 1.7) on the size and timing of fiscal packages summarise information for 30 OECD member countries. Using the weighted averages, over the period 2008–2010, spending increases were estimated to have increased budget deficit by 2.0 per cent GDP, while tax revenue contributed 1.9 per cent of GDP. The distribution over time was 15 per cent (of total package) in 2008, 48 per cent in 2009 and 37 per cent in 2010 (again using weighted averages).

Ferreiro et al. (2015) examine the pro- or counter-cyclical nature of fiscal policies in the EU-28 since 1999. The fiscal policy stance was judged in terms of primary cyclically adjusted budget balance. Countries were classified in terms of positive or negative output gap. Taking the

cumulative figures over the period 1999–2008, in negative gap years among the euro area countries on 21 occasions, fiscal policy was expansionary but on 19 occasions restrictive (corresponding figures for non-euro area countries 17 and 4). In positive gap years for the euro area countries on 76 occasions, fiscal policy was expansionary, 53 restrictive, and for the non-euro area countries 45 and 32, respectively. In 2009, the authors report policy expansive during the recession in 19 countries and restrictive in 6 countries (and three countries had a positive output gap). In 2010, corresponding figures are 12 expansions and 14 restrictive fiscal policies (and 2 countries in 'boom').

In mid-2009, the OECD argued that "The dramatic deterioration of fiscal positions and the rapid build-up of public debt in many countries constrain the further use of fiscal policy to support the economy. However, it is necessary to balance concerns about fiscal sustainability with the need to avoid an overly rapid phase-out of fiscal support" (OECD *Economic Outlook* 2009/1, p. 14). This dramatic deterioration of fiscal positions was, of course, attributable to declines in economic activity, and could be expected to be reversed as and when economic activity revived. It would follow that if economic activity were to decline further, more fiscal expansion would be required.

The first round of responses of fiscal policy could be described as letting the automatic stabilisers of fiscal policy take affect together with some discretionary policies to soften the recession. The recession of 2009 was still a sharp one, often the largest in the post-war period, and the fiscal responses were rapid in most cases but not of sufficient magnitude to stop dramatic rises in unemployment.

# 4     Second Rounds of Responses of Fiscal Policy

Fiscal-policy debates shifted in late 2009 and early 2010 much more towards demands for 'fiscal consolidation', removal of the discretionary fiscal stimulus and warnings over unsustainability of deficit and debt positions. In mid-2010, the OECD (2010/1) wrote that "the exit

from crisis-induced macroeconomic policies has yet to begin in earnest, with the exception of those economies having to undertake sharp fiscal consolidation as a result of market concerns about debt sustainability" (OECD *Economic Outlook* 2010/1, p. 15). The urgency was stressed by the OECD when they argued that "public finances need to start being brought credibly onto a sound footing by next year at the latest" in those countries where fiscal consolidation had not begun. "The pace of fiscal consolidation in those countries that have a choice should be sufficient to ensure continued credibility and avoid the risk of destabilising increases in long-term interest rates while, as far as possible, remaining commensurate with the subdued real recovery. With public debt burdens continuing to rise even after consolidation begins, it is essential that all countries have detailed medium-term fiscal consolidation plans setting out the actions to be taken in the years ahead" (OECD, *Economic Outlook*, 2010/1, p. 16).

A dominant feature of the debates was the focus on reducing the budget deficit through public expenditure reductions and tax increases with no regard to the alternative, albeit indirect route, of reviving private demand or indeed waiting for private demand to revive. A capitalist economy is inherently cyclical, and revival of demand generally comes, and with it a reduction in the budget deficit.

For the euro area countries, a major shift in fiscal policy was signalled by the 'fiscal compact' formally agreed in December 2011. From the outset, the countries adopting the euro had been subject to the Stability and Growth Pact and the requirement for a budget balanced over the cycle, an upper limit in budget deficit of 3 per cent of GDP and a 60 per cent debt to GDP ratio. These restrictions on national fiscal policies were not fully observed (for some details, see Sawyer 2017). Indeed, the view became that those failures had placed many euro area countries in a weak position and lacking 'fiscal space' to respond to the recession. There were then calls for required tighter rules to be put in place and enforced. The 'fiscal compact' had two features of particular relevance here. The first concerned the focus on the structural budget position as the key indicator of fiscal stance, and setting a balanced structural budget as the central aim of fiscal policy. The problematic nature of this feature is discussed in Sect. 8 below. The second was that requirements of the achievement of a balanced structural

budget were embodied into national constitutions, providing legal backing to the balanced budget requirement as well as making changes to the fiscal policy constitutionally difficult. Additionally, under the 'excessive deficit procedure' further austerity measures were demanded of those countries whose debt to GDP ratio exceeded 60 per cent.[4]

In the UK, the government had, in the budget of March 2010, set out proposals to reduce the cyclically adjusted budget deficit from 8.4 per cent of GDP in 2009–2010, and to 2.9 per cent in 2014–2015; as well as the actual deficit from 11.8 per cent of GDP to 4.0 per cent.[5] Following the general election of May 2010, a Coalition government of Conservative and Liberal Democrat Parties replaced the Labour government. The Coalition agreement between the Conservatives and Liberal Democrats "recognise[d] that deficit reduction, and continuing to ensure economic recovery, is the most urgent issue facing Britain". This, as often happens, was to elevate the importance of deficit reduction above so many other problems which afflict the UK economy ranging over unemployment, current account deficit, low productivity growth, inequality and climate change. It also treats the deficit as *the* problem, rather than a symptom of other problems (notably low private sector demand). It committed to "significantly accelerate the reduction of the structural deficit over the course of a Parliament, with the main burden of deficit reduction borne by reduced spending rather than increased taxes" with a plan for deficit reduction to be set out in an emergency budget which followed in June 2010 (Cabinet Office 2010, p. 15).

Fiscal and budgetary policies in the USA were a battle between the Democratic President and the Republican Congress, and the apparent drive of the latter to reduce deficits through expenditure reductions. The Budget Control Act (BCA) of 2011 set caps on discretionary spending for the financial years 2012–2021 and created the Joint Select Committee on deficit reduction. The BCA instructed the Joint Select Committee to develop proposals that would save $1.5 trillion over ten years. Automatic spending cuts ('sequestration') were to occur in 2013 if there was a failure to propose expenditure reductions of at least $1.2

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[4] For discussion of euro area policies see, for example, Arestis et al. (2013), Sawyer (2017).

[5] See Sawyer (2012, 2013) for detailed discussion of UK fiscal policy after the fiscal crisis.

trillion over ten years. In late 2012, the OECD could argue that "further reductions in the large federal budget deficit are necessary to restore fiscal sustainability, but the pace of consolidation should be gradual so as not to derail the already weak recovery" (*OECD Economic Outlook,* 2012/2, p. 77). In late 2013, the OECD still regarded "fiscal consolidation, while necessary, is acting as a headwind throughout the projection. So-called sequestration has triggered across-the-board spending cuts that started in 2013 and will amplify in 2014" (*OECD Economic Outlook*, 2013/2, p. 94). Yet despite the rise of the 'Tea Party', the battles between President and the Republican controlled congress, the Budget Control Act, etc., the decline in the budget deficit in the USA was among the slowest in the world. Equation (1) above may help explain the difficulties, which the USA has in reducing budget deficit—simply an economy with a large current account deficit and low investment has a corresponding budget deficit. No action was taken to resolve the large current account deficit.

The statistics in Table 3 relate to the evolution of budget deficits in the period 2011–2015. In terms of the actual budget position, there was not surprisingly a preponderance of budget deficits and in general on a declining trend (Finland being an exception as its deficit grew though the cyclically adjusted budget position did not). The cyclical adjusted budget (CAB) indicates a story of year by year fiscal consolidation with declines in that budget deficit and moves into surplus. A word of caution on that—for reasons discussed later the CAB can be strongly influenced by changes in the estimates of potential output rather than changes in fiscal position.

The OECD in mid-2010 indicated that "temporary parts of the fiscal stimulus programmes are set to be withdrawn in 2011 in most countries. Underlying balances are projected to improve move strongly, by 1 per cent of GDP or more, in a few countries (Greece, Iceland, Portugal and Spain). Even so, underlying deficits remain deep across the OECD area, exceeding the 2007 pre-crisis level by 3 ½ per cent of GDP on average" (OECD Economic Outlook, 2010/1, p. 48).

In late 2011, the OECD argued that for a large number of OECD countries there was a strong imperative to implement what they termed "credible fiscal consolidation programmes that put government finances

**Table 3**  Budget positions (per cent of GDP)

| | Cyclically adjusted | | | | | Actual | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 2011 | 2012 | 2013 | 2014 | 2015 |
| Austria | −2.2 | −1.5 | −0.0 | −1.2 | +0.6 | −2.6 | −2.2 | −1.4 | −2.7 | −1.0 |
| Belgium | −4.6 | −4.0 | −2.0 | −2.6 | −2.2 | −4.1 | −4.2 | −3.0 | −3.1 | −2.5 |
| Finland | −0.9 | −0.9 | −0.7 | −0.4 | 0.2 | −1.0 | −2.2 | −2.6 | −3.2 | −2.8 |
| France | −4.5 | −3.8 | −2.9 | −2.4 | −2.0 | −5.1 | −4.8 | −4.0 | −4.0 | −3.5 |
| Germany | −1.2 | +0.1 | +0.1 | +0.2 | +0.5 | −1.0 | 0.0 | −0.2 | 0.3 | 0.7 |
| Greece | −6.3 | −1.7 | −4.4 | +3.1 | −0.4 | −10.3 | −8.8 | −13.2 | −3.6 | −7.5 |
| Ireland | −9.9 | −4.7 | −3.0 | −3.7 | −2.1 | −32.1 | −12.6 | −8.0 | −5.7 | −3.7 |
| Italy | −2.6 | −0.3 | 0.7 | +0.1 | +0.1 | −4.2 | −3.7 | −2.9 | −2.7 | −3.0 |
| Luxembourg | +2.5 | +3.9 | +3.9 | +3.6 | +3.4 | −0.7 | 0.5 | 0.3 | 1.0 | 1.5 |
| Netherlands | −3.8 | −2.3 | −0.3 | −0.4 | +0.5 | −5.0 | −4.3 | −3.9 | −2.4 | −2.3 |
| Portugal | −5.8 | −2.2 | −0.7 | −3.5 | −1.9 | −7.4 | −5.7 | −4.8 | −7.2 | −4.4 |
| Spain | −6.0 | −4.3 | −0.4 | +0.8 | −0.1 | −9.6 | −10.5 | −7.0 | −6.0 | −5.1 |
| Euro area | −3.4 | −2.1 | −0.9 | −0.7 | −0.4 | −4.2 | −3.6 | −3.0 | −2.6 | −2.1 |
| UK | −5.7 | −6.4 | −4.2 | −4.9 | −3.9 | −7.7 | −8.3 | −5.7 | −5.6 | −4.3 |
| USA | −8.8 | −7.4 | −4.0 | −3.9 | −3.7 | −10.8 | −9.0 | −5.5 | −5.0 | −4.4 |
| Japan | −7.7 | −8.2 | −8.5 | −6.1 | −5.4 | −8.8 | −8.7 | −8.5 | −6.2 | −5.4 |

Source: Statistics from OECD Economic Outlook 2016/2
Note: + surplus − deficit

on a sustainable path and reduce financial vulnerabilities". However, they perceived that the fiscal multipliers were relatively high at that time (as compared with normal times), and that "the pace of consolidation must take into account the state of the economy and the adverse effects of fiscal policies on aggregate demand. Thus, budgetary outcomes should be allowed to deviate from announced consolidation programmes if economic activity turns out to be temporarily weaker than assumed, with the scope for deviation depending on fiscal positions and market pressures" (*OECD Economic Outlook,* 2011/2, p. 61). While the urgent need for fiscal consolidation was often stressed, the reasoning behind it was not clear. In situations of depressed private demand, fiscal policy should do 'whatever it takes' to support demand: if that involves (as it generally does) significant budget deficits, then in general they can be funded as depressed private demand comes from a high propensity to save and a low propensity to invest. There is only an urgency if there is some belief that a higher debt ratio will bring disaster. There is though the recognition that, *ceteris paribus*, fiscal consolidation brings lower economic activity, and represents a rejection of any notion of 'expansionary fiscal consolidation'.

Ferreiro et al. (2015) find that in the years 2011–2013, among the countries with negative output gap, within the euro area on 9 occasions fiscal policy was expansionary and 37 policies were restrictive; for the non-euro countries, the corresponding figures were 14 and 17, respectively. These figures are consistent with a retreat from Keynesian policies. There were a few countries with positive output gap: among those there were 4 occasions of expansionary fiscal policy and 3 restrictive.

In Table 4, the paths of budget deficits and forecasts thereof are displayed. The year in the first column indicates the year in which the figures

**Table 4** Evolution of budget positions

|  | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|
| USA |  |  |  |  |  |  |  |  |
| Actual balance |  |  |  |  |  |  |  |  |
| (% GDP) |  |  |  |  |  |  |  |  |
| 2011 | −11.6 | −10.7 | −10.0 | −9.3 | −8.3 |  |  |  |
| 2012 |  | −11.4 | −10.2 | −8.5 | −6.8 | −5.2 |  |  |
| 2013 |  |  | −10.7 | −9.3 | −6.5 | −5.8 | −4.6 |  |
| 2014 |  |  |  | −9.0 | −5.7 | −5.1 | −4.3 | −4.0 |
| Underlying balance |  |  |  |  |  |  |  |  |
| (% potential GDP) |  |  |  |  |  |  |  |  |
| 2011 | −7.4 | −6.8 | −6.0 | −5.6 | −4.1 |  |  |  |
| 2012 |  | −9.2 | −8.3 | −7.1 | −5.5 | −4.1 |  |  |
| 2013 |  |  | −9.0 | −8.1 | −5.5 | −5.0 | −4.1 |  |
| 2014 |  |  |  | −7.3 | −4.5 | −4.0 | −3.5 | −3.5 |
| Euro area |  |  |  |  |  |  |  |  |
| Actual balance |  |  |  |  |  |  |  |  |
| (% GDP) |  |  |  |  |  |  |  |  |
| 2011 | −6.4 | −6.3 | −4.0 | −2.9 | −1.9 |  |  |  |
| 2012 |  | −6.2 | −4.1 | −3.3 | −2.8 | −2.6 |  |  |
| 2013 |  |  | −4.1 | −3.7 | −2.9 | −2.5 | −1.8 |  |
| 2014 |  |  |  | −3.6 | −2.9 | −2.6 | −2.3 | −1.9 |
| Underlying balance |  |  |  |  |  |  |  |  |
| (% potential GDP) |  |  |  |  |  |  |  |  |
| 2011 | −7.4 | −6.8 | −6.0 | −5.6 | −4.5 |  |  |  |
| 2012 |  | −4.1 | −3.0 | −1.7 | −0.5 | −0.3 |  |  |
| 2013 |  |  | −3.5 | −2.1 | −1.1 | −0.6 | −0.1 |  |
| 2014 |  |  |  | −2.4 | −1.4 | −1.1 | −0.9 | −0.7 |

Source: *OECD Economic Outlook*: 2011/2 Table 1.4; 2012/2 Table 1.5; 2013/2 Table 1.5; 2014/2 Table 1.5

Note: The years given in column indicate the timing of the calculations: The figures given refer to the calculated or forecast budget deficit in the year indicated

were produced: hence, year 2011 signifies figures taken from the OECD Economic Outlook for November of that year. Thus, for the row reading 2011, the figures for 2009, 2010 are outcomes, whereas figures for 2011 and after are forecasts. It can first be seen that for both the USA and the euro area there was, for each of the years covered, the prospect of falling budget deficits whether in terms of the actual balance or (using the OECD term) underlying balance. For the USA, the decline in the actual budget deficit tended to turn out to be somewhat faster than forecast (notably relating to 2013). In contrast, the underlying budget deficit tended to turn out to be somewhat larger than forecast. For the euro area, the picture is one where the actual budget deficit did decline but not as quickly as envisaged. In some contrast, there was sharp reductions in the underlying balance, and could be seen to reflect the adoption of the 'fiscal compact'.

The post-2009 fiscal policies were generally pointing in the direction of fiscal consolidation. However, the decline of budget deficits was often relatively slow at least by way of comparison with the intentions set out in budget statements. Countries, which set out with reaching a balanced structural budget, failed to do so. The recovery from recession was slow in the first half of the 2010s, hampered by the attempts at fiscal consolidation.

## 5    The 'Debt Scare'

The figures in Table 2 suggest that many countries (though there is a wide variation) before the financial crisis held what may be seen as relatively high debt levels—the OECD average in 2007 being over 70 per cent. High has to be judged against some benchmark—and 60 per cent is used by Economic and Monetary Union (EMU) though there is little justification has ever given for that. It should first be noted that the debt figure refers to gross government debt; it is not a country's debt (though often referred to in those terms) and much of the debt is held by the private sector as financial assets. It also makes no allowance for public sector assets; and it takes no account of public sector debt held within the public sector.

Some of the quotes given above indicate that arguments for reducing budget deficit and engaging in fiscal consolidation invoked issues on the size of the public debt. Some invoked the argument for a negative relationship between the size of public debt and the rate of growth (at least above some threshold level of debt); sometimes combined by a 'falling off a cliff' argument—above some crucial level, economic decline would set in. "Our main result is that whereas the link between growth and debt seems relatively weak at 'normal' debt levels, median growth rates for countries with public debt over roughly 90 per cent of GDP are about 1 per cent lower than otherwise; average (mean) growth rates are several per cent lower. Surprisingly, the relationship between public debt and growth is remarkably similar across emerging markets and advanced economies" (Reinhart and Rogoff 2010b, p. 573).

Referring to a meeting of circa 40 US senators held in March 2011, Coburn (2012) writes that "Reinhart and Rogoff had spent much of the past year dismantling the belief that 'this time is different'—the notion that this particular group of policymakers in this moment in history were somehow smarter than all the others and could run up debt forever without catastrophic consequences. A key conclusion of their work is that economies like ours slow down when our debt-to-GDP ratio reaches about 90 per cent" (p. 29). Coburn (op. cit.) also suggests that "Reinhart echoed Conrad's point and explained that countries rarely pass the 90 per cent debt-to-GDP tipping point precisely because it is dangerous to let that much debt accumulate. She said, "If it is not risky to hit the 90 per cent [debt-to-GDP] threshold, we would expect a higher incidence'. (p. 31) (Senator Kent Conrad was Chair of the US Senate Budget Committee). It is then surprising how many countries have debt ratios well over 100 per cent, as Table 2 suggests with regard to gross financial liabilities.

Continuing that theme, "I don't want to be fire and brimstone" Rogoff said, "No-one knows when this will happen". Yet, he added, "it takes two years to turn the ship around …. Once you have waited too long, it's too hard to take radical steps" (Coburn 2012, p. 31). Coburn, himself, argued that "We have already passed the tipping point. Our debt

is already preventing the creation of one millions jobs a year" (Coburn 2012, p. 33).[6]

The director of the IMF Fiscal Affairs Department, Carlo Cottarelli, argued that "it is perhaps more controversial how bad the stabilization of public debt at high levels is for the economy. Ken Rogoff and Carmen Reinhart have identified a threshold of 90 per cent of gross public debt beyond which growth starts suffering. Their paper does not, however, take into account the possible reverse line of causality (from low growth to high public debt). Moreover, it is not based on econometric analysis" (Cottarelli 2011, p. 1). However, invoking work undertaken at the IMF, he argued that "in addition to problems for growth arising from a debt crisis, one should also be worried about problems for growth arising from high, even if stable debt" (Cottarelli, op. cit., p.2).

Authors at the Bank of International Settlements also suggest that "Our results support the view that, beyond a certain level, debt is bad for growth. For government debt, the number is about 85% of GDP. For corporate debt, the threshold is closer to 90%. And for household debt, we report a threshold of around 85% of GDP, although the impact is very imprecisely estimated. Our result for government debt has the immediate implication that highly indebted governments should aim not only at stabilising their debt but also at reducing it to sufficiently low levels that do not retard growth. Prudence dictates that governments should also aim to keep their debt well below the estimated thresholds so that even extraordinary events are unlikely to push their debt to levels that become damaging to growth" (Cecchetti et al. 2011, p. 1).

Although the work of Reinhart and Rogoff (2010a, b, 2011) and Reinhart et al. (2012) is often invoked in justification for austerity policies—especially as many countries approach or surpass the 90 per cent figure—there are many reasons why it should not be taken at face value. A perhaps relatively minor issue relates to the way in which debt is measured. There are in general tiers of government, local, regional and central. It would be usually the case that it is central government, which has a relationship with

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[6]Tom Coburn was Republican Senator for Oklahoma over the period 2005–2015.

the central bank, and only the expenditure of central government that could be (partially) financed by central bank money. Local and regional governments are generally subject to a range of budget limitations and receive a range of transfers from central government. As Reinhart et al. (2012) observe, "Of course, focusing on gross debt issued by the central government has its shortcomings. For example, it would be desirable to have long-dated measures of general government debt that include states and municipalities. However, for long-dated historical data, the Reinhart–Rogoff (2011) database only contains central government debt. There is also the issue of net debt versus gross debt …. Again, net debt data is not available on a long-dated cross-country basis" (footnote 2, pp. 74–75). IMF (2012) Table 6 provides (for 2011) figures, which indicate the extent of differences in the scale of debt relative to GDP depending on the measure of debt which is used. For the USA, gross general government debt is placed at 102.9 per cent of GDP, consolidation with the central bank lowers that to 91.9 per cent; net government debt is 80.3 per cent and net consolidated government and central bank debt 62.8 per cent. For the euro area countries, general government debt stood at 88.1 per cent and net consolidated government and central bank debt 49.7 per cent. Switzerland has general government debt at 48.6 per cent of GDP and net consolidated government and central bank debt—44.7 per cent (largely due to central bank net foreign assets of 55.9 per cent of GDP). These figures refer to financial assets and liabilities and make no allowance for capital assets owned by government.

A more substantial set of doubts on the work of Reinhart and Rogoff (2010a, b, 2011) relates to the serious statistical errors in their work as demonstrated by Herndon et al. (2014). The latter replicate the work of Reinhart and Rogoff (2010a, b) and "find that coding errors, selective exclusion of available data, and nonconventional weighting of summary statistics lead to serious errors that inaccurately represent the relationship between public debt and growth among these 20 advanced economies in the post-war period" (pp. 2–3). Once these statistical errors are removed, the conclusion emerges that the relationship between public debt and GDP is that over the period 1946–2009 growth for countries with a debt ratio in excess of 90 per cent is not −0.1 per cent as in Reinhart

and Rogoff (2010a, b) but 2.2 per cent instead. Herndon et al. (2014) also refute the Reinhart and Rogoff (2010a, b, 2011) evidence that "for an 'historical boundary' around public debt/GDP of 90 per cent, above which growth is substantively and non-linearly reduced. In fact, there is a major non-linearity in the relationship between public debt and GDP growth, but that non-linearity is between the lowest two public debt/GDP categories, 0–30 per cent and 30–60 per cent, a range that is not relevant to current policy debate" (p. 3). Herndon et al. (2014) critically examine the statistics and analysis of Reinhart and Rogoff (2010a, b), and conclude that "the relationship between public debt and GDP growth varies significantly by period and country. Our overall evidence refutes RR's [Reinhart and Rogoff's] claim that public debt/GDP ratios above 90% consistently reduce a country's GDP growth" (p. 257).

The empirical works quoted treat causation as running from debt ratio to growth. In contrast, there can be causation running from growth to public debt ratio. Indeed, and as Panizza and Presbitero (2012) argue the direction of causation could run from low economic growth leads to high levels of debt, as elaborated on below. The authors proceed to undertake instrumental variables estimation for the debt ratio to growth relationship seeking to follow as much as possible the sample and variables used in the study of Cecchetti et al. (2011). Significantly for our argument here is that their results with instrumental variables (and thereby seeking to address the endogeneity issue) do not confirm any causal relationship running from debt ratio to growth. Panizza and Presbitero (2012) state that "we do not find any evidence that high public debt levels hurt future growth in advanced economies. Therefore, given the state of our current knowledge, we think that the debt-growth link should not be used as an argument in support of fiscal consolidation" (pp. 16–17).

A given budget deficit (relative to GDP) of $b$ would lead to a sustained debt ratio of $b/g$ (where $g$ is the nominal growth rate) and hence the higher the nominal growth rate the lower would be the debt ratio. A further route comes from the relationship $I = (T - G) + S + FA$, where FA is the financial account balance and other symbols as above and $\frac{I}{Y} = \frac{I}{K}\frac{K}{Y} = g_K.v$, where $v$ is the capital-output ratio and $g_K$ the growth rate of the capital stock. The budget surplus relative to GDP is then:

$$(T - G)/Y = -b = -d \cdot (g + p) \tag{2}$$

where $b$ is the budget deficit relative to GDP, $d$ the debt to GDP ratio, $g$ is real growth rate and $p$ rate of inflation. Then writing:

$$(FA + S)/Y = \alpha \tag{3}$$

Combining these equations would give:

$$g_K . v = -d \cdot (g + p) + \alpha \tag{4}$$

and taking growth of capital stock and growth of output as equal it can be derived that:

$$\frac{dg}{dd} = -(g + p)/(v + d) < 0 \tag{5}$$

This simple model would indicate a negative relationship between the growth rate and the debt to GDP ratio, which arises from the implications of relatively low investment and associated low growth rate. The direction of causation in effect runs from low investment and growth to budget deficits to debt/GDP ratio.

In the past decade, the prospects of public debt have often been invoked to scare the populace into accepting the need for austerity and deficit reductions. At a rhetorical level, fear of 'burdening our grandchildren with debt' has often been invoked, without the realisation that government debt is an asset for those holding government bonds. In other respects, as hinted at in some of the quote above, debt ratio to GDP over 90 or 100 per cent has been argued to lead to lower growth, and to be suggested as unsustainable (whereas as indicated above a debt ratio converges on a steady rate). Doubts have been cast on the empirical and theoretical arguments that a high-debt ratio is harmful. At a minimum, the question has to be raised as to why a high-debt ratio has come about.

If it has come from a deficit position adopted to offset low private sector demand, then there would be no difficulty in funding the deficit (as there is potential excess net private savings).

# 6     The 'Multiplier'

It is evident from above that views on the size of the 'multiplier' were brought into discussions on fiscal policy and its timing. Specifically, the argument was put that the size of the 'multiplier' was dependent on the state of the business cycle, and that there being a relatively large multiplier would indicate that fiscal consolidation should be held back as reductions in public expenditure or rises in tax would be predicted to have a relatively large and negative impact on economic activity. But whatever the size of the 'multiplier', provided it is positive, should indicate that fiscal consolidation is not appropriate while there is unemployment and a negative output gap for simply there would be a negative impact on economic activity. In this section, two main points are argued. The first is that there is often confusion as to whether the multiplier represents a causal relationship or an association between a change (difference) in government expenditure (or budget deficit) and change (difference) in level of economic activity. The second is that while estimates of 'the multiplier' are generally positive, they lie within a generally wide range (below 1 to over 3) which reduces the usefulness of 'multiplier' estimates for policy purposes. There is though little support for 'expansionary fiscal consolidation' interpreted as the effects of deficit reduction to raise economic activity, and any association between reduced budget deficit and higher economic activity comes from the effects of the latter on the former.

In its simplest form, 'the multiplier' comes from an equilibrium relationship based on aggregate demand. For example, for a closed economy:

$$Y = C + I + G \qquad (6)$$
$$C = c(1-t) \cdot Y \qquad (7)$$

Then

$$Y\left(1 - c\left(1 - t\right)\right) = I + G \tag{8}$$

with symbols defined as above along with the addition of $c$ as the propensity to consume and $t$ the tax rate. And the 'multiplier' for a difference in government expenditure is $1/(1-c(1-t))$. In this context, the 'multiplier' is a comparative static exercise comparing two equilibrium positions which differ through the level of government expenditure. The multiplier process can be presented in time sequence form as the model moves from one equilibrium position to another. At each stage in the multiplier process, it is tacitly assumed that there is finance for the expenditure, and hence that an increase in government expenditure is supported by an increase in central bank money.

The 'multiplier' in this simple model suggests a *causal* story running from difference in government expenditure to difference in output though conducted within a comparative static framework. It is also a *ceteris paribus* story with many variables, explicitly or implicitly, held constant. In interpreting any empirical relationship between government expenditure and economic activity, there are three factors which should be taken into account: positive effects of government expenditure and output on key variables; negative feedbacks of government expenditure, taxation and budget deficits on key variables; due allowance for what would have happened anyway.

To illustrate, the closed economy setting is retained in order to focus on the key issues, and introduction of an open economy would complicate the algebra without adding anything of significance. Consumption and investment behaviour vary through the impact, direct and indirect, of government expenditure and tax rates, and through the impact of a range of other factors. These other factors can include monetary policy, in the open economy context exchange rate and foreign demand, workings of accelerator type mechanisms. The effects of government expenditure and tax rates include changes in the 'state of expectations', in 'confidence', and so on. It could then be viewed that a Keynesian style approach would regard these effects to be either neutral (as in the simple multiplier model

above) or reinforcing (lower public expenditure, higher tax rates tending to depress demand), whereas the 'fiscal consolidationist' would perceive these effects to be anti-reinforcing (lower public expenditure, higher tax rates restores 'confidence' leading to a higher level of demand).

The simple model is written as:

$$Y = c(\alpha,\beta)(1-t)Y + i(\gamma,\delta,(1-t)Y) + G \qquad (9)$$

where $\alpha$ and $\gamma$ reflect the effects of a change in government expenditure or tax rates on consumption and investment respectively and $\beta$ and $\delta$ other effects on consumption and investment.

In this exercise, $G$ is government expenditure on goods and services, and in taxes, income transfers are viewed as negative taxation.

In this exercise for reasons of simplicity and focusing on the key issues just consider the equilibrium relationship as in Eq. (9). Consider first the 'simple multiplier' case for a change in $G$ and then a change in $t$. The balanced budget multiplier would lead to the expectation that the effects of government expenditure are larger than the effects of taxation—though the balanced budget multiplier is usually derived for a lump sum tax change.

$$\Delta Y = \left[ c_1(\alpha,\beta)\Delta\alpha + c_2(\alpha,\beta)\Delta\beta \right](1-t)Y + c(\alpha,\beta)$$
$$\left[(1-t)\Delta Y - \Delta t \cdot Y\right] + i_1(\gamma,\delta,(1-t)Y)\Delta\gamma + i_2(\gamma,\delta,(1-t)Y) \quad (10)$$
$$\Delta\delta + i_3(\gamma,\delta,(1-t)Y)\left[(1-t)\Delta Y - \Delta t \cdot Y\right] + \Delta G$$

For a difference in government expenditure and relationship with difference in income, we have:

$$\Delta Y = \left[ c_1(\alpha,\beta)\Delta\alpha_g + c_2(\alpha,\beta)\Delta\beta_g \right](1-t)Y + c(\alpha,\beta)$$
$$\left[(1-t)\Delta Y\right] + i_1(\gamma,\delta,(1-t)Y)\Delta\gamma_g + i_2(\gamma,\delta,(1-t)Y) \quad (11)$$
$$\Delta\delta_g + i_3(\gamma,\delta,(1-t)Y)\left[(1-t)\Delta Y\right] + \Delta G$$

where the subscript $g$ is used to denote the effect of a change in government expenditure on the variable concerned. The 'multiplier' relationship is then:

$$\Delta Y / \Delta G \left[ 1 - c(\alpha,\beta)(1-t) - i_3(\gamma,\delta,(1-t)Y).(1-t) \right]$$
$$= \left\{ \left[ c_1(\alpha,\beta)\Delta\alpha_g + c_2(\alpha,\beta)\Delta\beta_g \right](1-t)Y \right] \quad (12)$$
$$+ i_1(\gamma,\delta,(1-t)Y)\Delta\gamma_g + i_2(\gamma,\delta,(1-t)Y)\Delta\delta_g \right\} / \Delta G + 1$$

From this, the first two terms on the left hand side would give a simple multiplier. This is clearly modified by the effects of income on investment, which serves to enhance the size of the multiplier. The right-hand allows for direct effects of government expenditure on consumer expenditure and investment and any effects arising at the same time as change in government expenditure but not causally related. It can then be readily seen that negative values of $\Delta\beta_g$ and $\Delta\delta_g$ can generate a negative value for $\Delta Y/\Delta G$: a rise, for example, in investment expenditure arising from an upturn of the business cycle and from government expenditure, was declining could generate the appearance of 'expansionary fiscal consolidation'.

A similar exercise for a change in the tax rate would yield:

$$\Delta Y \left[ 1 - c(\alpha,\beta) \left[ (1-t) - i_3(\gamma,\delta,(1-t)Y)(1-t) \right] \right.$$
$$= c_1(\alpha,\beta)\Delta\alpha_t + c_2(\alpha,\beta)\Delta\beta_t](1-t)Y + -\Delta t \cdot Y] + i_1(\gamma,\delta,(1-t)Y) \quad (13)$$
$$\Delta\gamma_t + i_2(\gamma,\delta,(1-t)Y)\Delta\delta_t + i_3(\gamma,\delta,(1-t)Y)[-\Delta t \cdot Y]$$

The claim made by IMF and others is that a programme of fiscal consolidation should be focused more (to the extent of 80 per cent) on expenditure cuts, and rather less (20 per cent) on tax rises. In Eqs. (12) and (13) above, the direct expenditure multiplier is likely to be larger than the direct tax revenue multiplier. The reason for this, as in the 'balanced budget multiplier', is that government expenditure adds directly to income (e.g. received by workers) and then that income is partially spent,

etc., whereas for tax revenue it has the effect only through consumption expenditure.

An expenditure cut or tax rise which is accompanied by factors favourable to demand (that is $\Delta\beta$, $\Delta\delta > 0$) which is sufficiently strong to offset the negative direct impacts of the expenditure cuts, or tax rises, will record that the expenditure cuts have a greater stimulus on output than tax cuts. But when those factors favourable to demand are absent or weak then the effect of expenditure cuts would again be greater than the effect of tax rises but now on the reduction in output. While it is relatively straightforward to make the conceptual distinction between the indirect effects of expenditure and tax changes on demand and the 'random' effects, it is rather difficult to do so empirically. Much of the indirect effects are said to come from changes in the 'state of confidence', in the 'state of expectations', etc., which are difficult to measure.

Now look at some estimates of the size of 'the multiplier'.[7] Ramey (2011) concludes "that the U.S. aggregate multiplier for a *temporary, deficit-financed* increase in government *purchases* … is probably between 0.8 and 1.5. Reasonable people can argue, however, that the data do not reject 0.5 or 2.0" (p. 673). Romer and Romer (2010) report a multiplier of around 3 for the US after three years of fiscal change.

Gechert and Rannenberg (2014) conduct a meta-regression analysis on 98 empirical studies with more than 1800 observations of multiplier effects with controls for regime dependency. They find that the fiscal multiplier is economically significantly higher during economic downturns. Spending multipliers are 0.6–0.8 units higher during a downturn. Spending multipliers are found to exceed tax multipliers by around 0.3 units in 'normal times' and by more during a recession. They conclude that "fiscal consolidation should take place during the recovery and should be primarily tax-based" (p. 1).

Qazizada and Stockhammer (2015) for a panel of 21 industrialised countries over the period 1979–2011 find a government spending multiplier of close to 1 during expansions and values of up to 3 during contractions. Their results though do not indicate any differences arising during periods of nominal zero lower bound (on interest rates).

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[7] See Arestis (2015) for further discussions.

After the financial crisis, the IMF (2012) recognised that "fiscal multipliers – which measure the ratio of a change in output to the discretionary change in the fiscal deficit that caused it – can for many reasons be expected now to be above the average multiplier identified in earlier studies. In particular, households are facing liquidity constraints, there is excess capacity in many countries, and there is little room for monetary policy to become more accommodative" (p. 15). "Fiscal adjustment is likely to have a larger adverse impact on economic activity when implements while output gaps are negative than when gaps are positive. In downturns, fiscal consolidation measures reinforce the economic cycle and thereby exacerbate the slump in growth, making up-front fiscal contraction particularly harmful" (IMF 2012 p. 15). Whatever happened to expansionary fiscal consolidation!

The IMF (2010) study adopts the approach of identifying fiscal consolidation by declared intent rather than by outcome, and concludes from their empirical work that "Fiscal consolidation typically has a contractionary effect on output. A fiscal consolidation equal to 1 per cent of GDP typically reduces GDP by about 0.5 per cent within two years and raises the unemployment rate by about 0.3 percentage point. Domestic demand – consumption and investment – falls by about 1 per cent" (p. 94).

The IMF (2012) study suggests that "in the current recessionary context, the negative impact of fiscal adjustment on activity can be expected to be large, as confirmed by new work on the size of fiscal multipliers during periods of weak economic activity. When multipliers are on the high side, the beneficial impact of fiscal adjustment on debt ratios and spreads may be delayed, This is another reason why, as long as financing allows a gradual but steady pace of adjustment seems preferable to heavy front-loading" (p. ix).

It could first be concluded from this very brief resume of evidence on the size of the 'multiplier' that it is found to be significantly positive. This may be a reflection of when changes in public expenditure and the adjusted budget deficit take place: if it is in situations where there is less than full employment then the Keynesian argument holds. There is scant evidence now, whether from the estimates of the multiplier or from the experience of fiscal policy in the past decade, of 'expansionary fiscal

consolidation'. And even when such appears to have been observed, it is more a reflection of fiscal consolidation being applied at a time when private demand (whether from investment or net exports) was reviving.

The estimates of the multiplier do, though, reveal two difficulties for the application of fiscal policy. First, there are a wide range of estimates of the multiplier, and hence uncertainty over the size of the multiplier at a particular time and at a particular place. Gauging the scale of fiscal change, which is then relevant (to achieve a particular objective), is then particularly difficult. Second, an estimated multiplier is a mixture of causal relationship and association, and again the application of fiscal policy requires well-based forecasts of what would happen in the absence of fiscal changes.

# 7     Composition of Deficit Reduction

The rhetoric of 'the deficit must be reduced/eliminated' comes with ideas as to how the attempt to reduce the deficit is to be made. That is to say whether it is reductions in public expenditure or increases in tax rates. The mood of the time has been for reductions in public expenditure.

The British government adopted the 80/20 rule. "The greatest contribution to the Government's fiscal consolidation will come from public spending reductions, rather than tax increases. This approach is consistent with OECD and IMF research, which suggests that fiscal consolidation efforts that largely rely on spending restraint promote growth. Tax measures can be an effective tool for reducing the deficit quickly, allowing for phased reductions in public spending. The Government's consolidation plans therefore involve a rising contribution from public spending over the forecast period" (HM Treasury 2010, p. 15); with public expenditure reductions scheduled to reach 77 per cent of the discretionary fiscal consolidation in 2014/15.

However, the IMF source references (*UK Article IV Consultation*, IMF, May, 2009) contains no evidence of its own (multiplier of close to 1 during expansions) and says "the emphasis in current plans to weigh the adjustment toward expenditure reduction is appropriate in light of international experience that expenditure-based consolidations are more

durable" (p. 6). The OECD reference (*Economic Outlook No.81*, OECD, Chapter 4, June 2007) does contain some empirical work but is based on the flawed methodology which many of the studies on fiscal consolidation use. This is to identify episodes of fiscal consolidation in terms of successful reductions in the cyclically adjusted budget position rather than by policy announcements of public expenditure reductions and tax rate rises designed to reduce the budget deficit.

A change in the budget deficit arising where actual output equals potential output (that is a zero output gap to which a cyclically adjusted budget position relates) has to involve as a matter of consistency a corresponding change in savings, investment and net exports arising when the output gap is zero (as can be seen from application of Eq. 1). A successful reduction in the cyclically adjusted budget deficit must involve some combination of reduced propensity to save, increased investment and net exports.

If, for example, the intentions to invest have risen, it is not surprising that output rises even though government expenditure has diminished. Thus, this approach assumes the answer—identify periods when structural budget deficit has declined, which means identifying periods when structural private sector surplus has declined, and then claim that the decline in the deficit has not caused output to decline, forgetting that there has been a corresponding rise in investment or decline in savings propensity. Recognising the shortcomings of this approach, Ferreiro et al. (2015, Table 8) find that the 'fiscal consolidation strategies', pursued within the 28 member states of the EU over the period 2009–2013, were divided into 4 countries where there was both lower tax revenues and lower expenditures, 6 with higher revenues and expenditures and 18 with higher revenues and lower expenditures. They estimate regression between the contribution of public expenditure decreases and the extent of fiscal consolidation (over the period 2009–13) and find a complex pattern. Small fiscal consolidations are mainly expenditure based, then for moderate sized consolidations (1–3 per cent of GDP) tax increases gain in importance. For large fiscal adjustments (3–7 per cent of GDP), the cuts in public expenditure are the main factors. And very large fiscal consolidations are accompanied by a declining weight of expenditure reductions.

# 8        Structural Budgets

## 8.1        Introduction to Structural Budgets

It has long been recognised that the budget position moves with the economic cycle with deficit (surplus) declining (rising) in boom times and reversed in recessions. It is long recognised that responding to a budget deficit arising from recession by fiscal consolidation would be harmful. Focusing on a cyclically adjusted budget position or structural budget position was seen as a way of helping to avoid such a response.

The structural budget position is calculated as that which would appertain if the economy were operating at 'potential output' and government expenditure and tax rates maintained at their current levels (apart from spending programmes and tax adjustments, which are explicitly related to the state of the business cycle). The estimates of the 'structural balance' depends on the output gap measure, with $SB = FB - eOG - OE$ where SB is structural budget, FB is fiscal balance, e is reaction of fiscal balance to output gap, OG, and OE is discretionary (for state of business cycle) adjustments to budget deficit. The cyclically adjusted budget position is $CAB = FB - eOG$. In practice, the focus is on the adjustment for the output gap and there is rather little difference between the cyclically adjusted budget and the structural budget.

The idea of the structural budget position has become important in two respects. The first is its use as a measure of the fiscal stance, which abstracts from the cyclical influences. It may then be used to judge whether there is an overall expansionary or contractionary fiscal policy, and in empirical work for consideration of fiscal consolidation. However if, as argued below, the structural budget position, which is calculated, does not fully abstract from cyclical influences (e.g. because the estimated 'potential output' is path dependent) then the validity of results of empirical work on fiscal consolidation is undermined.

The second is the increasing setting of budget targets in terms of the structural budget position: a notable example being the EMU 'fiscal compact' with requirements for a balanced structural budget. These have generally represented a 'firming up' of previous policies of balancing

budget over the course of the business cycle. Budget deficits calculated over the business cycle could only be undertaken retrospectively, whereas the structural budget position is, in principle, forward looking. The use of budget position over the business cycle can then only be judged after the event whereas the structural budget can be used in the formulation of policy.

## 8.2    'Potential Output'

'Potential output' is a theoretical construct, which is a property of a corresponding theoretical model, and the model may fail to correspond to the real world (or may apply at sometimes but not at others and not be a universal theory). In its simplest form, the theory from which 'potential output' emerges is one summarised in the idea of the Phillips' curve in which inflation is based on output gap (actual output relative to 'potential output') and expected inflation. Formally this can be expressed as:

$$p = f\left(y - y^*\right) + p^e \tag{14}$$

where $p$ is the rate of inflation, $p^e$ expected rate of inflation, $y$ output and $y^*$ 'potential output'. The theory requires that output gap has a positive effect on inflation, and the coefficient on expected rate of inflation is unity. It reflects the idea that a high level of demand leading to high output and a positive output gap has inflationary effects. Furthermore, expectations of inflation are highly relevant to the inflationary process and with a coefficient of unity on expectations the long-run Phillips curve is vertical—and hence in order to avoid escalating inflation (or deflation) the economy will need to operate with a zero output gap.

But what if that theory does not accord with reality? For example, what if the coefficient on expected inflation turns out to be different from unity? This is not just a matter that the coefficient is not significantly different from unity. Suppose, for example, it was estimated at 0.9 with standard error of 0.6; it would not be significantly different from unity, but the best estimate would be 0.9. Further, other variables

influence domestic inflation—for example, global inflation, movements in the exchange rate, bargaining power, etc.—and allowing for them is important.

Borio et al. (2016) argue for the inclusion of information about the financial cycle (using data on credit and property prices) to be incorporated into measures of potential output. They argue that "identifying non-inflationary output is too restrictive given that growing financial imbalances can place output on an unsustainable path even if inflation is low and stable" (p. 1). They propose a framework to use information on the financial cycle in the construction of estimates of 'potential output'. They also note that inflation has very little information that can be utilised to estimate 'potential output'.

## 8.3    Estimating 'Potential Output'

A range of methods have been deployed for the estimation of 'potential output' (as indicated in Murray 2013), which can be placed under two headings. The first comes from estimation of inflation—economic activity relationships including those between inflation and output, and between inflation and unemployment (from which a non-accelerating inflation rate of unemployment, NAIRU, is calculated and then in turn a corresponding level of output). The second comes from treating potential output as some form of trend output.

The estimation of 'potential output' is inevitably backward looking in the sense that it has to be estimated from previous data, which is often subject to revision. These observations lead into two sets of issues, which are now discussed. First, different ways of modelling 'potential output' can give different estimates (and thereby different estimates of the structural budget). Second, how far do estimates of 'potential output' for a specific period of time change as further data becomes available?

Jarocinski and Lenza (2016) point to a range of analyses, which have suggested that the great recession resulted in a decline in growth of potential output, and that estimates of 'potential output' would be affected depending on the view taken on growth of 'potential output'.

In their work, seven alternative modelling assumptions relating to real activity indicators and models of trend components of variables are used. The resulting estimates of the output gap agree on the timing of peaks and troughs of the business cycle, but differ significantly on its level. For 2014–2015, for example, the estimates for the output gap lie in the range −2 to −6 per cent; such a range of estimates could be expected to impact on estimates of structural budget position of around 2 per cent of GDP (corresponding to an estimate of 0.5 for *e* in the formula for structural budget given above).

The reliability of measures of 'potential output' and structural budget can also be gauged by seeing how the estimate of structural budget for a specific year changes over time as further data becomes available. Figure 1 relates to the cyclically adjusted budget balance for the Euro Area as a whole. Each of the lines refers to statistics presented in *OECD Economic Outlook* Statistical Annexe in the year indicated (using the second issue during the year). Figure 1 illustrates imprecision in the calculations of cyclically adjusted budget positions. It can be seen, for example, that the estimate for the cyclically adjusted budget produced at the end of 2010 was deficit of 4.2 per cent of GDP, the estimate made at end of 2011 was 6.6 per cent of GDP; in 2012, 4.8 per cent of GDP and in 2013, 5 per cent of GDP.
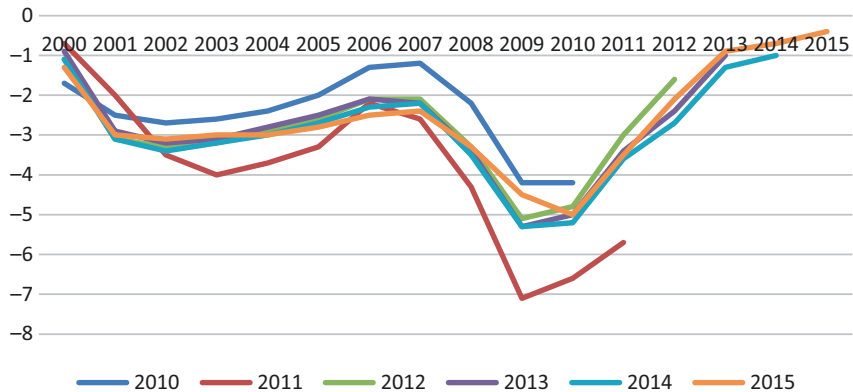


**Fig. 1** Cyclically adjusted budget deficits as % GDP: euro area (Source: Based on statistics given in *OECD Economic Outlook*, various issues)

Heimberger and Kapeller (2016) review how the estimates of potential output and structural budget position are formulated, and further show (for example, their Table 2) the extent to which downward revisions of potential output have increased pressures for fiscal consolidation. For the year 2014, they indicate that for Greece the output gap used was −9.1 per cent, but −42.1 per cent if potential output had grown over the period 2009–2014 at the average pre-crisis growth rate, with the consequence that a cyclically adjusted balance of 0.8 per cent would have been one of 16.6 per cent. For Spain, an estimated output gap of −6.9 per cent would have been one of −25.5 per cent, changing a CAB from −2.2 to +7.7 per cent.

Heimberger and Kapeller (2016) base their study on the performativity of economic models—that economic models "do not merely record a reality … but contribute powerfully to shaping, simply by measuring, the reality" (Callon 1998, p. 23). Heimberger and Kapeller (2016) "analyze the PO [potential output] model not primarily as a scientific device that allows economists to assess the position of an economy in the business cycle and to draw conclusions on the 'structural component' of the fiscal balance, but rather as a conceptual foundation for an authoritative political practice that structures the room for fiscal policy manoeuvring in EU countries" (p. 3). They note the pro-cyclicality of NAIRU and potential output (PO) estimates. They argue that there are three mechanisms for understanding that. "First, the EC's model estimates *reaffirm prevailing beliefs* among economists and policy-makers by providing additional support for established policies. Second, estimates of NAIRU and PO affect the *timing and speed of fiscal policies*, which is due to their importance for calculating structural balances in the EU's fiscal regulation framework. Finally, reaffirmation of beliefs and the model-induced pro-cyclical fiscal policy bias trigger *a reinforcement of cyclical trends …*" (p. 10).

Tereanu et al. (2014) analyse historical data on revisions of actual and potential output growth in the EU. They find that revisions in output gap estimates were almost 1 ½ per cent of potential GDP, with consequent revisions in the estimates of the cyclically adjusted budget. And this was particularly the case in crisis periods. They conclude that "caution is

therefore needed in interpreting CAPBs [cyclically adjusted primary balance] as an indicator of fiscal effort" (p. 15).

There is also the complicating factor of shifts in the assessment of 'potential output'. An example of this is that "essentially all of the convergence [between 2009 and 2014] between the economy's level output and its potential [i.e. output gap] has been achieved not through the economy's growth, but through downward revisions in its potential …. Today, it is increasingly clear that the trend in growth can be adversely affected over the longer term by what happens in the business cycle" (Summers 2014, p. 66). Changes such as these would clearly impact on the assessment of the fiscal stance.

## 8.4   'Potential Output' and Unemployment

The concept of 'potential output', as being consistent with constant inflation, is closely linked with the NAIRU as the rate of unemployment consistent with constant inflation. Indeed, some measures of 'potential output' are derived from measures of NAIRU translated into an employment rate and combined with a measure of the capital stock through a production function to yield the level of 'potential output'.

Figure 2 plots the time paths of actual unemployment and an estimate of NAIRU (made by the OECD) for selected countries. It first illustrates how high the estimated NAIRU is for some countries both in absolute terms and in relative (to other countries) terms. Recall that the 'fiscal compact' aims for a structural balanced budget—which translates here into a budget balanced if the economy concerned were operating at the NAIRU. Thus, with the estimate in Figure 2, Spain would be expected to have a balanced budget if unemployment were 18 per cent.

Second, the time paths illustrate the tendency for the estimated NAIRU to follow the path of actual unemployment. This may be a reflection of some form of path-dependency such that a higher level of unemployment involves de-skilling of work force and lower investment which themselves lead to a higher level of 'structural' unemployment.
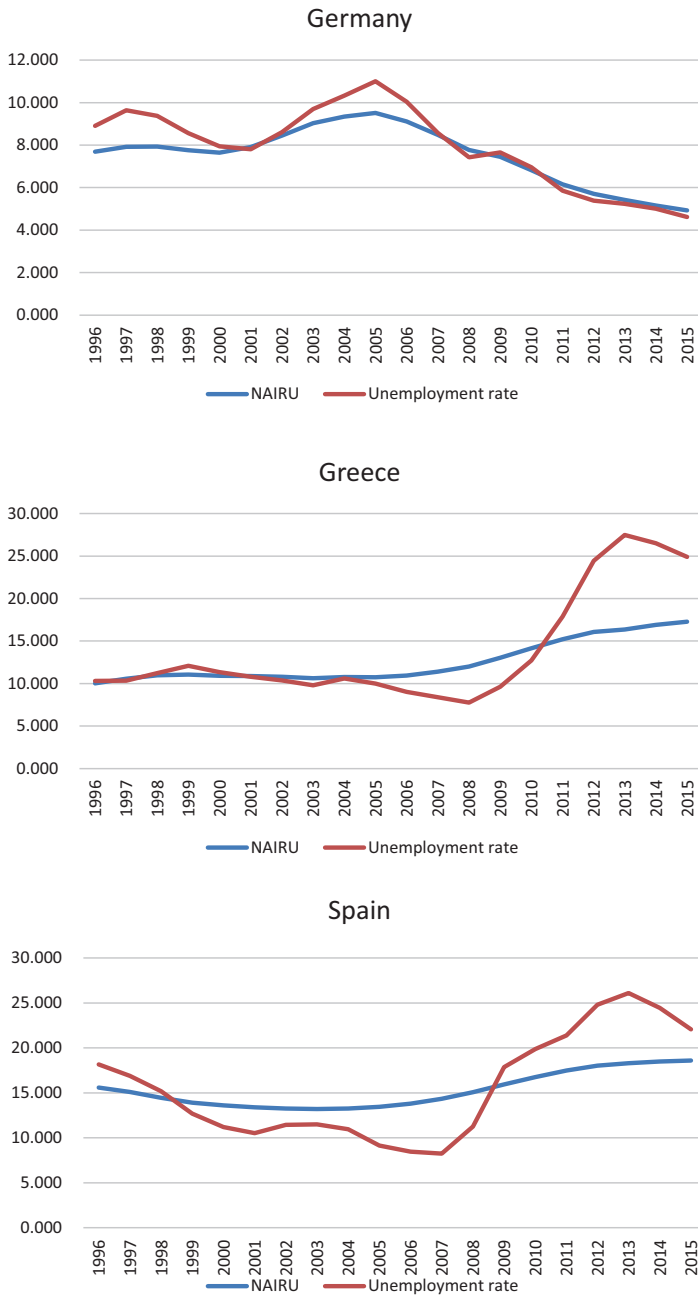
**Fig. 2** Unemployment and the NAIRU (Source: *OECD Economic Outlook*, various issues)

## 8.5     Why Do Structural Budget Deficits Persist?

Tables 2 and 4 illustrate the degree to which countries run deficits rather than surpluses even when cyclical factors are taken into account. The question can then be asked why do countries tend to behave in this way? Is it illustration of tendencies towards profligacy or is it suggestive that the achievement of a surplus on the public budget faces considerable obstacles?

One response could be that countries continue to have substantial unemployment, and that unemployment involves budget deficits as output and tax revenues are low. It is a well-known argument that the automatic stabilisers of fiscal policy should be allowed to work in a downturn and that budget deficit results. But that refers to actual deficit, and here the talk is of structural budget. The intention is that the structural position abstracts from the effects of cyclical fluctuations of output and employment, and should be unaffected by such fluctuations. It is, though, possible that the structural budget is miscalculated—for example, discretionary expenditure or tax cuts made in response to a down-turn and which will be reversed when there is an upturn may not be incorporated into the structural budget estimation. If that is so, then it does make the structural budget problematic as a guide to policy: trying to fly a plane with a faulty instrument panel.

A final response, and our preferred one, is that a balanced structural budget is not universally feasible, and that seeking to impose the same fiscal policy requirements on all EMU member countries falls foul of the 'one size fits all' problem. It may well be that some countries can reach structural budget surpluses through a combination of large net exports and low net private savings (low savings and/or high investment). There is then an asymmetry—countries for which a budget surplus is feasible and/or desirable are permitted to run surpluses, countries for which a budget deficit is required are not so allowed.

The 'impossibility' of structural budget balance comes from the following argument. Suppose that the economy was operating at 'potential output', and then Eq. 1 would hold. The budget deficit position would then be the structural budget position (by definition): now assume that the balanced structural budget has been achieved. Then:

$$I - S + \text{CA} = 0 \tag{15}$$

However, is this equation sustainable? Have the levels of investment, savings and current account position come about as a result of voluntary decisions? Are the levels of investment, savings, and current account position those which are desired at 'potential output'? If they are not, then Eq. (15) would not be sustainable, and hence a balanced structural budget would not be feasible.

## 9    Concluding Comments

In the first responses to the intensification of the financial crises in late 2008, included (besides bail-outs of financial institutions, lowering of interest rates followed by quantitative easing) the use of discretionary fiscal expansion along with allowing the automatic stabilisers to operate. But the general tenor of fiscal policy soon changed with emphasis on austerity and fiscal retrenchment. The epitome of this was the adoption of the 'fiscal compact' within EMU at the end of 2011. While the attempts to reduce budget deficits have led to a general reduction in budget deficits, they have not brought substantial economic recovery nor have they in general resulted in budgets in balance or surplus.

It has been argued that scares over the level of debt may have held back use of expansionary fiscal policy, even though the empirical and theoretical arguments for the effects of public debt on growth are weak. The estimates of 'the multiplier' are generally positive, but the range and the interpretation of the estimates can reduce their value for use in the formulation of fiscal policy. The usefulness of the notion of 'structural budget' has been questioned, and its problematic nature noted.

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# Inequality and the Need for Relevant Policies

## Ahmad Seyf

**Abstract**  It is difficult to deny that there is a great and widening income and wealth divide in the global capitalist economies. This chapter investigates if this divide has widened since the global financial crisis of 2007–2008. With the further development of a rentier capitalism, the super rich and big corporations, have learned how to hide their wealth and even in some cases, their income. This chapter discusses the scale of tax evasion and tax avoidance, and evaluate their impacts on state's tax base. Proposals for tax reforms will be discussed. Given the scale of tax evasion and avoidance, for progressive taxation to be effective in reducing the gap, other measures may be needed and will be discussed. This chapter also discusses how this higher revenue should be spent in order to narrow income and wealth divide. As a case in point, education is highlighted.

**Keywords**  Great Recession • Inequality • Rentier capitalism • Tax evasion • Tax avoidance

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# 1    Introduction[1]

It is difficult to deny that there is a great and widening divide in the global capitalist economies; a divide between the very richest, the top 1 per cent, and the rest. Not only is the 1 per cent's share high, but it seems to be rising even after the global crisis of 2008. In 2010, 388 individuals had the same wealth as the bottom half of global population i.e. about 3.6 billion, but in 2015, this number is just 62 (Oxfam 2016). In 2017, the number is further down to only 8, i.e. "Eight men now own the same amount of wealth as the poorest half of the world" (Oxfam 2017, p. 2). The wealth of the top 1 per cent has risen by 45 per cent since 2010, whereas the wealth owned by the bottom half of humanity has fallen by 1 trillion dollars during the same period (Oxfam 2016). During these years, the global economy was growing, but not only was there no trickle down, if anything, wealth trickled up and an elaborate system of tax haven and secret jurisdiction have been created and expanded to ensure that wealth stays there (Oxfam (America) 2016). In this chapter, further exploration of some of these points is offered. First, to shed some lights on this growing inequality; and second, to see what could be done to reduce its social and economic impact. It is argued that next to climate change, this rising inequality is the most serious and dangerous challenge that the world faces.

It is broadly true that inequality per se is not a new phenomenon under capitalism. What is perhaps new is its worrying growth in the last four decades. In the rest of this chapter some of the underlying factors are explored. First, alternative narratives are evaluated, which are available as to what has happened since the 2008 meltdown. This section is followed by an examination of factors that have produced the existing level of inequality. The potential implications of this finding are examined and this leads to the discussion of policy implications. Given the changes that have taken place, it is argued that conventional economic theories, such as progressive taxation or a conventional wealth tax, as proposed by Picketty (2014) and Zucman (2015a, b), would not be effective in reducing this growing inequality. A serious re-examination of the way in which the global economy is managed is required in order to reduce this trend and to ensure a respectable levels of overall stability.

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## 2     Inequality Since 2008

While there seems to be a general consensus that inequality of income and wealth has increased in the last four decades, views on the post-2008 situation seem to differ. On the one hand, Saez (2013) and Stiglitz (2015, p. 120) claimed that 95 per cent of growth since 2008 went to the top 1 per cent. Rose (2015, p. 1) on the other hand, argues that the 'fact' "that income inequality grew during the Obama Administration is a statistical gimmick". He further claims that "the income group that saw the largest loss of income from 2007 to 2012 in Piketty's own data was the so-called 1 percent" (Rose, op. cit., p. 1). The policy implications of Rose's assertions are significant; he argues that "policymakers should ignore calls to abandon a robust economic growth strategy that includes a strong focus on technological innovation, digital transformation, and other key driver of productivity growth" (Rose 2015, p. 2). Rose (2015) questions the data used by Saez (2013) and relying heavily on a report by Congressional Budget Office concludes that it was not 91 per cent of economic growth between 1979 and 2007 that went to the wealthiest 10 per cent, it was "47 percent of growth of after-tax income" (p. 7) which is still significant. However, Congressional Budget Office (2016, 4) points out that the top 1 per cent inflation adjusted after tax income grew at an average rate of about 3 per cent per year, making that income 192 per cent higher in 2013 than it was in 1979 for those households. The household in the bottom quintile experienced an average growth of about 1 per cent over the same period, making their income 46 per cent higher in 2013 than it was in 1979. Cynmon and Fazzari (2014) have shown that in the last 15 years, on two occasions, the share of income going to the top 5 per cent in the USA declined. The first time was after the end of the dot.com bubble in 2001, and the second case followed the great financial meltdown of 2007–2008. Cynmon and Fazzari (2014, 6) study also shows that on both occasions, the income share going to the top 5 per cent recovered quickly and in the first case, it went up even higher by 2005–2006. The share of income going to the top 5 per cent recovered during the Great Recession too as it is discussed below. Sommeiller et al. (2016) studying the situation in the USA share the view that despite a fall in income inequality immediately after the financial crisis, the rising trend resumed and pointed out

that in the post-Great Recession era, "in 24 states, the top 1 percent captured at least half of all income growth between 2009 and 2013, and in 15 of those states, the top 1 percent captured all income growth. In another 10 states, top 1 percent income grew in the double digits, while bottom 99 percent incomes fell" (p. 2). Taking the USA as a whole, in their view, the top 1 per cent captured 85.1 per cent of total income growth between 2009 and 2013. This observation refutes the point made by Rose (2015).

In the UK, a similar pattern is seen, but in other economies, the situation is slightly different. The Financial Times (12 December, 2016) reported that in the UK "it is increasingly common for those in poverty to be working, rather than jobless or retired". In the same article, it is further claimed that "since 2008 inequality has declined because high income households were hit harder by failing earnings and asset returns during the recession". At least among the 'poorest' 95 per cent of the population, "income inequality is no higher now than it was 25 years ago" the article continues. McGuinness (2016, p. 9) points out that the Gini coefficient for the UK for 2014–2015 is about the same as the previous year, but it is lower than immediately before the economic downturn in 2008, but it will be higher based on income after housing costs. It is further stated that in terms of income shares, the top 20 per cent of the population enjoyed 42 per cent of total disposable income (before housing costs) while the share of the bottom 20 per cent was only 8 per cent. However, McGuinness (op. cit., p. 17) concludes that "after 2015/16 income inequality is projected to increase". This point is confirmed by the Institute of Fiscal Studies in their paper on income inequality in the UK. IFS (2014, p. 4) states 'there is good reason to think that the falls in income inequality since 2007–08 are currently being reversed' and they refer to direct tax and benefit reforms introduced between April 2013 and April 2015 as the main drivers of the expected changes (ibid., p. 54).

World Bank (2016) still holds a view on the positive impacts of income inequality, a view that lacks empirical support, but given its influence on policy makers could very easily be utilised to implement policies that would make the current situation worse. In this study, World Bank argues that "some level of inequality is desirable to maintain an appropriate incentive structure in the economy" or, "simply because inequality also reflects different levels of talents and effort among individuals". This may be true in relation to earned income inequality, but, unearned income is

essentially linked with power and ownership of assets and has nothing to do with talents. This report by the World Bank tackles many issues related to the inequality, but its approach suffers from a serious shortcoming. The report states that "inequality exists in many dimensions and the question "inequality of what" is essential". The report, however, focuses on inequalities in income or consumption expenditure, but "it does not address all types of inequality, for example, inequality related to ownership of assets" (p. 3). While this report rightly points out that "income inequality and unequal opportunities are intimately related", how is it that a similar link between income and wealth inequalities is not likewise emphasised?

Zucman (2015a, p. 1) observed the concentration of capital income is much greater than the concentration of labour income. He adds that the top 1 per cent enjoy about 40 per cent of capital income flows. Around the same time, the New Economic Foundation (2014, p. 3) published a report, which in contrast to the World Bank seems to have a more robust approach to inequality by stating "barely constrained expansion of credit and the consequent relentless rise in asset prices have concentrated wealth in fewer hands". The report continues this is "self-reinforcing because increasing wealth accrues both higher income returns and greater political power" (ibid.).

In relation to the situation in the USA, Mian and Sufi (2014, pp. 19–25) have shown how the early decline in the net-worth inequality immediately after the financial crisis came to an end and indeed, was reversed. In their examination, a household's net worth is composed of two types of assets; financial assets and housing assets. The net worth of a household is the sum of these two types of assets minus any debt. It is important to look at the position of various deciles in relation to net worth and especially the types of assets that they own. The two poorest deciles in the USA have a very high debt level, about 80 per cent and little or no financial assets. In fact, 80 per cent of their assets were represented by housing assets which were heavily leveraged. On the other hand, at the beginning of the recession, the two richest deciles differed in two important ways. First, they had a lot less debt on their housing assets when the recession began, only 7 per cent, compared with 80 per cent for the two poorest deciles. Second and more significant, their net worth was mainly in the form of non-housing assets. Between 2006 and 2009, house prices in the USA declined by nearly 30 per cent on average and the house price had barely moved even by the end of 2012, i.e. almost no recovery.

Considering the leverage multiplier, such a decline in house price leads to a larger decline in net worth of the poorer families with a high leverage ratio. Given that the poorest 20 per cent of the population hold a 20 per cent equity, when there is a 30 per cent fall in house prices, not only does it wipe out the entire net worth of these families but leaves them in negative equity situation.

Mian and Sufi (2014, p. 25) single out high household debt as the main contributing factor, leading to greater inequality and point out that in 2007, the top 10 per cent of net worth distribution had 71 per cent of the wealth in the economy and this was up from 66 per cent in 1992. By 2010 the share of the top 10 per cent rose to 74 per cent. It is true that share price fell sharply in 2008 and 2009, but stock and other financial assets' prices rebounded very strongly after 2009, bond prices up by more than 30 per cent between 2007 and 2012. For the two richest deciles, there was a decline in their net worth too, but the decline was less than 10 per cent. Mian and Sufi (2014, p. 23) conclude by observing that "high debt in combination with the dramatic decline in house prices increased the already large gap between the rich and poor in the United States". Stiglitz (2015, 88) confirming this development in the USA pointed out "while the top 1 percent have seen their incomes rise 18 percent over the past decade, those in the middle have actually seen their income fall". There may be many reasons for this growing inequality, but one possible reason for this was a mistaken view about economics that argued what matters, is not how the national pie is divided but the size of the pie. Hudson (2015, p. 18) is also quite clear about the pattern of inequality in the US. He points out that the "wealthiest one percent has captured nearly all the growth in income since the 2008 crash". Blecker (2016, 6) points out that from 2007 to 2013 "only the top 5 percent had any positive gains whatsoever, all other quintiles lost, and the lower the quintile, the greater were the income losses". Likewise, Cynamon and Fazzari (2015) found that the current level of household demand is more than 17 per cent lower than its pre-recession trend. They argue that in the pre-recession years, the impact of rising inequality and stagnant wages were compensated by borrowing and this is not feasible now, hence, the only way out, in their view, is wage growth across the board. Carney (2016) could not have been more frank and forthcoming,

"when the financial crisis hit, the world's largest banks were shown to be operating in a 'heads-I-win- tails-you-loose' bubble, widespread rigging of some core markets was exposed; the masters of the universe became minions" and went on to claim that "to put it mildly, the performance of the advanced economies over the past ten years has been consistently disappointing". Related to the drag on demand, Carney spells out while in the advanced economies current level of activity is around 13 per cent lower than the pre-crisis trend, "in the UK, the shortfall, at 16 percent is even worse. Over the past decade real earnings have grown at the slowest rate since the mid-19th century" (For US please see, US Congress Joint Economic Committee, 2010).

This said, however, in major capitalist economies it was generally true that the poorer households shared the following features:

– High leverage.
– High exposure to housing.
– Little or no financial wealth.

It is this combination, which contributed to very low net worth, which proved disastrous and contributed to the growing inequality.

China offers an interesting case. In China the income of all social groups increased, but the rich enjoyed a bigger increase, hence, inequality in China, as elsewhere grew. The difference, however, is that in China a serious decline in poverty rate emerged (Naughton 2017). For instance, in the period leading to the Great Recession, 2002–2007, the income of the bottom two deciles increased by 46 per cent, whereas the income of the top two deciles almost doubled and increased by 94 per cent (Sicular 2013, 2). Brazil on the other hand, offers a further twist in this issue. For the period between 2001 and 2009, robust growth in the incomes of the poor combined with slow growth in income for the rich indicates that inequality has indeed declined (Sicular 2013, 3).

To sum up, while Rose's (2015) observation as to the immediate impact of the financial crisis is supported by evidence, his overall generalisation of the trend is rather misplaced and is refuted by evidence. Additionally, whatever the disagreement on the scale of inequality and its changes during the last decade, calling the post Great Recession economic approach 'a robust economic growth strategy' as Rose (op. cit.) does, is highly questionable.

# 3    Why Is There So Much Inequality?

The fact that there were rich and poor people in human societies was well known and was perhaps as old as history itself. But in the last hundred years, there seems to have been at least two periods when inequality increased. The first was the Gilded Age which ended in the Great Crash of 1929. During this period, 1865–1929, in the USA, inequality grew sharply but wages on average rose as well (see Wisman 2013 and Butchart 1997 for a general discussion). Galbraith (2009, 194) calls this "the bad distribution of income" when the five per cent of the population received approximately 'one-third' of all personal income. Standing (2016, p. 16), calls the current situation as a second Gilded Age, roughly post 1980, but compared with the first, there is a big difference. During the second Gilded Age, not only has inequality grown sharply but wages on average have stagnated or fallen. For the UK, Haldane (2014, 4) observed that "Growth in real wages has been negative for all bar three of the past 74 months". Furthermore, in view of the extensive use of financial austerity, not only child poverty and inequality are likely to increase, but those relying on state benefits have fallen further behind. As a result, for instance, in the UK, the number of people who are dependent on the food bank increased nearly sharply in the last 8 years since the great financial crisis, from 25,899 people in 2008–2009 to 1,109,309 people in 2015–2016 (The Trussell Trust 2016). A similar development has taken place in the US, the number of people dependent on food stamps programme has shown a sharply rising pattern too. In April 2008, 28 million Americans used food stamps, but in October 2015, the number reached 45.4 millions, a rise of more than 62 per cent, roughly one-seventh of the population in that country received this emergency food aid (Bjerga 2016).

## 3.1    Dimensions of Inequality

There are many dimensions to inequality. IMF (2014) classifies 'economic inequality' into four groups:

– Inequality of income
– Inequality of wealth

– Lifetime inequality
– Inequality of opportunity

Even in the case of income, we must distinguish between income before and after tax as the main focus usually is on inequality in disposable incomes (after benefits and direct taxes). Another issue is whether inequality is assessed on an individual basis or a household basis. If we wish to assess the post-tax income, we should also include indirect taxes in our calculation too. This is especially important as in the last four decades, the structure of taxation has changed in favour of indirect taxation. Furthermore, most countries have gone for financial austerity too, which has shown to adversely affect the poorer section of the community. The IMF (2014, 11) found "the Gini coefficient of wealth in a sample of 26 advanced and developing economies in the early 2000s was 0.68, compared to a Gini of 0.36 for disposable income". It is to be noted that the USA has one of the highest Gini coefficients of wealth at 0.84 among the advanced capitalist economies. Another issue worth mentioning is that in advanced economies, between 70 per cent and 90 per cent of total household gross wealth was in the form of non-financial assets, primarily housing (IMF 2014, 12). This study also confirms "Financial wealth is generally more unequally distributed than real estate: for example … the Gini coefficient for financial wealth (on average 0.8 for a group of seven advanced countries) exceeds that for non-financial wealth (0.63)" (p. 13).[2] Whatever dimension of inequality we look into, there seems to be a general consensus that it has increased drastically in the last four decades (IMF 2014; Stiglitz 2013, 2015; Lee 2014; Mian and Sufi 2014; Hudson 2015; Hacker and Pierson 2010; Ostry et al. 2014; Treeck and Sturn 2012; Dabla-Norris et al. 2015). Several factors have been suggested as the main drivers of this growing inequality. Lee (2014), for instance argues that several elements of globalisation contributed to the growth of inequality worldwide. However, he distinguishes between factors causing more inequality in advanced economies from those that produce similar results in the developing countries. In the case of advanced economies, he argues that the growth of outsourcing and a rapid increase in foreign direct investment outflows and expansion

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[2] These countries are the USA, the UK, Japan, Italy, Canada, Finland and Sweden.

of trade in intermediate goods contributed to this growing divide. In the case of developing countries, the channels are different. One main factor, according to Lee (op. cit), is the difference in their initial endowment; but more significantly, these economies are more seriously and detrimentally affected by financial instability. The impact of technology on inequality in the developing countries has been emphasised too. It is argued here that technology is not necessarily destroying jobs, but it is surely helping to destroy old income distribution system creating a rental wedge between profit, which is growing, and wages that are falling and become more uncertain. In this view, technology is contributing to greater inequality by making it easier for firms to restructure, or to offshore and outsource with the sole objective of cost minimisation. Related to technology, it is also discussed that labour saving technologies have reduced the demand for labour, not only for semi-skilled or un-skilled, but all kinds of labour.

While it is true that some of the views discussed above are in agreement with our contribution, it will be argued that in order to understand the mechanisms leading to greater inequality, we need to examine both economic and political factors that were combined to bring about this situation. One factor that should be examined is the changing of power relationship in the economy, and more specifically, the weakening of organised labour in most countries. Whatever the scale of the inequality, it has to be created, or an environment in which greater inequality could flourish should be generated. In the process of creating this environment, a number of developments could be observed.

## 3.2    Structural Factors

At an intellectual level, the meaning of 'free market' has been slanted to fit the requirements of new rentier classes to accumulate a growing share of the national income. As Stiglitz (2013, p. 47) points out, winning in the game of rent seeking has made fortunes for many of those at the top, but "it is not the only means by which they obtain and preserve their wealth". The tax system has also been adjusted and through their political

influence designed a tax system enabling them to pay less than their fair share (see also Hacker and Pierson 2010). This said, however, it is not intended to get into a detailed historical debate about what earlier political economists meant by a 'free market' and what in the last century has been primarily offered instead. Suffice it to say that for them, a market was free if it was free from rent to hereditary landlord class and from interest and monopoly rent paid to private owners.

A free market, according to Smith (2007, Book 1, chapters 5, 7), was a market in which people would be rewarded for their labour and enterprise. To him, receiving income without making a positive contribution to production of use value, was unproductive or rentier income. In the last 40 years, if not longer, a 'free market' has been defined as a market 'free' for rentiers, that is free from state regulations and taxation of unearned rentier income.[3] As we argue later, various mechanisms have been created to enable the rich to avoid and evade payment of taxes. While the share of income going to the rich kept rising, the portion taken away as taxes, was declining, hence, the growing inequality. As Hudson (2012, 3) points out, since the late 1970s in the USA, despite the steady increase in productivity, prices did not fall for the consumers, nor have the real wages increased for most workers. Likewise, most of the economic gains have been enjoyed by the finance, insurance and real estate (FIRE) sector, at the top of which stood high finance. It is not so much of a problem that industrial capitalism has been transformed into financial capitalism; it is the nature of this financial capitalism which is at the centre of most of our problems. This emerging system developed further into an evolutionary family of offshoots: pension fund capitalism, the bubble economy, debt deflation, and austerity. The way things are evolving, aided by the neo-liberal economics community, the construction of global framework of institutions and regulations enabling the elite to maximise their rental income. Not only will that be anything but a 'free market', but Hudson (2012) may be right in calling this emerging economic system neofeudalism.

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[3] When Friedman (1975) claims that 'there is no such thing as a free lunch', that means there are no parasites taking without giving an equivalent value in return, i.e. no private sector parasites.

## 3.3    Competitive Advantage Versus Comparative Advantage

Another shift that contributed to growing inequality is related to international trade and transactions.

For Smith (2007, Book 3, chapter 1) and Ricardo (2001, chapter 7) the basis for international trade was absolute and comparative advantages respectively. If economies specialise according to these advantages, and then enter into international exchange with minimum state intervention, the global welfare would improve. For this to be true, in the Classical sense, it was essential that capital and technology would not cross borders, and mainly goods would be involved in international transactions. Under globalisation and all the rules and regulation changes, though, this main assumption is violated. When capital mobility in entered into the equation, the outcome would be different. In the last four decades, neoliberal narrative was dominant, and neoliberalism, as the main school of thought behind this shift, is obsessed with competition. Free trade under this condition, i.e. with capital and technology mobility, will produce at least, two adverse outcomes: Export of jobs from less efficient producing countries. Just to name two examples. Standing (2016, 14) reports that between 2008 and 2015, the USA lost over 6 million manufacturing jobs. Roberts (2011) gives more details of this process of jobs offshoring. Citing from an official report, Roberts (op. cit) points out that between 2001 and 2011, the USA lost 54,621 factories and manufacturing employment fell by 5 million employees. In this case, the 'recovery' of overall level of employment in the USA and other advanced economies is irrelevant as higher paid jobs have been replaced by jobs paying a lot less.

In the UK, the pattern is the same, between 2001 and 2011, nearly 1.3 million jobs, one-third of total, were lost in the manufacturing sector, and since then, only 120,000 of them were recovered (Berry 2016). It should be pointed out that the job losses in the manufacturing sector since 2008 were less than 400,000 (Ellis 2016). It is, however, claimed that the employment in the UK is at record high, but this view ignores some relevant details in the official data. Roberts (2013) points out that if part-time workers who cannot get full time jobs are added, and those who are in temporary positions as permanent work is not available, and

further, add discouraged workers, those who left the labour force alto-gether, the UK under-employment rate will jump to 21 per cent, much higher than the 15.8 per cent at the beginning of the Great Recession. Since then, the number of part-time jobs went up by 400,000, temporary posts up by 100,000, and youth unemployment up by 277,000, and the average real wage suffered the largest decline since the 1920s (op. cit.).

## 3.4     A Race to the Bottom

Under neo-liberal narrative, an economy could only develop if it had competitive advantages over its rivals. As comparative advantages are being replaced by competitive advantages, the view now is that all econo-mies had to be better at producing the same things. Under neo-liberal globalisation, the engine of international transactions is not comparative advantages as Ricardo (op. cit.) would have argued, but capital mobility and for this reason, the result will be different. As it has already been noted, there will be substantial job relocation. Under this situation, assume that the US government offers subsidies for research and develop-ment. Even when this policy is effective, and new methods of production are discovered, so long as there is capital mobility, these methods would not necessarily stay in the USA, but would go offshore to places where wages and other costs are lowest. It is true, that American households, as consumers, may buy cheaper goods; but, the same American households, as workers, may lose their jobs and there may also be growing interna-tional financial imbalances. It is in this context, that we witness a grow-ing competition among many capitalist states to attract foreign capital. In addition, to the creation of another avenue for the rich and super rich, i.e. owners of capital, to have more rental income in the shape of 'financial and fiscal incentives' such as grants and subsidised loans, other measures may be undertaken:

– Downward pressure on real wages in advanced capitalist economies.
– Lowering the standards for environmental protection.
– Perpetuating the so-called 'currency war' to remain internationally competitive.
– Last but not least, lowering corporation taxes.

Growing global competition with no minimum global standards of behaviour will manifest itself in the form of a race to the bottom. Under this situation, the lower the real wages and other payments, including welfare payments, the more attractive that economy will be for foreign capital.

In view of free capital mobility, the wage differential becomes a major determinant of where to invest. According to the US Bureau of Labour Statistics, as of 2009, average hourly take-home pay for US workers was $33.53. In China, in 2008, the averages hourly labour cost was $1.36 and in India or Vietnam, it was even less (Roberts 2011). Consider an American corporation decides to outsource 10,000 such jobs to China or India. For every hour of work, the corporation would save $320,000 in labour costs. How this saving affect the work of the corporation is not of any concern here, however, unless those American workers, whose jobs have been outsourced, are able to return to work with similarly rewarding jobs, this kind of outsourcing would have obvious distributional implications.

Not only does the growth of outsourcing endanger job opportunities in the advanced economies, but it also exerts greater pressure on the wages of those who remain employed in these countries. Corporations could potentially use this possibility to refuse wage demand by their workers and this brings another aspect of the problem to view; namely the dual nature of wages under a capitalist economic system. As a component of cost of production, the lower the wages the better for the capitalist system, but at the same time, for most people, this is the main source of their income, and lower income will have clear impact on aggregate demand. Cheap and growing credit may be a short-term solution for this problem, but, we now know, especially after the debacle of 2008; what would debt-financed consumption produce.

It is not said directly—despite the fact that institutions have been set up with the stated aim of attracting foreign capital—but the main preoccupation of policy makers across the capitalist world has become finding ways to attract and retain foreign capital, leading to the creation of new form of rent being paid to the super rich, i.e. subsidies to foreign investors. Trying to boost exports and to limit imports is a clear indication that old mercantilism is revitalised under a new disguise. This development

has also been used as a political justification for cutting direst taxes, especially on capital and on corporation. Post-Second World War, progressive taxation has been gradually replaced by a regressive system (Stiglitz 2013, p. 47). There has been a shift in tax burden from direct to indirect taxation which applies to all irrespective of their levels of income (Fisher 2014, 44–45). However, what do these changes mean in the real world?

Specialisation as discussed by Smith (2007, book 1) and Ricardo (2001, chaps 7, 25) is old-fashioned. What is suggested now is to be 'competitive' which in turn, means to have lower costs of production. It is true that it does not necessarily mean lower wages, but lower wages and lower other benefits will surely help. It is, indeed, not accidental that in the UK and the USA, trade union bashing has become part of the policies of the state under Thatcher (UK) and Reagan (USA). Since the 1980s, labour share of national income was shrinking in most economies, and this is despite the fact that labour productivity has risen during these years. In the USA, the labour share was 53 per cent in 1970, but by 2012, it dropped to 43.5 per cent. In China, the drop was more than 20 per cent and there was a sharp fall in South Korea too (Standing 2016, p. 20). In Germany, average wages were lower in 2015 than in 1990, although national income per person had risen by nearly 30 per cent (ibid., 22). To see the impact more clearly, between 1973 and 2007, "a period of rising national income, average real wages in the USA fell by 4.4 percent. By contrast, between 1947 and 1973,…. Real wages grew by 75 per cent" (ibid., p. 21).

– Lower production costs are expected to lead to greater profitability.
– Lower taxation for the owners of capital to encourage them to stay and not to take their capital out to a more friendly environment so to speak.

This is how a race to the bottom has begun. In the race that ensued, the main economic game in town has become how to attract and maintain foreign investment and how to make labour market more flexible. What flexibility is meant here is indeed a "political code language for jobs in which pay can fall as well as rise and in which there is little security" (Sayer 2016, p. 17). This in turn has been used to justify cutting direct taxes, especially on capital and offering attractive subsidies to investors.

**Table 1** Tax paid as per cent of gross income: UK

| Year | Poorest 10% | Middle 10% | Richest 10% |
|---|---|---|---|
| 1979- Thatcher come to power | 35 | 38 | 37 |
| 1990- End of Thatcher, John Major | 47 | 37 | 32 |
| 1997- End of Major, Tony Blair | 44 | 36 | 34 |
| 2010- David Cameron | 43 | 31 | 33 |

Source: Fisher (2014, pp. 44–45)

When this happens, there are two options open to state with declining taxation income. Either, impose austerity by cutting social and other productive expenditure, or to transfer the tax burden on the rest of the community. Table 1 above illustrates the point about tax changes in the UK since 1979.

Since 1979, while the richest 10 per cent pays 4 per cent less of their income in tax, the effective tax rate paid by the poorest 10 per cent rose by 8 per cent during the same period. If we also consider the vastly different income growth of these two deciles, i.e. the richest 10 per cent enjoyed a much higher growth, the growing divide is for anyone to see. Being paid more and paying less tax, obviously more will be left in the pockets of those who are being paid more. The above table, however, does not tell the full story. In 1979, the tax burden for the poorest 10 per cent was made up of 14 per cent direct taxation and 21 per cent indirect tax; for the richest 10 per cent, it was 23 per cent and 14 per cent respectively. However, when we look at the situation in 2010, the 43 per cent, tax burden for the poorest 10 per cent is made up of 12 per cent direct taxation and 31 per cent indirect tax, whereas the richest 10 per cent, paid 25 per cent direct tax, and only 8 per cent indirect taxes (Fisher 2014, pp. 44–45).

## 3.5   Further Distortions

Related to the spin introduced in relation to the notion of 'free market', the deformation went further. It is common sense that in a morally fair market people would be rewarded for their labour and enterprise and would not receive income without making a positive contribution

to production. In such a market, any income that does not meet this condition is 'unearned income'. However, when it is assumed that everyone receives income in proportion to the contribution they make to production, then, this will deny the fact that economic rent is unearned and should be treated differently as advised by Smith (2007, Book 1, chapter 11), Mill (2009, Book 4, chapter 2) and other political economists of the past. This distortion has not only contributed significantly to this growing divide, but has made our economic system less efficient and more wasteful. For any income to become 'earned', it should be linked with the production of goods and services, i.e. production of use value. In fact, there are two conditions that are essential for making any income 'earned'; one, it is work based, and two, what they produce and deliver have use value. Given this definition of earned income, it is clear that any income that does not meet these conditions will have to be classified as 'unearned'. Unearned income not being linked with production must necessarily be a transfer.

On the face of it there is nothing morally wrong with transfer. But we have two types of transfers, one transfer is based on needs and the other based on power and it is the latter which is problematic. Children, the elderly and the sick and those unable to do paid work may get this type of unearned income which may be provided by families or by the state. But unearned income could also be extracted by those who control an already existing asset, that could be land, or building or equipment that others need or want and therefore would be charged for their use. The beneficiaries of extracted unearned income can get it irrespective of the fact whether they are capable of working and consequently earning an income. This would be better called 'extracted', as it usually is extracted by those who control an already existing asset, such as land or a building or equipment that others lack but need or want and who can therefore be charged for its use. Extracted unearned income is a reflection of power based on unequal ownership and control of key assets. In short, we have:

Income: ⟶ Earned ⟶ Work based ⟶ producing use values

⟶ Unearned ⟶ Transfer ⟶ Need based

⟶ Extracted ⟶ Power based
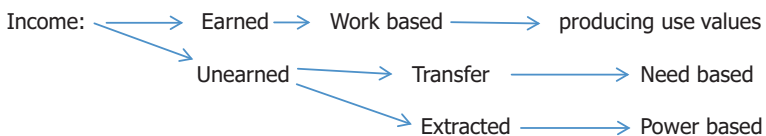
## 3.6     Mechanisms of Rent Extraction

There are several mechanisms for rent extraction. The oldest form of this mechanism is land rent. The origin of land rent is unequal private property of land. If land is owned by a minority, as everybody needs land to live on and the supply of land is primarily fixed, the landowners can charge others rent for the right to use their land. Given that the land is not produced by human labour and is already there, hence, the payment of rent should not be seen as payment for the creation of something useful and there is no direct or indirect costs of production either. It is possible that occasionally some landlords may undertake activities to improve the land. In this case, part of the rent may become earned income. In most cases, however, this may not be the case. However land values, and with them rents tend to rise over time. The main reason being as cities develop and expand and more efficient infrastructures are added, this important part of extracted unearned income rises. It is clear then, that rent extraction is *par excellence*; an example of taking without producing. But how can it be possible for someone to live without producing anything? If the rentiers are consuming goods and services in vast quantities without contributing to their production, then; who is producing them? There is only one possible answer to these questions. For it to be possible for some to consume without contributing to their production, there must be others who produce more than what they consume. Undoubtedly producers are getting a wage or salary, but it must be true that part of their labour must remain unpaid. It follows from this, human societies must be better off if there are fewer people who are free riding on the labour of others. The ability to extract unearned income is not limited to land ownership. Monopolies and bankers do the same. It is in this context, that from mid nineteenth century Europeans tried to free their economies from landlords, monopolies and the banks. If the rentiers cannot be eliminated, they should be heavily taxed. For the last four decades, if not longer, this whole issue has been turned upside down. Rentiers of different description enjoyed a free ride. It is conjectured here that Mill (2009) was referring to this phenomenon when he wrote "suppose that there is a kind of income which constantly tends to increase, without any exertion or sacrifice on the part of the owners: those owners

constituting a class in the community whom the natural course of things progressively enriches consistently with complete passiveness on their own part". He then continues "in such a case it would be no violation of the principles on which private property is grounded, if the state should appropriate this increase in wealth, or part of it, as it arises" (p. 629). What the state can do with this is clear, it is not a manifestation of taking anything from anybody; Mill (op. cit.) adds, "it would merely be applying an accession of wealth, created by circumstances, to the benefit of society, instead of allowing it to become an unearned appendage to the riches of a particular class" (p. 630). He then moves to discuss rent, ground rent in some detail, but his argument can easily be extended to cover all kinds of rental incomes.

Speaking of the landlords, Mill (2009) argues that "they grow riches, as if it were, in their sleep, without working, risking or economizing. What claim have they, on the general principle of social justice, to this accession of riches? In what would they have been wronged if society had, from the beginning reserved the right of taxing the spontaneous increase of rent, to the highest amount required by financial exigencies" (p. 630). In fact, most of earlier political economists, Smith (2007, Book 1, chapter 11), Mill (2009, Book 4, chapter 2) and others believed that "it seemed obvious that the first thing that should be taxed was unearned income from rent" (Sayer 2016, p. 51); but how strange that most modern governments would rather tax earned income from labour and enterprise than extracted unearned income by the rentiers of different description. To mention one example in passing the recent UK government instead of implementing a 'mansion tax', i.e. taxing property owners and developers, are so keen about 'bedroom tax', i.e. taxes on low income people in state housing. Mendoza (2015, p. 59) looking at these issues offers some interesting insights. She points out that under the Attlee government and up to 1975, about 80 per cent of government spending on housing went on capital investment on the supply side, building and maintaining affordable home, but by 2000, 85 per cent of government spending on housing went on the demand side, as the housing shortage allowed private landlords to drive up rents. More recently, in 2015, about 50 per cent of housing benefits bill 'goes to private landlords'. It is also worth mentioning that Council House sale under Thatcher made

the situation a lot worse, as "more than a third of former council house now sit in the property portfolio of wealthy landlords" (Mendoza 2015, p. 59). But around the late nineteenth century the rentiers fought back and claimed that there was no such a thing as unearned income; no money making in their sleep, and they were 'productive'. The opposition to unearned income going scot-free is not limited to nineteenth-century political economists. Even after the counter-revolution by the neo-liberal economists who dismissed the difference between 'earned' and 'unearned' income and declared all income as earned, Keynes (1936, 164, p. 237) was also concerned about the rising income of the rentiers, dismissed them as "the functionless investor" and discussed what could be done "so that the functionless investor will no longer receive a bonus".

Discussing rental income, Keynes (op. cit.) was too optimistic, while postulating decreasing trend for the rate of interest, he went on to say that "this state of affairs would be quite compatible with some measure of individualism, yet it would mean the euthanasia of the rentier" and as a result "the euthanasia of the cumulative oppressive power of the capitalist to exploit the scarcity- value of capital" (p. 237). In his view, land rent is there because there may be intrinsic reasons for the scarcity of land; no such reasons are in existence in relation to capital. Keynes's (1936) defence of moderately high rate of interest is linked with "the necessity of providing a sufficient inducement to save" (p. 236). But there are two issues here. First, it is the scale of investment that determines the extent of effective saving and the scale of investment is indirectly linked with interest rate, i.e. low interest rate is believed to encourage investment. Second, it may have been true that at the time of writing the General Theory, there was a link between saving and the supply of loanable funds for productive investment, but in modern times, given the way in which financial sectors create money and credit out of the thin air, this link has been effectively broken (Jackson and Dyson 2012). Furthermore, two factors are working at the same time. First, the "demand for capital is strictly limited" and moreover, "it would not be difficult to increase the stock of capital up to a point where its marginal efficiency had fallen to a very low figure" (Keynes 1936, p. 237). Keynes' (op. cit.) optimism is rather excessive, as he goes on to say "I see, therefore, the rentier aspect of capitalism as a transitional phase which will disappear when it has done

its work" (p. 237). Eighty years later, not only have we not witnessed the euthanasia of the rentiers, as he put it, but as Stiglitz (2015, 98) observes "the financial industry, which now largely function as a market in speculation rather than a tool for promoting true economic productivity, is the rent-seeking sector par excellence" and adds "rent seeking redistributes money from those at the bottom to those at the top" (p. 99). As a mechanism for wealth extraction, rent-seeking is primarily directed towards getting a larger share of the pie rather than increasing its size. But let us discuss this mechanism further.

## 4     Rentier Capitalism *Par Excellence*

The term 'rent' was originally used, and still is, to describe what a landlord received for the use of a piece of her/his land, i.e. this is a return linked with ownership and not because of anything one actually does or produce. The term 'rent' was eventually extended to include other forms of unearned income, such as monopoly profits- again an extra returns linked with power of controlling the market, and most if not all the transactions in the financial sector. Before discussing the forming of the rentier capitalism in more details, we point out that the destructive nature of rent was well known in the literature. Discussing the effect of growing inequality on the propensity to consume for the community as a whole, Keynes (1936, 164) wrote that the propensity to consume is likely to decline, but "the effect of the transfer from entrepreneurs to rentiers is more open to doubt". But, "if rentiers represent on the whole the richer section of the community and those whose standard of life is least flexible, then the effect of this also will be unfavourable". In recent times, there were other changes in the working of our economic system. In relation to banking, as Fisher (2014, p. 7) puts it so eloquently "they lend out money that does not exist" and the banks "make cash out of thin air", then charge borrowers for the privilege of using it. This view on how money is created is supported by the Bank of England too (McLeay et al. 2014, see also, Jakab and Kumhof 2015). In addition, most of the lending is not for productive purpose. In the USA, for instance, about 80 per cent of new bank loans by 2007–2008 were real estate mortgage (Hudson 2015, p. 154) and

in the UK, the net bank lending to non-financial business in 2014 and 2015 was negative, to the tune of over £14 billion (Standing 2016, p. 36). Eighty years after Keynes (1936) declaring the 'euthanasia of the rentiers', the rentier is anything but dead. In fact, they are the main beneficiaries of the neo-liberal income distribution system. Keynes (op. cit.) could not have foreseen how the neo-liberal narrative of capitalism would allow powerful individuals and firms to 'create' scarcity of assets from which an increasing rental unearned income could be generated. In fact, this is one of the fundamental factors contributing to rising inequality that we witness in all countries. The problem with rent is exactly the same as the problem with growing debt, both create deflation. Before examining this issue further, we point out that in the modern era, mechanism for rent extraction comes in a variety of forms and shapes. We will briefly describe some of the most common mechanisms being used to extract rent.

Individuals or groups are allowed to take over firms, then saddle them with unbearable level of debt. In the process, top executives pay themselves huge bonuses and then declare bankruptcy. As it happened frequently in recent years, this is a kind of 'socialism for the rich', i.e. gains are privatised and then come socialising the losses of the private sector at the expense of ordinary tax payers.

Another method used for rent extraction is companies even by borrowing, given the low interest rates, use the proceeds to buy back their own shares with the sole purpose of forcing up the share prices. This in turn enables top executives to take windfall gains by selling their shares. In both of these cases, there will be no extra production, but, some would take a bigger share of the pie and others a smaller share. The question that begs an answer is simple. As Norris (2014) pointed out "Corporate profits are at their highest level in at least 85 years. Employee compensation is at the lowest level in 65 years"; why then American businesses are not investing and are sitting on $1.9 trillion cash? Davidson (2016) believes that "the notion that a corporation would hold on to so much of its profits seems economically absurd". He offers two reasons: first, corporations are traditionally borrowers not saves, and second, given the very low interest rate, they could earn more if they invest the surplus. But, why is this happening? Lazonick (2014) by focusing on the USA provides a partial answer to this question and points out that 449 companies in the S&P

500 index used 54 per cent of their earnings during 2003–2012, a total of \$2.4 trillion, to buy back their own stock. Dividends absorbed an additional 37 per cent of their earnings and that left very little for investments in productive capabilities or higher income for employees. We also know that too many companies have cut capital expenditure and even increased debt to boast dividends and increase share buybacks. Table 2 below shows this situation in a number of well-known US big corporations.

All these corporations spent more than their net income on these two components, i.e. repurchase and dividends. Why are they doing this? A simple answer is the stock-based instruments make up the majority of the managers' pay, and in the short term buybacks drive up stock prices. In 2012, the 500 highest paid executives in the USA received on average \$30.3 million per annum each, 42 per cent of their compensation came from stock option and 41 per cent from stock awards. What is important for our discussion here is the impact of this policy on income distribution, which would become more unequal as a result. This is part of what would be a deliberate policy to enhance asset-price inflation, and this kind of inflation is always beneficial to those who own these assets; in this case, company shares. In addition to the impact of this measure on the chief executives' pay, it also appears that there might have been a change in the management direction of these companies too. From the end of the Second World War until the late 1970s, 'retain and reinvest' approach to resource allocation prevailed at major US corporations. The end result of this approach was higher income for workers, greater job security hence sustainable prosperity for most people. Then came a different

**Table 2**  Buybacks in the USA (\$ billion), for the decade 2003–2012

| Company | Net income | Repurchase | Dividends | Total | % of net income |
|---|---|---|---|---|---|
| Microsoft | 148 | 114 | 71 | 185 | 125 |
| IBM | 117 | 107 | 23 | 130 | 111 |
| Cisco System | 64 | 75 | 2 | 77 | 121 |
| Procter & Gamble | 93 | 66 | 42 | 108 | 116 |
| HP | 41 | 64 | 9 | 73 | 177 |
| Intel | 79 | 60 | 27 | 87 | 109 |
| Pfizer | 84 | 59 | 63 | 122 | 146 |

Source: Lazonick (2014, p. 11)

approach, i.e. 'downsize and distribute' regime in resource allocation. This may have been brought about by greater competition that resulted from globalisation. What happened next, intensified by globalisation, was every attempt was made to reduce costs and hence, any freed up cash was used to repurchase shares or to pay to shareholders as dividend. In turn, this is in line with the emergence and further growth of rentier capitalism.

Overall, it seems that a process of value creation was replaced by a process of value extraction. The end result is employment instability and growing income and wealth inequality. Not to mention lower than historical trend growth rates. In fact, trillions of dollars that could have been spent on innovation and job creation in the world economy over the past four decades have instead been used to buy back shares for what is effectively stock price manipulation. Apart from personal greed, Wall Street was in the act too, putting pressure on decision makers to maximise returns to shareholders. This in turn led to an attempt to align the interests of management and shareholders by making stock-based pay a much bigger component of executive compensation. As a matter of fact, the main objective of firm has become to maximise shareholders value and combined with this, the Wall Street's expectation for ever higher quarterly earnings per share. This in turn added to the impetus of stock repurchase becoming top in the list of corporation's aims and objectives. The end result is the stock market would become not only inefficient but misleading as the stock prices are actually managed and manipulated by these activities. Buybacks often come at the expense of investment in productive capabilities and other projects for the enhancement of firm's specific advantages. Hence, while attractive in the short term, these buybacks are not certainly efficient for the long term interests of shareholders.

## 4.1    Rent Deflation

One effective mechanism for wealth transfer, from debtors to creditors, is deflation. The vicious circle of debt deflation is rather well known ever since the 1930s (Fisher 1933). Deflation becomes possible if firms try to lower their costs, among others things by reducing nominal wages. A cut in wages would be a serious blow to indebted households as their

debt burdens are fixed in nominal term. It is obvious that when an indebted household faces a wage cut while their debt service charges, remains the same, they are likely to cut spending even further and this would be counter-productive for firms collectively, as demand for their products fall. This process would lead to a vicious circle as can be seen in the chart below:
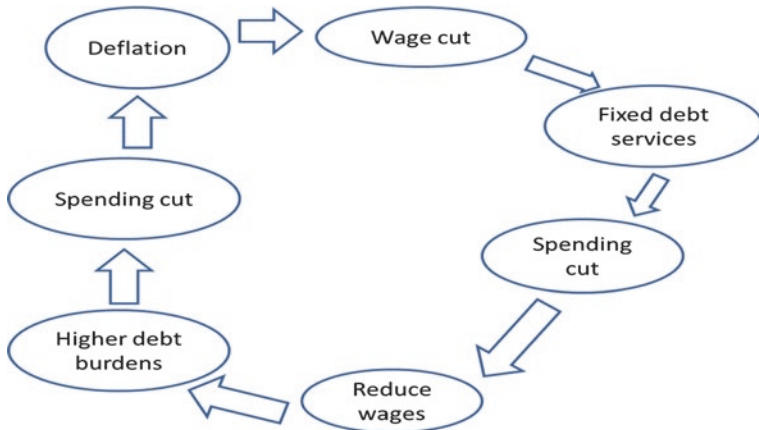


Source: Own construction, based on Hudson (2015)

In addition to the above, there is another source for deflation, i.e. rent deflation. Given the definition of rent, i.e. unearned income not linked with labour and production of use value, it is an extracted transfer payment from directly or indirectly productive sector to rent recipients who do not play a direct and active role in production. Their link is based on power and ownership of assets, which they can withhold. In a sense, rentiers come between producers and consumers. By extracting an increasingly bigger portion of earned income, this can deflate overall demand which in turn will enhance the impact of rent on profits. There is no doubt that lower profits would mean lower investment. Smith (2007, p. 655) argued that "both ground-rents and the ordinary rent of land are a species of revenue which the owner in many cases, enjoys without any care or attention of his own. Though a part of this revenue should be taken from him in order to defray the expenses of the state, no discouragement will

thereby be given to any sort of industry…Ground-rents and the ordinary rents of land are, therefore, perhaps, the species of revenue which can best bear to have a peculiar tax imposed upon them".

In more recent times, however, this 'peculiar tax' has been overlooked. It is clear that if rents and other unearned income are not taxed or not taxed sufficiently, the tax burden will be onto commerce and industry, eating up part of their profits, consequently harming capital accumulation and hence, depresses job creation. When the tax base is weakened, there will be several possibilities. It is likely that public sector's deficits will increase, hence, the interest charges payable on an increasing level of public debt will have to be financed via taxation. Alternatively, if debt financing is not undertaken, austerity will have to be imposed. Setting the pretence of modernity aside, the contemporary rentiers in the financial sector occupy a similar position that landowners did in feudal Europe. Increasingly debt service plays the same extractive role that land rent played in times past. There is a difference though. The landowners would spend their rental income into the economy for luxuries and new capital investment; but the current financial rentiers recycle most of their receipt of rent into new loans, or use to manipulate the price of their shares in the stock exchange. The end result is the same, less new goods or services would be produced, and there would be less investment in new skills. This behaviour tends to enhance the deflating impact of rent as this growing burden of debt is taking place without corresponding increase in output or living standards.

As indicated earlier, one major shift, which contributed to the growing inequality problem is the claim that 'all income is earned', and this soporific illusion distracts attention from how the rentiers of different description extract revenue without making a positive contribution to value creation, hence, leaving a smaller share of the national cake to the rest to share. What is particularly disturbing is that the same rentiers use their influence and power to change our tax system too. In recent decades when the regressive expenditure taxes were on the rise, taxes on capital gains and corporate profits showed a declining trend everywhere. There were further developments to encourage rentier capitalism to flourish. The classical concept of economic rent has gradually disappeared by calling finance, insurance and real estate 'industries'. Despite this, as Hudson

(2015, p. 20) points out, about 50 per cent of what the media report as 'industrial profits' are actually rent extracted by FIRE sector. The remaining parts of 'industrial profits' are not independent from rental income either if we consider monopoly and rents associated with patents and other privileges. In his study of the UK, Zucman (2015a, p. 1) pointed out that "the top 1 percent enjoys about 40 percent of capital income flows…. The concentration of capital income is much greater than the concentration of labour income". In addition, this unearned income enjoys tax benefits too; the non-domiciled residents who choose to be taxed on a remittance basis only pay taxes on the very low fraction of their income brought into the UK. In short, on dividends, interest and capital gains earned on their foreign stocks and bonds no taxes are paid if not transferred to a UK bank account. The borderline between profits and rents is deliberately blurred to ensure that rentiers will go on scot-free and parasitic nature of rents is effectively overlooked. On the other hand, if all income is earned and if as Mankiw (2013) claims the current income distribution system is based on marginal productivity theory, i.e. factors of production are rewarded according to their contribution in the value creation process, why have wages stagnated since the 1970s while productivity has soared and the gains were mostly extracted by banks and financiers? Mishel and Bivens (2015) have shown that between 1973 and 2014, the hourly real wages increased by 9.2 per cent while during the same period labour productivity rose by 72.2 per cent.

Hacker and Pierson (2010, 49) discussing the impact of tax policy on income distribution in the USA observe another anomaly. They point out "the top 0.1 percent had about 7.3 percent of total national after-tax income in 2000, up from 1.2 percent in 1970. If the effect of taxes on their income had remained what it was in 1970, they would have had about 4.5 percent of after-tax income". In their view, what we have in the USA is what they call 'winner take all economy' and in their view "the truth is that most people have missed the visible hand of government because they've been looking in the wrong place" (p. 71). In fact, in the USA, the discussion focused on minimum wage, or earned income tax credit, primarily what had been done to help the poor, whereas "the real story, however, is what our national political elites have done for those at the top, both through their actions and through their deliberate failure

to act" (op. cit., p. 71). Atkinson et al. (2013, 7) make a similar point by stating that top tax rate in France in 2010 was only 10 per cent points lower than in 1950, whereas the top tax rate in the USA was less than half its 1950 value. They provide evidence that a decline in top tax rate and a rise in the income share of the top one per cent is correlated in the USA and add that the USA experienced "a reduction of 47 percent points in its top income tax rate and a 10 percentage point increase in its top 1 percent pre-tax income share" (p. 8). It appears two reinforcing forces are in operation here. On the one hand, the pay gaps between different groups are enlarging significantly and second, the higher income groups with a much bigger pay cheque pay a smaller percentage in tax. Undoubtedly, the result of this mechanism is growing inequality that is witnessed. For the USA, Saez (2013, 1) pointed out that while the average real income per family grew by 6 per cent from 2009 to 2012, but the gains were very unevenly divided. The top 1 per cent incomes went up by 31.4 per cent whereas the growth of income for the bottom 99 per cent was only 0.4 per cent during this period. To put it differently, 95 per cent of income gains in the first three years of the recovery were captured by the top 1 per cent. Between 2009 and 2013 the average income of the top 1 per cent grew 17.4 per cent, about 25 times as much as the average income of the bottom 99 per cent, which grew 0.7 per cent (Sommeiller et al. 2016, 3). The average income of the bottom 99 per cent grew by 6.8 per cent between 2002 and 2007. But during the Great Recession, from 2007–2009, average real income of the bottom 99 per cent fell by 11.6 per cent. That means that the average real income of the bottom 99 per cent at the end of 2009 was less than what it was in 2002 (Saez 2016, p. 2).

## 4.2    Dominance of Financial Capital

Another factor contributing to the growing inequality in the advanced capitalist economies is what Standing (2016, 36) suggests as the disease, which manifests itself when financial capital dominates the whole economy. In the UK, "a process of deindustrialisation started from the 1960s" (Kitson and Michie 2014, p. 19); although it may have started

earlier. However, undoubtedly, it speeded up in the 1980s following the Big Bang, when the city was deregulated. Persistent over-valued currency combined with other measures implemented by Thatcher government accelerated deindustrialisation in the UK. Britain lost 25 per cent of its manufacturing industry during 1980–1984 (McNally 2011, p. 46).

Even in more recent times, it seems as if a very similar decline began in Canada, as 20 per cent of its manufacturing industry was lost since 2008 (Standing 2016, 36). In the case of the USA while profits and incomes rebounded in financial activities and the Wall Street seems to be doing fine, in the seven years after the financial crash 6 million industrial jobs were lost (ibid.). The half-serious recovery in the UK after 2010 was entirely due to rentier activities by FIRE sector. On the situation in the UK, Michell (2014) noted that "by late 2009, the volume of business investment had fallen by nearly a third and, despite a recovery during 2013, is still twenty per cent below pre-crisis levels". On the other hand, he adds "while in the autumn of 2012, consumer credit was contracting at a rate of around four per cent annually, one year later credit expansion had resumed, with positive credit growth of close to four per cent per annum". With this development in mind, it is worth mentioning that in the last four decades in most capitalist economies income from assets and wealth, mostly associated with the activities in the financial sector, has been taxed less than income from employment. In the UK, for instance, the basic income tax is 20 per cent, but, the capital gains tax was cut to 10 per cent in 2016 budget.[4] Clearly rising income from asset ownership and declining tax rate will lead to a growing income gap. On the other hand, there are delicate mechanisms to park money and wealth in tax havens, avoiding and evading the payment of an ever declining tax burden.

## 4.3 Illicit Financial Outflows

One factor contributing significantly to rising inequality, which requires special attention and is often overlooked, is the illicit financial outflows.

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[4] Available at: http://www.which.co.uk/money/tax/capital-gains-tax/guides/capital-gains-tax-allowances-and-rates, accessed 11 March 2017.

For the study of inequality, illicit outflows and tax havens create two problems. The wealth and income enjoyed by the world's rich are systematically underestimated and the assets and wealth parked offshore are not properly factored into an analysis of inequality. Second, primarily because of prevailing secrecy, the trend of rising inequality in many countries appear to be worse than what is measured by official data. It is a global problem, as we shall see, but its impact may be more serious in some countries than others. It is mostly undertaken by the rich and super rich or their agents. The prime aim of these activities appears to be to reduce the amount of taxes that will have to be paid. This is a very serious issue in developing countries as they already have a low tax base and the illicit financial outflows, intensifies the problem. Once again, a low tax base will inevitably lead to either financial austerity or growing debt. Kar and Spanjers (2015) pointed out that in the ten years leading to 2013, developing countries lost $7.8 trillion via these illicit outflows. The average annual illicit outflows from these countries increased from $465.3 billion in 2004 to $1090.1 billion in 2013. These financial resources are taken out of developing countries using the following mechanisms:

– Trade misinvoicing outflows
– Hot money narrow outflows

Out of every $5 taken out of these countries $4 are through trade misinvoicing and almost 40 per cent of all the illicit outflows are taken out of Asia. During 2004–2013, in seven out of ten years, the volume of illicit outflows was larger than the total foreign direct investment and total official development assistance. To see how these economies may be affected by these outflows, it is stated that "for every dollar of official development assistance that entered the developing world in 2012, ten dollars flowed out illicitly" (Kar and Spanjers 2015, viii). Trade misinvoicing takes place via re-invoicing and it is usually referred to as trade based money laundering.

An issue not sufficiently discussed in the academic literature is that most trade transactions have two routes, a real route and an artificial mostly offshore trade trail. The real route is the one that an item produced in country A is transported to country B and consumed by consumers there. But the artificial, primarily an accountants' paper trail is different.

Shaxson (2012, pp. 13–14) describes this paper trail by taking an example. Bananas produced in Honduras are exported to the UK. Following the advice offered by 'tax experts' the banana producing company run its purchasing network from, say, the Cayman Islands and further put a financial subsidiary in Luxembourg. The brand of the product may be parked in Ireland, its shipping subsidiary in the Isle of Man, some of its management expertise may be in Jersey and insurance arm is registered in Bermuda. What happens next is each member of this chain will charge other parts for the services they provide. Suppose the financial subsidiary lends money to the producing company in Honduras and charge $10 million per year interest for the loan. The producing firm subtract this $10 million dollars from its local profits, as interest charges are tax deductible, but Luxembourg being a tax haven pays no taxes on its income. Not only does a big chunk of the tax bill in Honduras disappears, but no one can tell whether this $10 million dollar is the real going rate. It may be just an accounting invention to evade payment of taxes. Using this practice is wide spread and trade partners often write their own trade document or, as mentioned above, a third party may be involved. According to Kar and Spanjers (2015, p. 1) "fraudulent manipulation of the price, quantity or quality of good or service on an invoice allows criminals, corrupt government officials and commercial tax evaders to shift vast amount of money across international borders quickly, easily and nearly always undetected". It is true that about two thirds of global cross border trade happens inside multinational corporations; and their ability to operate in multiple countries through numerous subsidiary companies enables them to manipulate their cost internally to avoid tax payments. Profits could be shifted to tax havens where tax rate is very low or even zero and costs are recorded where the tax rates are the highest.[5] During the period between 2004 and 2013, the illicit financial outflows for developing countries grew by 6.5 per cent annually whereas most of these economies did not grow by this rate during this period. Trade misinvoicing outflows happen in two ways:

– Import over invoicing
– Export under invoicing.

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[5] https://newint.org/books/reference/world-development/case-studies/avoidance-and-its-impacts/, accessed 31 January 2017.

The impact of these measures on corporate profits is obvious. For tax purposes, they understate corporate profits while a substantial sum is shifted abroad, namely to tax haven locations. Import over invoicing artificially raises impost costs while export under invoicing artificially lower corporate revenue; both have implications for tax purposes. As indicated above this is a very serious problem that does not receive the attention that it deserves in the literature. Between 2004 and 2013, except in 2006–2008, the average annual illicit financial outflows were greater than the total foreign direct investment and official development assistance combined (Kar and Spanjers 2015, viii, p. 15). For instance, in 2013, the total official development assistance was $99.3 billion whereas the total illicit financial outflows is estimated at $1.1 trillion, i.e. for every development-targeted dollar entering the developing world, over $10 dollar exited illicitly and this has held true since 2010. On average, for the period between 2004 and 2013, the average annual illicit financial outflows from developing countries was about 4 per cent of their GDP (Kar and Spanjers 2015, p. 23). The distributional impact of tax evasion is spelt out by Zucman (2015b, p. 2), "in the end the taxes that are evaded have to be compensated for by higher taxes on the law-abiding often middle-class households is the United States, Europe, and developing countries".

## 4.4    Tax Avoidance and Tax Evasion

The dividing line between tax avoidance (legal) and tax evasion (illegal) is really very thin but they have identical effects, lowering government revenue that must be borne by others in higher taxes or spending cuts. Especially following the 2008 Crisis and the subsequent financial deficits that many governments faced, effectively leading to the globalisation of austerity, these two issues have become the elephant in the room for policy makers and professional economists. Almost everybody is aware that this is happening at a massive scale, but little effective measure is taken to tackle this modern plague. IMF (2013, p. 4) admits that "tax avoidance by multinationals has emerged as a major risk to governments much needed revenue". This report further testifies that there is "extensive base erosion

and profit shifting and detachment of tax location from the location of business activity". The World Bank (2016, 42) is even more forceful and points out that "it is also about 50 percent of the tax revenue estimated to be annually lost through tax avoidance". Matthews (2016) provides the latest estimate for the US economy, by suggesting that according to estimate issued by the Internal Revenue Service "tax evasion is a pretty lucrative business, costing the federal government on average $458 billion per year between 2008 through 2010". The Tax Justice Network (2011) offers an estimate for the world economy at large, and says "it is estimated that total tax evasion of in excess of $3.1 trillion, or about 5.1 percent of world GDP, occurs as a result of the operation of the shadow economies found in every state in the world". In an update of the same issue by Henry (2012, 5) for the same Network, estimates get bigger and the numbers are more troublesome. Referring to global financial wealth, the report points out that "by our estimate, at least $21 to $32 trillion as of 2010- has been invested virtually tax-free through the world's still expanding black hole of more than 80 'offshore' secrecy jurisdictions". Henry (op. cit.) estimates that the developing countries "might be losing as much as $120–$160 billion per year in lost tax revenue on the interest and other income generated by all this unreported anonymous wealth-more than the entire global total of foreign aid from OECD countries" (ibid., p. 19).

As to the activities of global firms in tax havens, McIntyre et al. (2015, 1) have examined this issue and suggest that Fortune 500 companies are holding $2.1 trillion in accumulated profits offshore for tax purposes (see also CTJ, 2016). If the US government could reach this surplus and tax it according to the laws of the land, Fortune 500 "would collectively owe $620 billion in additional federal taxes" (p. 2). How do they do it, is of no concern here, but, the fact remains that the problems of these tax avoidance and tax evasions are so serious that there must be a collective action. There is a structural problem with our corporate tax system. It is primarily based on the idea that one can establish the profits earned by each multinational subsidiary by subsidiary. In reality, an army of accountants and other experts emerge and move their profits wherever they want. In 2010, the amount of profits that US firms 'reported' to have made in Bermuda, with a GDP of $6 billion, and Cayman Islands, with a GDP of

$3 billion, were $94 billion and $51 billion respectively, giving a profit/ GDP ratio of 1643% and 1600% respectively (McIntyre et al. 2015, 14). Surely this type of behaviour can be stopped if there is sufficiently strong political will to tackle this issue. One way to avoid paying taxes is using intra-group loans; branches located in countries that tax profits heavily, will be loaded with debt, usually provided by subsidiaries of the same companies in tax havens. The aim is to reduce profits where they are taxed and the profits appear where they are not taxed, or are taxed nominally. This method is simple but at the same time easily detectable. The second and more widely used method is transfer mispricing. This is an administrative pricing mechanism used by big corporations to minimise tax obligation.

Another problem with the US tax system is the possibility of deferring the payment of taxes by US firms almost indefinitely. On paper, the US corporations must pay 35 per cent tax on all profits, wherever they are earned around the globe. But this rate applies only after that money had been repatriated back to the USA. It is estimated that about $2 trillion of profits are 'permanently re-invested' abroad to avoid being taxed in the USA. There are other ways that tax cheating takes place. Companies would artificially shift the ownership of assets to subsidiaries that exist only on paper in tax haven; the most infamous one may be the Ugland House in Cayman Islands 'that serves as registered address for 18857 companies'. A patent may be transferred to a tax haven and a company operating in the USA will have to pay royalty which lowers taxable profits in the USA. A subsidiary in a high tax country can borrow from a subsidiary in a low tax country enabling the parent company to essentially pay artificially high interest rate to itself. The result of this accounting exercise is parent company's tax bill will be lower. Given the secrecy that predominates, official data is hard to come by, but other researchers have provided similar estimates of the revenue loss. For instance, Oxfam (2016) report that tax dodging by multinational corporations costs the US government about $111 billion each year and says that the loss of tax revenue for developing countries is about $100 billion a year, preventing crucial investment in education, health care, infrastructure and other forms of poverty reduction. On top of these revenue losses, it is amazing that corporations receive massive subsidies too. Oxfam (2016) reveals

that from 2008 to 2014, the top 50 largest US corporations collectively received $27 in federal loan, loan guarantees, and bailouts for every $1 they paid in federal taxes. A lot more could be said about this anomaly, but it suffices to say that the offshore games make markets profoundly inefficient and wealth is transferred from poor taxpayers to rich shareholders of these corporations.

# 5     Policy Recommendations

The global situation is so serious that doing nothing is not an option. Furthermore, given the development in the last 40 years, the dominant economic narrative, i.e. neoliberalism has lost all credibility. The current situation is the product of this narrative and it is unlikely that this could offer any respite let alone any long term solution.

- We need not only to tax the rich and redistribute wealth back to the rest, but to cut back their sources of rental income as well.
- A prime source of rental income, i.e. intellectual property protection must be revised to ensure the balance between providing incentive for innovation and public access to information is right.
- In recent years, the sale of natural monopolies privatised generated economic rent. These monopolies should be brought back under public ownership to prevent rent extraction.
- As part of neo-liberal built-in austerity, the crazy drive to privatise and commodify, directly or in disguise, must stop. In both cases, it increases the cost of living for the lower earning groups while, at the same time offers more opportunities for rent seeking to the rich.
- The global financial system must be tamed in order to build a more stable economy which acts in the public interest.
- Not only the top income tax rates declined, but so much income is hidden that the real tax rate is not effective in addressing the rising divide. While progressive taxation should be proposed, serious action to reduce tax evasion and avoidance is essential.
- Given the scale of hidden wealth in the world economy, Picketty's (2014) proposal about a wealth tax—while a noble idea—will not go

far, unless, a serious attempt is made to uncover this enormous amount of hidden wealth in secret jurisdictions.

- The views expressed by Mian and Sufi (2014, 163) that when there is excessive private debt——beyond repayment capacity——household debt restructuring will be more effective than fiscal stimulus is also relevant.

- Open trade is necessary but finance must be tightly regulated, otherwise, surges of capital would generate recurrent crises that would hamper growth, disrupt and discredit open trade.

- By reforming our tax system the distinction between earned and unearned income should be preserved. Progressively higher taxes should apply to unearned income, and further, the extra revenue must be used to enhance production and productivity in the economy. Education and health care are two areas that should receive this extra investment, to make our economy more productive and further to act as the most effective measures to reduce inequality in the economy.

# 6    Summary and Conclusions

This chapter highlighted the extent of inequality and its dimensions. The main argument is, despite having a longer history; it has intensified in the last four decades. It has fallen during 2007–2009, as an immediate consequence of the financial crisis, but this trend was reversed after 2009. A number of structural factors contributing to greater inequality have been discussed but a more serious culprit is the rentier capitalism which, focuses on value extraction at the expense of value creation. This chapter has also assessed the role of tax avoidance and tax evasions in this process. Given the risk associated with growing inequality, the use of fiscal policy is strongly recommended but for an effective fiscal policy, the prevailing international tax system must be overhauled.

In April 2009, in their response to the global financial crisis, the world leaders in their meeting in London promised to 'end the banking secrecy'. Little effective measures have been taken since then. It is vital that the sooner this secrecy comes to an end the better for the health of our global economy.

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# Financialisation and Distribution Before and After the Crisis: Patterns for Six OECD Countries

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**Abstract**  In this contribution, we analyse the effects of financialisation on income distribution, before and after the Great Financial Crisis and the Great Recession. The analysis is based on a Kaleckian theory of income distribution adapted to the conditions of financialisation. Financialisation may affect aggregate wage or gross profit shares of the economy as a whole through three channels: first, the sectoral composition of the economy; second, the financial overhead costs and profit claims of the rentiers; and, third, the bargaining power of workers and trade unions. We examine empirical indicators for each of these channels for six OECD (Organisation for Economic Co-operation and Development) economies, both before

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and after the crisis. We find that these countries have shown broad similarities regarding redistribution before the crisis, however, with differences in the underlying determinants. These differences have carried through to the period after the crisis and have led to different results regarding the development of distribution since then.

# 1    Introduction

The effects of financialisation, or of the "increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies" to use Epstein's (2005, p. 3) widely quoted definition, on income distribution have been explored in several contributions, as recently reviewed by Hein (2015). Redistribution of income has taken place at different levels, from labour to capital, from workers to top managers and from low-income households, mainly drawing on wage incomes, to the rich, drawing on distributed profits (dividends, interest, rents) and top management salaries. This has contributed to severe macroeconomic imbalances at both national and international levels, i.e. rising and unsustainable household debt-to-income ratios in some countries and severe current account imbalances at regional (Euro area) and global levels, which then led to the severity of the financial and economic crisis of 2007–9, starting in the USA and spreading over the globe (Hein 2012; Stockhammer 2010, 2012, 2015a).

The recovery from the crisis has been rather sluggish so far, and this has given rise to a renewed discussion about stagnation tendencies in mature capitalist economies. In the mainstream version of this debate, as represented by Summers's (2014, 2015) 'secular stagnation' hypothesis, distributional issues are ignored or they play only a marginal role at best. Post-Keynesian approaches, however, focus on income distribution, as well as on the stance of macroeconomic policy, when it comes to explaining stagnation tendencies after the crisis (Blecker 2016; Cynnamon and

Fazzari 2015, 2016; Hein 2016; Palley 2016; van Treeck 2015). Therefore, in this contribution, we will try to shed some light on the development of income distribution before and since the outbreak of the crisis for a set of mature capitalist economies, and on the role financialisation has played in all this. The main focus will be on functional income distribution (wage and profit shares), but we will also look at indicators for personal or household distribution of income (Gini coefficients, top income shares).

Of course, we are not the first to study the distributional consequences and effects of the crisis, as, for example, the papers by Cynnamon and Fazzari (2016) and Dufour and Orhangazi (2015) on the USA, by Branston et al. (2014) on the USA and the UK, or by Schneider et al. (2016) on the Eurozone testify. However, we will provide the results of a comparative analysis for six developed OECD (Organisation for Economic Co-operation and Development) countries applying a consistent Kaleckian approach for the examination of the effects of financialisation on functional income shares, with a respective unique set of indicators, as proposed by Hein (2015), and initially applied by Hein and Detzer (2015) for the case of Germany. The countries included in the current overview comprise three main 'debt-led private demand boom' economies before the crisis, the USA, the UK and Spain, which had managed to over-compensate the lack of investment and income-financed consumption demand by credit-financed consumption before the crisis. According to Dodig et al. (2016), in the course and after the crisis, the UK and the USA turned towards domestic demand-led economies mainly relying on government deficits to stabilise demand, whereas Spain under the dominance of the Euro area regime and the imposed austerity policies turned towards an export-led mercantilist economy drawing on improved net exports as a driver of meagre demand growth. Next we have two main 'export-led mercantilist' economies before the crisis, Germany and Sweden, which had (partly) compensated the lack of investment and income-financed consumption demand by rising net exports and current account surpluses before the crisis. In the course and after the crisis, these countries have seen an increasing relevance of domestic demand, however, with persistently high current account surpluses, which still qualify them as 'export led', according to Dodig et al. (2016). And, finally, we have France as a 'domestic-demand-led' economy before the crisis, which has remained so in the course and after the crisis, according to Dodig et al. (2016). In this contribution, we

will be able to present only the overall pattern of results for the relationship between financialisation and income distribution before and after the crisis derived from detailed data analysis for the respective countries. The presentation of the data for each of the countries we have studied in order to generate this pattern can be found in Hein et al. (2017).

Our contribution is organised as follows. In Sect. 2, we will review the trends of distribution before and after the crisis for the six countries we have examined. We will look at the development of the adjusted wage share, top income shares and the Gini coefficients for both market and disposable incomes. Due to data constraints, we will focus on the period from the early/mid-1990s until the financial and economic crisis, and then on the period since the crisis. Sect. 3 will provide the theoretical backbone of our contribution, a Kaleckian theory of income distribution adapted to the conditions of financialisation. Sect. 4 will contain the results of our country studies. Sect. 5 will provide a comparison, and Sect. 6 will summarise and offer some conclusions regarding the determinants of distributional change before and after the financial and economic crisis.

## 2    Trends in Redistribution Before and After the Crisis

Looking at the evolution of different indicators for income inequality, it can be said that the era of financialisation was marked by three redistributional trends from the early 1980s until the financial and economic crisis of 2007–9.

First, from the late 1970s/early 1980s until the Great Recession (2008–9), income was redistributed from labour to capital. Figure 1 presents the adjusted wage share as percentage of GDP at factor costs for our countries from 1970 until 2015.[1] All the countries considered here have seen, apart from cyclical fluctuations, a downward trend at least from the early 1980s until the financial and economic crisis of 2007–9. However, in several countries most of the redistribution took place in the course

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[1] The adjusted wage share, or the labour income share, thus includes labour incomes of both dependent and self-employed workers, and GDP excludes taxes but includes subsidies.
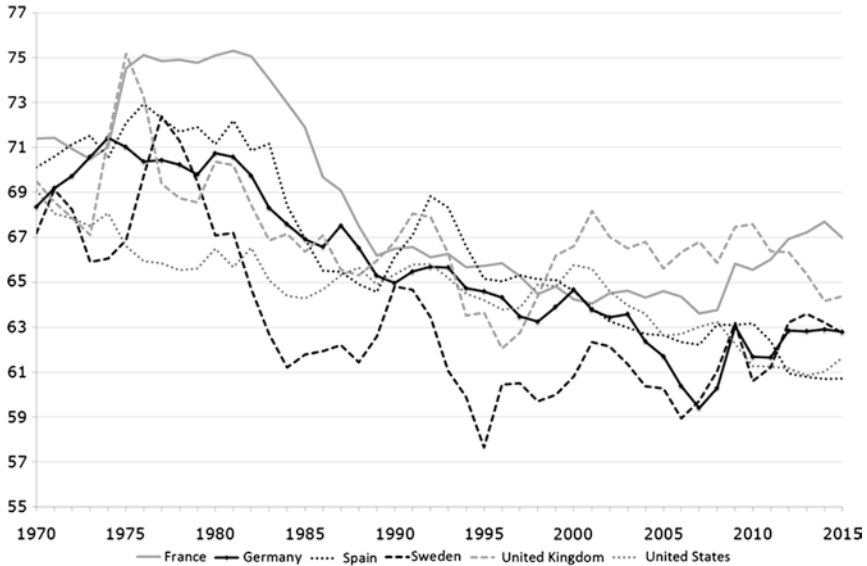
**Fig. 1** Adjusted wage share, selected OECD countries, 1970–2015 (per cent of GDP at factor costs). (Note: The adjusted wage share is defined as compensation per employee as a share of GDP at factor costs per person employed. It thus includes the labour income of both dependent and self-employed workers, and GDP excludes taxes but includes subsidies; Source: European Commission (2016), our presentations)

of the 1980s. Our comparative analysis of the determinants of redistribution in Sect. 4 will be constrained to the period starting in the early 1990s or even later, mainly due to data availability. Therefore, we need to take a closer look at distributional tendencies from the early 1990s until the Great Recession and at the developments since then. Here we find that for the USA, Spain, Germany and to a lesser degree for France and Sweden also, the period from the early 1990s until 2007 was characterised by a tendency of the adjusted wage share to fall. However, in the UK, the adjusted wage share remained roughly constant in this period. After the crisis, a continuation of the downward trend can be observed in the USA and Spain, and also in the UK, the adjusted wage share has shown a falling trend. In Germany and Sweden, the falling trend could be stopped and the adjusted wage share seems to have remained constant, and in France even a slightly upward trend can be observed after the crisis.
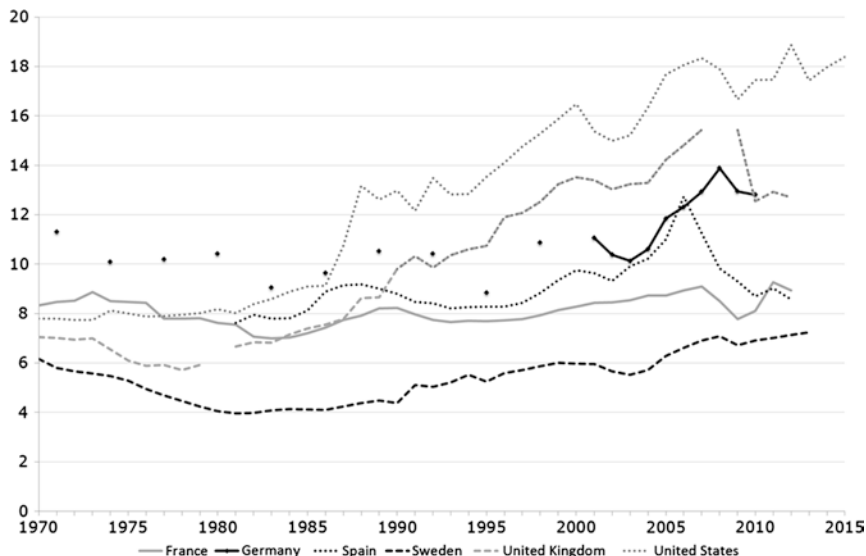
**Fig. 2** Top 1 per cent income share; selected OECD countries, 1970–2015 (per cent of pre-tax fiscal income without capital gains). (Note: For France, Germany, Spain, Sweden and the USA, shares relate to tax units; in the case of the UK, data covering the years 1970 until 1989 comprise married couples and single adults and from 1990 until 2012 adults; Source: The World Wealth and Income Database (2016), our presentation)

Figure 2 shows the development of the top 1 per cent income shares for our countries, covering the years 1970 until 2015, if possible.[2] For the reason mentioned above, let us focus again on the period from the early 1990s until the crisis, on the one hand, and on the period since then, on the other. In the USA and the UK, already starting in the early 1980s, the top income share experienced a remarkable increase until the financial and economic crisis of 2007–9. In the case of the USA, the rise was considerably driven by a rise in top management salaries (Hein 2015). In Spain, Germany, Sweden and France the top 1 per cent income share only started to rise in the 1990s or even the early 2000s, but it increased as well until the crisis of 2007–09, but not to the same level as in the USA or the

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[2] The data apply to income before taxes and is provided by the World Wealth and Income Database. For more information on the dataset and its limitations, see Piketty and Saez (2003).
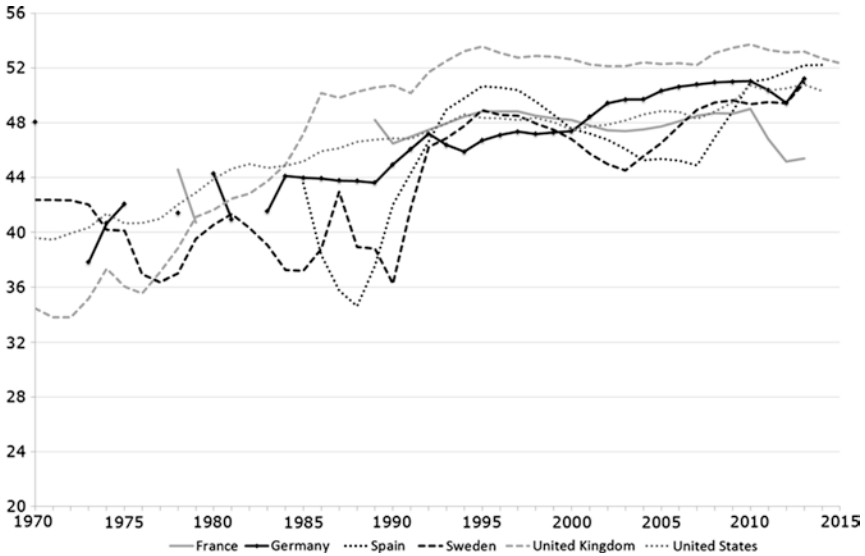
**Fig. 3**   Gini coefficient of market income of selected OECD countries (1970–2015). (Note: The Gini coefficient is based on equivalised (square root scale) household market (pre-tax, pre-transfer) income. Source: Adapted from Solt (2016).)

UK. After the crisis, top income shares started to rise again in the USA, they remained roughly constant in Sweden and France, and they started to decline in the UK and Spain. For Germany, due to a lack of recent data, no statement about the development after the crisis can be made.

Figures 3 and 4 show the development of Gini coefficients for market and disposable income, respectively, covering the years 1970 until 2015, if possible and thus demonstrate developments in personal income distribution. Again we focus on the period from the early 1990s until the crisis and on the period since then. Before the crisis, the Gini coefficient for market income increased significantly in the USA, the UK, Germany and Sweden, while it remained roughly constant in France and Spain, with wide fluctuations in the latter country, however. With the crisis of 2007–09, the rise in the Gini coefficient of market income was especially pronounced in Spain and this upward trend seems to have continued since then. It can also be observed in the USA and Germany, but less so in Sweden. In the UK the Gini coefficient for market income has remained constant on a very high level, and in France it has even declined.
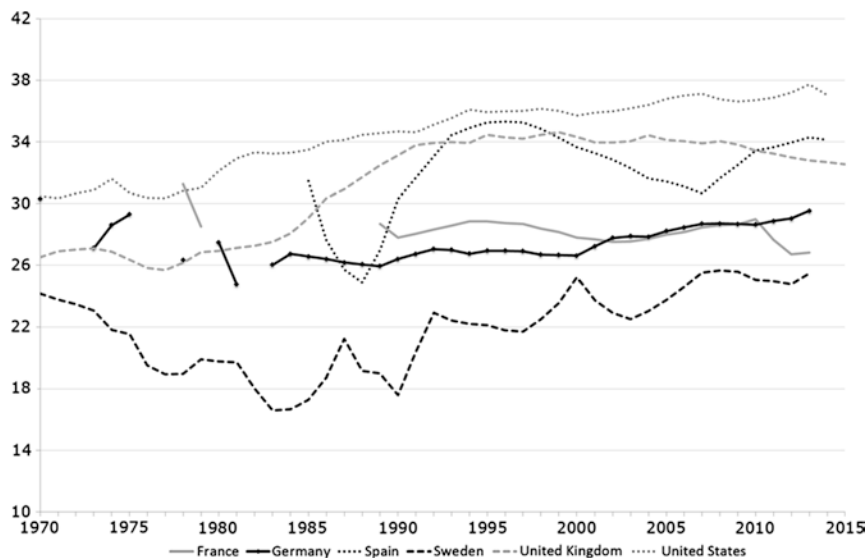
**Fig. 4** Gini coefficient of disposable income of selected OECD countries (1970–2015). (Note: The Gini coefficient is based on equivalised (square root scale) household disposable (post-tax, post-transfer) income. Source: Adapted from Solt (2016).)

With regard to the development of the Gini coefficient of disposable income, which measures personal income inequality after taxes and transfer payments, the picture is rather mixed. In France, this Gini coefficient also remained constant until 2009 when it even started to decline. In the UK, this Gini coefficient had increased in the 1980s, and in the 1990s, it remained relatively constant until the crisis, while since then it has shown a slight downward trend. In Spain, the Gini coefficient increased tremendously in the early 1990s and followed a downward trend from the mid-1990s until the financial and economic crisis of 2007–9, when inequality increased again. In Germany, the Gini coefficient of disposable income shows a sustained upward trend, before and after the crisis. The same holds true for the USA, which has had the highest Gini coefficient for disposable income in our data set. In Sweden, the Gini coefficient of disposable income was rising until the crisis but has stabilised since then and has remained at the lowest level in our set.

# 3    The Effect of Financialisation on Income Distribution: A Kaleckian Approach

In this section, we outline a Kaleckian approach towards the explanation of the development of income shares, i.e. profit and wage shares, under the conditions of financialisation. The focus here is on the determination of functional income distribution because changes in the latter will also affect the personal or household distribution of income.[3] In other words, if financialisation triggers falling labour income shares and hence rising gross profit shares, including retained profits, dividends, interest and rents, this should also contribute to rising inequality of household incomes. The major reason for this is the unequal distribution of wealth, which generates access to capital income and hence gross profits. If the profit share increases, this will then also increase the inequality of household incomes to the extent that profits are distributed to households according to the unequal distribution of profit-generating wealth. Of course, if rising profits—relative to wages—are retained in the corporate sector and thus not distributed to wealthy households, the link between redistribution at the functional level and at the personal/household level will be weakened.

Hein (2015) has reviewed the recent general empirical literature on the determinants of income shares against the background of the Kaleckian theory of distribution, in order to identify the channels through which financialisation and neo-liberalism have affected functional income distribution. According to the Kaleckian approach (Kalecki 1954, Part I; Hein 2014, Chap. 5), the gross profit share in national income, which includes retained earnings, dividend, interest and rent payments, as well as overhead costs (thus also top management salaries) can be determined as follows, starting from pricing in incompletely competitive goods and services markets.

With Kalecki we assume that firms mark up marginal costs which are roughly constant up to full-capacity output given by the available capital stock. This implies that the mark-up is applied to constant average variable costs. Unit variable costs are composed of unit direct labour

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[3] According to Atkinson (2009), the development of functional income distribution is fundamental for the other dimensions of distribution as well as for the macroeconomic effects of distributional changes.

costs and unit material costs. To the extent that raw materials and semi-finished products are imported from abroad, international trade is thus included into the model. In this approach, the mark-up has to cover overhead costs, i.e. depreciation of fixed capital and in particular salaries of overhead labour, on the one hand, and firms' gross profits, i.e. interest and dividend payments as well as retained profits, on the other hand.

For a domestic industrial or service sector $j$, which uses fixed capital, labour and imported raw materials and semi-finished goods as inputs, we get the following pricing equation:

$$p_j = \left(1 + m_j\right)\left(wa_j + p_f e\mu_j\right), \ m > 0, \tag{1}$$

with $p_j$ denoting the average output price in sector $j$, $m_j$ the average mark-up, $w$ the average nominal wage rate, $a_j$ the average labour-output ratio, $p_f$ the average unit price of imported material or semi-finished products in foreign currency, $e$ the exchange rate and $\mu_j$ imported materials or semi-finished inputs per unit of output. Since the relationship between unit material costs and unit labour costs ($z_j$) is given by

$$z_j = \left(\frac{p_f e\mu_j}{wa_j}\right), \tag{2}$$

the price equation can also be written as

$$p_j = \left(1 + m_j\right)\left[wa_j\left(1 + \frac{p_f e\mu_j}{wa_j}\right)\right] = \left(1 + m_j\right)\left[wa_j\left(1 + z_j\right)\right]. \tag{3}$$

The gross profit share ($h_j$), including overhead costs and thus also management salaries, in gross value added of sector $j$ is given by

$$h_j = \frac{\Pi_j}{\left(\Pi + W\right)_j} = \frac{1}{\dfrac{1}{\left(1 + z_j\right)m_j} + 1} = \frac{\left(1 + z_j\right)m_j}{\left(1 + z_j\right)m_j + 1}, \tag{4}$$

with $\Pi$ denoting gross profits, including overhead costs, and $W$ representing wages for direct labour. For the corresponding share of wages for direct labour in gross value added $(1- h_j)$ we obtain

$$\left(1-h\right)_j = \frac{W_j}{\left(\Pi + W\right)_j} = \frac{1}{\left(1 + z_j\right)m_j + 1}. \tag{5}$$

The gross profit share $(h)$, including overhead costs, for the economy as a whole is given by the weighted average of the sectoral profit shares, and the wage share of direct labour $(1 - h)$ for the economy by the weighted average of the sectoral wage shares:

$$h = \frac{\Pi}{\left(\Pi + W\right)} = \frac{1}{\frac{1}{\left(1+z\right)m}+1} = \frac{\left(1+z\right)m}{\left(1+z\right)m+1}, \tag{6}$$

$$1-h = \frac{W}{\left(\Pi + W\right)} = \frac{1}{\left(1+z\right)m+1}. \tag{7}$$

Functional income distribution is thus determined by the mark-up in pricing of firms, by the relationship of unit material costs to unit labour costs and by the sectoral composition of the economy. According to Kalecki (1954, pp. 17–8) the mark-up, or what he calls the 'degree of monopoly', has several determinants.

First, the mark-up is positively related to the degree of concentration within the respective industry or sector. Second, the mark-up is negatively related to the relevance of price competition relative to other forms of competition (product differentiation, marketing, etc.). We summarise these two determinants as the 'degree of price competition among firms in the goods market'. Third, Kalecki claims that the power of trade unions has an adverse effect on the mark-up. In a kind of strategic game, firms anticipate that strong trade unions will demand higher wages if the mark-up and hence profits exceed 'reasonable' or 'conventional' levels, so that the excessively high mark-up can only be sustained at the expense of ever-rising prices and finally a loss of competiveness of the firm. This will induce firms

to constrain the mark-up in the first place. Of course, this will become effective only if there is heterogeneity within the firm sector, such that firms are either facing different increases in nominal wages or they are operating with different technologies, such that the increase in nominal wages will lead to different changes in their unit direct labour costs. Fourth, Kalecki argues that overhead costs may affect the degree of monopoly and hence the mark-up. Since a rise in overhead costs squeezes gross profits, "there may arise a tacit agreement among the firms of an industry to 'protect' profits, and consequently to increase prices in relation to unit prime costs" (Kalecki 1954, p. 17).[4] From the perspective of the firm, interest payments on debt are also part of overhead costs, and thus the idea of an interest rate or interest payments elastic mark-up has been introduced into Kaleckian models of distribution and growth (Hein 2014, Chap. 9). A permanent increase in interest rates (or interest payments) would thus induce firms, on average, to increase the mark-up in order to survive. Recently, this idea has been further extended arguing that from the perspective of the management of the firm, dividend payments are as well a kind of overhead obligations. A permanent increase of dividend payments could therefore induce management to recover this drain of funds for real investment or other purposes by means of increasing the mark-up, either by raising prices or by forcing down unit labour costs if market conditions and the relative bargaining power of firms and labour unions allow for (Hein 2014, Chap. 10).

From this model, we obtain the three determinants of functional income distribution, here the gross profit share, including overheads, and hence management salaries, as shown in Table 1. First, the profit share is affected by firms' pricing in incompletely competitive goods markets, i.e. by the mark-up on unit variable or direct costs, with the mark-up being determined by the degree of price competition, workers' and trade unions' bargaining power, and by overhead costs and gross profit targets as explained above. Second, with mark-up pricing on unit variable costs, i.e. material plus wage costs, the profit share in national income is affected by unit (imported) material costs relative to unit wage costs. With a constant mark-up, an increase in unit material costs will thus increase the profit share in national income. And third, the aggregate

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[4] However, Kalecki (1954, p. 18) adds: 'The degree of monopoly may, but need not necessarily, increase as a result of a rise in overheads relative to prime costs'.

**Table 1** Financialisation and the gross profit share—a Kaleckian perspective

| Stylised facts of financialisation (1.–7.) and neo-liberalism (8.–9.) | Determinants of the gross profit share (including (top) management salaries) | | | 2) Price of imported raw materials and semi-finished products | 3) Sector composition of the domestic economy |
| | 1) Mark-up | | | | |
| | 1.a) Degree of price competition | 1.b) Bargaining power and activity of trade union | 1.c) Overhead costs and gross profit targets | | |
|---|---|---|---|---|---|
| 1. Increasing shareholder value orientation and short-termism of management | … | + | + | … | … |
| 2. Rising dividend payments | … | … | + | … | … |
| 3. Increasing interest rates or interest payments | … | … | + | … | … |
| 4. Increasing top management salaries | … | … | + | … | … |
| 5. Increasing relevance of financial to non-financial sector (investment) | … | + | … | … | + |
| 6. Mergers and acquisitions | + | … | … | … | … |
| 7. Liberalisation and globalisation of international finance and trade | − | + | … | +/− | +/− |

**Table 1** (continued)

| Stylised facts of financialisation (1.–7.) and neo-liberalism (8.–9.) | Determinants of the gross profit share (including (top) management salaries) | | | | |
| | 1) Mark-up | | | 2) Price of imported raw materials and semi-finished products | 3) Sector composition of the domestic economy |
| | 1.a) Degree of price competition | 1.b) Bargaining power and activity of trade union | 1.c) Overhead costs and gross profit targets | | |
| 8. Deregulation of the labour market | … | + | … | … | … |
| 9. Downsizing of government | … | + | ... | … | + |

Source: Hein (2015, p. 921)

Notes: '+' denotes the positive effect on the gross profit share, '−' denotes the negative effect on the gross profit share and '…' denotes no direct effect on the gross profit share

profit share of the economy as a whole is a weighted average of the industry or sector profit shares. Since profit shares differ among industries and sectors, the aggregate profit share is therefore affected by the industry or sector composition of the economy.

Integrating some stylised facts of financialisation and neo-liberalism into this approach and reviewing the respective international empirical and econometric literature, Hein (2015) has argued that there is some convincing empirical evidence that financialisation and neo-liberalism have contributed to the rising profit share, and hence to the falling labour income share since the early 1980s, through three main channels, as can also be seen in Table 1.[5]

First, the shift in the sector composition of the economy, from the public sector and the non-financial business sector with higher labour income shares towards the financial business sector with a lower labour

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[5] See, in particular, the recent panel econometric studies on the determinants of functional income distribution, including data for large sets of countries or industries by Dünhaupt (2017), Godechot (2016), Kristal (2010), Stockhammer (2009, 2013a, b, 2015b) and Tomaskovic-Devey and Lin (2013).

income share, has contributed to the fall in the labour income share for the economy as a whole in some countries.

Second, the increase in management salaries as a part of overhead costs, together with rising profit claims of the rentiers, i.e. rising interest and dividend payments of the corporate sector, has in sum been associated with a falling labour income share. Since management salaries are part of compensation of employees in the national accounts and thus of the labour income share, or the adjusted wage share as shown in the previous section, the wage share, excluding (top) management salaries, has fallen even more strongly than the wage share taken from the national accounts.

Third, financialisation and neo-liberalism have weakened trade union bargaining power through several channels: increasing shareholder value and short-term profitability orientation of management; sectoral shifts away from the public sector and the non-financial business sector with stronger trade unions in many countries to the financial sector with weaker unions; abandonment of government demand management and full employment policies; deregulation of the labour market; and liberalisation and globalisation of international trade and finance.

Of course, these channels may not apply to all the developed capitalist economies affected by financialisation to the same degree, if at all. In the following section, we will therefore review the results we have obtained for empirical indicators for these channels for our six countries in Hein et al. (2017), and assess the development, before the financial and economic crisis from the early 1990s until 2007–9 and then in the course and after the crisis.

For the first channel, the sectoral composition channel, we have looked at the contributions of the financial corporate, the non-financial corporate, the household and the government sectors to gross value added of the respective economies, and at the profit shares in the financial and non-financial corporate sectors, in particular. This has allowed us to see whether there has been the expected structural change in favour of the financial sector, whether the financial corporate sector has had a higher profit share than the non-financial corporate sector and whether a potential change in the sectoral composition of the economy in favour of the financial corporate sector as such has contributed to a rise in the profit share and hence a fall in the wage share for the economy as a whole.

For the second channel, the financial overhead costs or rentiers' profit claims channel, we have more closely examined the functional distribution of national income and distinguished the different components of aggregate profits in order to see whether a rise in the profit share benefitted firms in terms of retained earnings or rather rentiers in terms of distributed profits, dividends and interest, in particular. In turn, this has allowed us to infer whether rising income claims of rentiers—and thus overhead costs of firms—have come at the expense of workers' income or at the expense of retained earnings under the control of the management of firms.

And, finally, for the third channel, the bargaining power channel, we have assessed several determinants of workers' and trade unions' bargaining power. A first set has been related to the labour market, and we have looked at unemployment rates, union density, wage bargaining coverage, the strictness of employment protection for different types of workers, and at the gross and net unemployment benefits replacement rates. In this context, we have also considered the development of trade openness in order to assess the pressure of international competition on workers and trade unions, and we have taken a look at households' debt-to-GDP ratios, which should also negatively affect workers' and trade unions' bargaining power, according to Barba and Pivetti (2009). Finally, we have assessed the bargaining power of workers at the non-financial corporate level. This should be affected by the managers' interest in the maximisation of short-term profits in favour of shareholder value as opposed to the long-term growth of the firm. This strategy implies boosting share prices by paying out profits to shareholders, squeezing workers, and by financial investments instead of real investments in the capital stock of the firm. In terms of indicators, we have examined the relevance of property income received (interest and dividends) in relation to the operating surplus of non-financial corporations to assess the relevance of real vs. financial investments and property income paid to identify the distributional pressure of shareholders on the management. A high relevance of received financial profits and of dividend payments, in particular, was interpreted as indicating a high shareholder value orientation of management, which should be detrimental to workers' bargaining power at the corporate level.

# 4     Results from Country Studies

## 4.1     The USA

### The USA Before the Crisis

As we have shown in Sect. 2, in the decades before the crisis the USA has seen a tendency of the adjusted wage share to fall, which was accompanied by a spectacular rise in top income shares, partly driven by rising top management salaries, as well as by an increase in Gini coefficients both for market income and for disposable income of households. We will focus here on the contribution of financialisation to this development, paying attention to the period from the early 1990s until the crisis and making use of the model outlined in Sect. 3.[6]

Looking at the sectoral composition of gross value added of the US economy and the sectoral profit shares as determinants of aggregate wage and profit shares, we have found that the contribution of non-financial corporations to value added declined before the crisis of 2007–9. The share of the financial corporate sector in gross value added slightly increased, and the same was true for the household sector, including non-corporate business. At the same time, the profitability of the financial sector remained well above that of the non-financial sector. The sectoral composition effect in favour of the financial sector thus contributed to the rise of the aggregate profit share in the USA before the crisis.

In order to examine the financial overheads/rentiers' profit claims channel, we first looked at the developments of the components of net national income. Having risen considerably in the 1980s (Dünhaupt 2012), the share of net property income, the rentiers' income share, remained somewhat constant from the 1990s until the financial and economic crisis, and then only rose shortly before the crisis. The share of retained earnings had a slightly rising trend from the 1990s until the crisis, while the labour income share was on a slightly falling trend. Whereas the financial over-heads/rentiers' profit claims channel had a strong effect on redistribution

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[6] For a broader assessment of financialisation and the financial and economic crisis in the USA, e.g. see Evans (2016).

at the expense of the wage share in the 1980s (Dünhaupt 2012), when corporations managed to pass through the rising profit claims of rentiers putting pressure on workers and squeezing their claim on value added, this channel considerably weakened in the 1990s and in the early 2000s but still contributed to the fall of the wage share.

Looking at the components of the rentiers' income share, we also found for the period from the early 1990s until the crisis a strong indication for increasing power of shareholders and increasing shareholder value orientation of management. While the share of interest income in net national income in a period of very low interest rate saw a rapid decline, the share of distributed property income, i.e. mainly dividends, rose remarkably in the period before the financial and economic crisis.

Assessing the bargaining power channel of redistribution under the conditions of financialisation and neo-liberalism, we first considered several indicators directly related to the labour market. First, the unemployment rate was quite low in the period before the crisis of 2007–9, although slightly higher than in the boom of the late 1990s. Trade union density in the USA was among the lowest in this multi-country study and further declined in the period before the crisis. The same holds true for wage bargaining coverage, leaving a high and increasing number of workers unprotected by collective labour agreements regarding wages and working conditions. Second, with respect to employment protection, nothing changed in the immediate period before the crisis; the USA remained at very low levels in this regard, too. However, as a counterpart to this labour market deterioration, unemployment benefits improved somewhat over the years before the crisis, but again from very low levels in international comparison. Furthermore, the internationalisation and globalisation of finance and trade put pressure on workers' and trade unions' bargaining power, as indicated by steadily growing trade openness of the US economy, albeit from a very low level compared to other countries in our dataset. Finally, household debt-to-GDP ratios significantly increased in the early 2000s, constraining workers' bargaining power in the labour market because increasing relevance of fixed payment commitments, in particular, for mortgages, made potential job and income losses even more severe.

The bargaining power of workers at the firm level is affected by the managers' tendency to maximise short-term profits in favour of shareholders. Regarding property income received in relation to the operating surplus of non-financial corporations, from the early 1990s until the crisis, there cannot be seen an overall increase in the relevance of distributed property income nor of dividend payments (distributed income of corporations), in particular, in contrast to what had happened in the 1980s (Dünhaupt 2012). Therefore, this indicator does not show a further rise in the relevance of financial investment boosting short-term profits and thus an increase in shareholder value orientation of management. Turning to property income paid in relation to the operating surplus, we see no overall increase, but a rise in the relevance of dividend payments (distributed income of corporations) can be observed, which indicates an increase in shareholder value orientation of non-financial corporate management from the early 1990s until the crisis.

Summing up the US case before the crisis, we have found support for all three channels of transmission of the rising dominance of finance on functional income distribution. The sectoral composition changed in favour of the financial corporate sector with a higher profit share, financial overhead costs and rentiers' profit claims increased, and workers' and trade unions' bargaining power significantly deteriorated.

## The USA in the Course and After the Crisis

Since the financial and economic crisis of 2007–9, the tendency of a declining wage share in the USA seems to have been persisting. Similarly, top income shares and the Gini coefficients for market and disposable incomes also seem to have risen after the crisis. Overall inequality has thus increased in the course and after the crisis, as has also been observed by Branston et al. (2014), Cynamon and Fazzari (2016) and Dufour and Orhangazi (2015).

Looking at our channels of redistribution in finance-dominated capitalism, we have found a slight increase in the share of financial corporations in value added, as well as in financial sector profitability relative to the non-financial corporate sector after the respective drops during the

crisis. The sectoral composition effect has therefore contributed to the continuous fall of the aggregate wage share after the crisis.

With regard to the financial overheads/rentiers' profit claims channel, we have observed an increase in the share of net property income in net national income and a corresponding fall in the wage share, and also in the share of retained earnings since 2010. This increase in the share of net property income has been driven by a recovery of the share of dividend income, which had seen a sharp drop during the crisis, but now has reached the high pre-crisis values again. Therefore, also the financial overheads/rentiers' profit claims channel has contributed to the fall of the wage share and the rise in inequality in the course and after the crisis.

Finally, looking at the indicators for the workers' and trade unions' bargaining power channel, we have found that the bargaining power of workers seems to have become even weaker after the crisis. Unemployment has increased to levels not seen since the 1990s, and union density and bargaining coverage have further declined. The degree of openness of the US economy and hence international competition has risen and put additional pressure on workers and trade unions. However, employment protection has remained constant, and unemployment benefit replacement rates have even increased. In addition, household debt has decreased due to deleveraging. With regard to shareholder value orientation of management and hence workers' bargaining power at the non-financial corporate level, both of our indicators have shown a decline in shareholder value orientation: The relevance of property income received in relation to the operating surplus has declined. As for the relevance of the property income paid out, it has remained constant after the fall in the course of the crisis and is now well below the pre-crisis value, with the dividends paid out remaining constant at the pre-crisis level. Overall, our indicators for the bargaining power channel have shown some ambiguous results.

Therefore, the continuous fall in the wage share and rising inequality in the USA since the crisis can be related to a further change in the sectoral composition towards the financial corporate sector with a higher profit share, and a rise in financial overheads and rentiers' profit claims. The improvement of some indicators of workers' and trade unions' bar-

gaining power at the non-financial corporate level was accompanied by the further deterioration of the economy-wide and labour market determinants.

## 4.2    The UK

### The UK Before the Crisis

For the UK, in Sect. 2, we have seen a constant adjusted wage share from the 1990s until the crisis, which was, however, associated with a considerable rise in top income shares, as well as an increase in Gini coefficients both for market and disposable incomes of households. Again we will focus here on the contribution of financialisation to these developments following the model outlined in Sect. 3.[7]

We first address the sector composition channel for the effect of financialisation on functional income distribution. It could be observed that while the share of the government sector in gross value added of the economy remained roughly constant in the period from the mid-1990s until the crisis, the share of the financial corporate sector increased considerably from 5 per cent in 2000 to over 8.5 per cent in 2007. This was accompanied by a fall in the share of the non-financial corporate sector in the same period from 60.5 per cent in 2000 to 56.7 per cent in 2007. At the same time, the profit share of the financial corporate sector was higher than the profit share of the non-financial corporate sector during the whole pre-crisis period except for 1999–2002. This suggests that the increasing share of the financial sector should have been conducive to an overall rise in the profit share and a fall in the wage share—which we did not observe, however, because the profit shares, both in the financial and in the non-financial corporate sectors, had a slight tendency to fall before the crisis, with wide fluctuations in the profit share of the financial corporate sector.

For the financial overheads/rentiers' profit claims channel, there has been no evidence for an increase in the profit claims of rentiers, since the share of rentiers' income (net property income) in net national income

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[7] For a broader assessment of financialisation and the financial and economic crisis in the UK, see Lepper et al. (2016), for example.

decreased from close to 14 per cent in 2000 to close to 11 per cent in 2007. This downward trend in the share of rentiers' income as a whole has also been found for the main components, including the share of dividend incomes. This allowed the share of retained earnings to rise considerably, and also the labour income share could recover in the years before the crisis.

For the bargaining power channel, we have found the following results. First, unemployment rates were on a downward trend until the crisis, but the union density rate declined by more than 10 percentage points from the early 1990s until the crisis. Similarly, the bargaining coverage rate fell by almost 10 percentage points. The indicators for employment protection showed little change from the 1990s onwards; the same was true for unemployment benefit replacement rates. The increasing degree of trade openness and rising household debt ratios, however, should have weakened workers' bargaining power.

Finally, looking at the shareholder value orientation of management, and hence at property income received and paid by non-financial corporations, we have found some indications for a shift of managers' preferences in favour of financial investments over real investment in the capital stock, which should have been detrimental to the bargaining power of workers at the non-financial corporate level. Between the mid-1990s and 2007, the relevance of total property income relative to the operating surplus of non-financial corporations increased substantially, driven primarily by dividends received. However, for the UK we do not find an increase in the relevance of profits of non-financial corporations being distributed as dividend payments (distributed income of corporations). Overall, some indicators have shown a weakening of trade union bargaining power, which should have contributed to a fall in the wage share, whereas others have not.

Summing up the UK case before the crisis, we have obtained ambiguous findings regarding the change in the sectoral composition towards the financial corporate sector and the financial overheads/rentiers' profit claims channel, as well as with respect to workers' and trade union's bargaining power. This might explain why the aggregate wage share in the UK remained roughly constant in the period before the crisis, whereas the other distributional indicators have shown rising inequality.

## The UK in the Course of and After the Crisis

Since the crisis the adjusted wage share in the UK has seen a tendency to fall, whereas top income shares have been somewhat reduced and Gini coefficients have remained constant at high levels. Since the Great Recession, a few indicators have pointed to the weakening of the importance of finance in the UK economy. First, the share of financial corporations in gross value added has somewhat declined, whereas the share of non-financial corporations has recovered. The profit share of the financial corporate sector has remained stable and is still higher than the profit share of the non-financial corporate sector. Taken together, this means that the sectoral composition channel has rather provided the conditions for a recovery of the wage share and also for a decline in household income inequality.

With regard to the financial overheads/rentiers' profit claims channel, we have found a slight tendency of the rentiers' income share to decline after the crisis, which should also have been conducive to a rise in the wage share.

Regarding the third channel, however, the workers' and trade unions' bargaining power channel, a considerable weakening of the workers' position could be observed starting with the crisis. Unemployment has been significantly higher than in the period before the crisis, and trade union membership and bargaining coverage has further declined. The indicators for employment protection have remained roughly constant, as have the unemployment benefit replacement rates. Household indebtedness has remained at a very high level, and trade openness has increased further, putting additional pressure on workers' bargaining power.

Furthermore, since the Great Recession, the relevance of financial investment as compared to real investment of non-financial corporations seems to have slightly increased. Although the importance of total property income received by non-financial corporations has declined, driven primarily by falling interest income, the relevance of dividend payments obtained has increased considerably. Finally, since 2008 the distributed income of corporations, i.e. dividend payments, in relation to the operating surplus of non-financial corporation has increased. Each development indicates a rising orientation of managers towards shareholder

value, which comes at the expense of the power of other stakeholders in the corporation, i.e. labour.

In sum, whereas the sectoral composition and the financial overheads/rentiers' profit claims channels of financialisation would have allowed for a rise in the wage share and an improvement of overall distribution in the UK after the crisis, this did not come true for the wage share because workers' and trade unions' bargaining power was depressed, according to our data inspection. This finding is broadly in line with the observation by Branston et al. (2014), who found that during the recessionary period of 2008–11, the degree of monopoly in the UK manufacturing and retail sectors increased. This has then contributed to depressing the wage share and raising the profit share in these sectors and in the economy as a whole. According to our analysis, it has been in particular the deterioration of the workers' and trade unions' bargaining power, as a determinant of the degree of monopoly or the mark-up, which has caused this development.

## 4.3   Spain

**Spain Before the Crisis**

To recall our findings in Sect. 2, the Spanish economy before the crisis saw a tendency of the adjusted wage share to fall. This was accompanied by roughly constant Gini coefficients both for the market and for the disposable income of households, and by an increase in top income shares. Let us now focus again on the contribution of financialisation to this development following the model outlined in Sect. 3.[8]

For the study of the first channel, the importance of the financial corporate sector, we have first looked at the sectoral shares of the total economy. There was a slightly growing relevance of the financial sector in the Spanish economy during the early 2000s before the Great Recession, however, starting from lower values than in the USA or the UK. In addition, the share of the non-financial corporate sector in gross value added

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[8] For a broader assessment of financialisation and the financial and economic crisis in Spain, see Ferreiro et al. (2016), for example.

increased before the crisis, whereas the share of households, i.e. non-corporate business, declined, and the share of the government remained roughly constant. Simultaneously, the profit share of the financial corporate sector increasingly exceeded the profit share of the non-financial corporate sector. The sectoral composition channel of financialisation as such should have contributed to the fall in the aggregate wage share, if we can assume that the adjusted wage share in the non-corporate sector, as part of the household sector in the national accounts, was lower than in the financial corporate sector.[9]

Looking at the financial overheads/rentiers' profit claims channel for the Spanish economy, we have found a slight decline of the net property income share in national income in the 2000s before the crisis. Therefore, from this perspective, no upward pressure on the mark-up, and hence no downward pressure on the wage share, was imposed. Falling financial overheads/rentiers' profit claims rather allowed for a rise in the wage share and also the share of retained earnings in the years immediately before the crisis. However, this was only possible because the increase in the share of dividend incomes associated with increasing financialisation and shareholder value orientation of management was more than compensated by a simultaneous fall in the share of net interest incomes.

With regard to the bargaining power channel, we have observed a significant improvement in the rate of unemployment in the early 2000s. However, the already very low union density rate fell further in the early 2000s, and particularly the high bargaining coverage rate deteriorated significantly. Employment protection and unemployment benefits replacement rates did not see significant changes. On the other hand, household indebtedness more than doubled in the early 2000s, and trade openness increased significantly from the mid-1990s until the crisis.

Finally, looking at property income received and paid in relation to the operating surplus of non-financial corporations, we have found a remarkable shift towards shareholder value orientation and short-termism of management, which was detrimental to the bargaining power of workers at the corporate level. With regard to property income received, we have observed a considerable rise, driven mainly by the increase in distributed

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[9]To support this claim, we would need data on sectoral labour income shares, which include the labour income of the self-employed.

income of other corporations, i.e. dividends, indicating a rising relevance of financial investments as compared to real investment. In turn, regarding the property income paid, we have found that the relevance of total distributed property income increased vigorously in the early 2000s until the crisis, driven by dividend and interest payments, indicating both rising shareholder value orientation and rising indebtedness of corporations. Therefore, although unemployment rates in Spain decreased in the years before the crisis, several other criteria indicate the falling bargaining power of workers in this period, explaining the tendency of the wage share to fall from the early 1990s until the crisis.

Summing up, the fall in the wage share in Spain before the crisis can thus be related to a change in the sectoral composition towards the financial corporate sector and to the fall of workers' and trade unions' bargaining power, whereas there has been no indication for the financial overheads/rentiers' profit claims channel to have had an effect.

## Spain in the Course of and After the Crisis

Since the crisis, the tendency of the wage share to decline in Spain has continued, whereas top income shares have fallen, but Gini coefficients have continued to rise.

Looking at the three channels through which financialisation may affect income shares, we have found that, after the crisis, the share of financial corporations in gross value added has declined, as has the profit share in this sector, which has even fallen below the profit share of the non-financial corporations. The sectoral composition channel would have thus allowed for an increase in the wage share in national income.

However, the share of net property income in net national income has started to rise again after the crisis, driven, in particular, by an increase in the share of dividend income. Simultaneously, the share of retained earnings has remained constant and even slightly increased, which means that labour has had to bear the burden of rising overheads and rentiers' profit claims.

This has been made possible by a further spectacular decline in bargaining power of workers and trade unions, as our indicators have shown,

both for the aggregate and for the corporate level. Unemployment has more than doubled in the course of the crisis, employment protection has decreased, in particular, for temporary contracts, and household debt-to-GDP ratios and trade openness have slightly increased. Furthermore, the shareholder value orientation of management of non-financial corporations has also risen considerably since the crisis. The relevance of property income received has gone up, driven by dividends received, and also the dividends paid have risen.

Summing up the case of Spain, we can say that the sectoral composition channel would have allowed for a rise in the wage share and an improvement of overall distribution after the crisis. However, this distributional space could not be exploited by labour because workers' and trade unions' bargaining power has been further depressed, in particular, by austerity policies and high unemployment,[10] as well as by rising shareholder value orientation at the non-financial corporate level. Therefore, the wage share has continued to fall, and it has been the distributional position of rentiers, but also retained earnings of firms, which have benefitted so far.

## 4.4    Germany[11]

### Germany Before the Crisis

As we have seen in Sect. 2, the German economy before the crisis saw a tendency of the adjusted wage share to fall. This was accompanied by a rise in top income shares, in particular, in the period immediately before the crisis, and increasing Gini coefficients both for market income and for disposable income of households. We will now present the contributions of financialisation to this development following the model from Sect. 3.[12]

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[10] For austerity policies in Spain, see Febrero and Bermejo (2013) and Ferreiro and Gomez (2015).

[11] This section draws on and updates what has been presented in Hein and Detzer (2015).

[12] For a broader assessment of financialisation and the financial and economic crisis in Germany, see Detzer and Hein (2016), for example.

Checking the relevance of the channels for the influence of financialisation on functional income shares before the crisis, with respect to the first channel, we have found that neither the profit share of the financial corporate sector was higher than the profit share in the non-financial corporate sector in the period of the increasing dominance of finance starting in the early/mid-1990s, nor was there a shift of the sectoral shares in gross value added towards the financial sector, which remained roughly constant at a low level. However, the share of the government sector in value added saw a tendency to decline, from close to 12 per cent in the mid-1990s to below 10 per cent in 2007. Similarly, the share of the household sector, containing non-corporate business, declined from around 25 per cent in the early 1990s to below 22 per cent in 2007, whereas the share of the non-financial corporate sector increased by 5 percentage points in the same period. Ceteris paribus, this change in sectoral composition means a fall in the aggregate wage share and a rise in the aggregate profit share because the government sector is a non-profit sector in the national accounts, and the adjusted wage share in the household sector should be higher than in the corporate sector. However, the financial corporate sector was not involved in this channel of redistribution.

Downsizing the share of the government sector in Germany was a consequence of restrictive macroeconomic policies, and most importantly restrictive fiscal policies, focussing on price stability, improving external price competitiveness and balanced budgets in the run-up to the introduction of the euro in 1999, and then, in particular, during the stagnation period of the early and mid-2000s. Apart from this sector composition effect, restrictive macroeconomic policies had another important effect on the wage and labour income shares via its depressing impact on the bargaining power of workers and trade unions, as we will argue below.

Regarding the second channel, the financial overheads/rentiers' profit claims channel, we have found several developments supporting its validity in the case of Germany. There has been substantial evidence that the increase in the profit claims of rentiers came at the expense of the workers' share in national income. From the 1990s, after German re-unification, until the Great Recession, the fall in the wage share benefitted mainly the rentiers' income share. Only during the short upswing before the Great Recession did the share of retained earnings also increase at the expense

of the wage share. Decomposing the rentiers' income share, it has become clear that the increase was exclusively driven by a rise in the share of dividends, starting in the mid-1990s, when we observed an increasing dominance of finance and shareholders in the German economy.

With respect to the third channel, the depression of workers' and trade unions' bargaining power, we have found that several indicators apply to the development in Germany before the crisis. Starting in the early/mid-1990s, downsizing the government sector, as shown above, and the switch towards restrictive macroeconomic policies focussing exclusively on achieving low inflation, high international price competitiveness and (close to) balanced public budgets meant low growth and rising unemployment.[13] Policies of deregulation and liberalisation of the labour market (Hartz-laws, Agenda 2010) explicitly and successfully aimed at weakening trade union bargaining power through lowering unemployment benefits (replacement rates and also duration), establishing a large low-paid sector, as well as reducing trade union membership, collective wage bargaining coverage and coordination of wage bargaining across sectors and regions (Hein and Truger 2005). As a result of the reforms, unemployment benefits were drastically reduced, so that net- as well as gross-replacement rates declined considerably in the early 2000s. While indicators for employment protection showed a slight increase in employment protection for regular contracts from 2000 onwards, temporary contracts were heavily deregulated, contributing to the emergence of a dual labour market in Germany. The weakening of trade unions since the mid-1990s could be seen by the decline in membership, i.e. union density, but in particular by the decline in bargaining coverage, which fell from 74 per cent in the mid-/late 1990s to only 64 per cent until the crisis. Furthermore, the trade and financial openness of the German economy increased significantly and put pressure on trade unions through international competition in the goods and services markets and through the effect of delocalisation threat. Trade openness increased by more than 30 percentage points of GDP from

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[13] Bibow (2005), Hein and Truger (2005, 2009), and Herr and Kazandziska (2011) have presented extensive analyses of the restrictive macroeconomic policies that dominated the German economy since the mid-1990s, and during the trade cycle of the early-2000s until the Great Recession, in particular.

the early 1990s until the crisis. However, household debt-to-GDP ratios remained low by international comparison and only slightly increased before the crisis.

Looking at shareholder value orientation and bargaining power at the non-financial corporate level, we have found that shareholder value orientation and short-termism of management of non-financial corporations increased significantly in the period before the crisis, thus increasing the pressure on workers and trade unions and constraining their bargaining power. A rising relevance of financial profits by non-financial corporations indicated an increased preference of management for short-term profits obtained from financial investment, as compared to profits from real investment, which might only be obtained in the medium to long run. This increase was driven by growing interest payments received in a period of low interest rates and by an increase in dividend payments obtained, and, furthermore, by reinvested profits from FDI. Turning to distributed profits, we have observed a rise in the importance of distributed property income in the period before the crisis. This increase was driven almost exclusively by an increase in distributed income of corporations, i.e. dividends, whereas interest payments in relation to the gross operating surplus stagnated or even declined.

Summing up the German case before the crisis, it can be argued that the fall in the wage share was mainly caused by the rise in financial overheads and rentiers' profit claims, and, in particular, by the significant fall in workers' and trade unions' bargaining power. There was no change in sectoral composition towards the financial sector; however, the changes at the expense of the government and maybe the household sector have contributed as well to the fall in the wage share of the economy as a whole.

## Germany in the Course of and After the Crisis

In the course and after the crisis, the wage share in Germany has remained roughly constant, whereas Gini coefficients for households' market and disposable income have continued to rise slightly. Lack of data does not allow for any conclusion regarding the post-crisis tendency of top income

shares. Reviewing the three channels through which financialisation may affect income shares, we have found the following results.

First, the sectoral composition of the German economy has remained roughly stable, and the profit share in the financial sector has remained below the one in the non-financial corporate sector, with an increasing gap between the two. This should have contributed to a rising wage share for the economy as a whole.

Second, the pressure via the financial overheads/rentiers' profit claims channel on the wage share has declined and the property incomes share, as well as the share of income going to rentiers in terms of dividends, has remained constant. This has allowed the wage share to remain stable and the share of retained earnings to rise.

Third, looking at the workers' bargaining power channel, labour market indicators have indicated mixed results. Unemployment rates have fallen significantly after the crisis, due to the quick recovery of the German economy from the crisis (Detzer and Hein 2016). However, several labour market indicators have changed further to the disadvantage of workers and trade unions. Trade union density and wage bargaining coverage have further declined, unemployment benefit replacement rates have fallen further and employment protection legislation has remained constant. Trade openness further increased after the crisis, but the already low household debt-to-GDP ratio has fallen. Furthermore, the introduction of a legal minimum wage in 2015 (Amlinger et al. 2016) should have had a positive impact on workers' and trade unions' bargaining power. At the non-financial corporate level, shareholder value orientation has fallen and the pressure on labour has been relieved, as the fall in the relevance of both financial profits received and financial profits paid out has indicated, and in dividends paid out, in particular.

Summing up, during and after the crisis, the pressure through the financial overheads/rentiers' profit claims channel on the wage share has relaxed and workers' bargaining power has somewhat recovered, by the reduction of shareholder value orientation at the non-financial corporate level and, in particular, by the rapid recovery of the German economy from the crisis providing falling unemployment rates (Detzer and Hein 2016; Dodig et al. 2016). Therefore, redistribution at the expense of the wage share has come to a halt. However, neither this does imply that the

trend towards a falling wage has actually been reversed, nor has rising inequality of household incomes, as indicated by the Gini coefficients for market and disposable income, come to a stop.

## 4.5    Sweden

### Sweden Before the Crisis

Sweden had seen a tendency of the wage share to fall, and the top income share and the Gini coefficients for market and disposable incomes to rise before the crisis, as we have discussed in Sect. 2. However, the top income shares and the Gini coefficient for disposable income were the lowest in our country set.[14] Let us now apply our model from Sect. 3 to assess the effects of financialisation on factor income shares.

Regarding the relevance of the sector composition channel in Sweden, we have found that there was no shift of the sectoral shares in gross value added towards the financial sector prior to the crisis. In fact, it was the non-financial sector that increased its share slightly at the expense of households and the government. However, the profit share of the financial corporations was higher than the profit share of the non-financial corporation in the whole studied period, but with some convergence tendency observed up to the crisis. Through this channel, there was hence no downward pressure of financialisation on the aggregate Swedish wage share.

With respect to the financial overheads/rentiers' profit claims channel, we also did not find much pressure on the wage share before the crisis. The share of net property income in net national income was broadly stationary before the crisis, with a slight fall in the early 2000s before rising back to its share of the 1990s until 2007. It seems that prior to the crisis the movements in the share of wages were rather inversely related to the share of retained earnings in the short run, with only a slight fall in the medium run. Looking at the decomposition of rentiers' income, we have found a slight increase in the share of dividends in the early 2000s,

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[14] For a broader assessment of financialisation and the financial and economic crisis in Sweden, see Stenfors (2016), for example.

which, however, was compensated for by a fall in the share of net interest income. Therefore, the financial overheads/rentiers' profit claims channel was of no relevance in Sweden before the crisis.

For the bargaining power channel, we have found some deterioration for labour market indicators before the crisis. Unemployment rates saw a tendency to rise until the crisis. The union density rate fell by almost 10 percentage points between 1990–4 and 2005–9, but the bargaining coverage remained at a very high level. Employment protection, while remaining constant for regular contracts, was heavily downsized for temporary contracts. Simultaneously, the net replacement rates, excluding and including social benefits, were reduced, too. Furthermore, the trade openness of the Swedish economy continuously increased until the crisis, putting pressure on workers' income claims. The same was true for the household debt-to-GDP ratio.

The fall in bargaining of workers and trade unions as indicated by the development of some labour market institutions and by rising trade openness was further reinforced by rising shareholder value orientation of management at the non-financial corporate level. Looking again at our two indicators, we have found that in Swedish non-financial corporations, total property income received in relation to the gross operating surplus almost doubled between 1995 and 2007. This remarkable increase was primarily driven by the distributed income of corporations, i.e. dividends, while the interest income lost in significance following the decrease in the interest rates in late 1990s. The increase in relevance of dividend payments obtained suggests that there was a period of increasing importance of the financial investment as compared to real investment in Sweden in the years preceding the crisis. With regard to the second indicator of increasing shareholder value orientation of management— the growing relevance of profits distributed to shareholders—such a development could also be observed in Swedish non-financial corporations. Distributed property income paid increased significantly, especially between 2005 and 2007. This increase could be mainly attributed to the increase in distributed income of corporations, whereas the relevance of interest fell and later stagnated.

Summing up the Swedish case before the crisis, we can argue that the slight fall in the wage share before the crisis can be attributed in particular

to the pressure on workers' and trade unions' bargaining power, whereas the sectoral composition and financial overheads/rentiers' profit claims channel were irrelevant.

## Sweden in the Course of and After the Crisis

Since the crisis, the wage share in Sweden has stabilised. The same seems to be true for the Gini coefficients for household incomes and the top income shares.

Looking at the sectoral composition channel for functional income distribution, there has not been much of a change since the crisis. And also profit shares in the financial and the non-financial corporate sectors have remained rather stable.

With regard to the financial overheads/rentiers' profit claims channel, we have seen a modest increase in the share of net property incomes in national income, driven by the share of dividend incomes. However, this has not come at the expense of the wage share, but rather at the expense of the share of retained earnings.

Finally, the results regarding the bargaining power channel have been mixed. On one hand, looking at labour market indicators, we have observed a slight rise in unemployment rates, a decline in union density and in bargaining coverage. Furthermore, employment protection for employees on temporary contracts has been further weakened, and for unemployment benefits, a further decline in the net replacement ratios has been observed. Also the household debt-to-GDP ratio has further increased. All this has further weakened workers' and trade unions' bargaining power after the crisis. However, on the other hand, trade openness has slightly fallen but remained at a high level. Furthermore, at the non-financial corporate level, the shareholder pressure on management has declined significantly. This has been indicated by the significantly declining relevance of financial profits relative to the operating surplus of non-financial corporations, driven by a fall in dividends received. We have also observed a substantial decrease in the relevance of total distributed property income, in particular, the decrease in the relevance of dividend payments.

Summing up, in the course and after the crisis neither the sectoral composition nor the financial overheads/rentiers' profit claims channel put any pressure on the Swedish wage share. Furthermore, the rapid recovery of the Swedish economy after the crisis (Dodig et al. 2016; Stenfors 2016) and the decline of shareholder value orientation in the non-financial corporate sector have been sufficient to stabilise workers' and trade unions' bargaining power. This prevented a further fall in the wage share and stabilised functional income distribution between capital and labour, as well as the indicators for household income inequality, however, without reversing the pre-crisis trends.

## 4.6    France

**France Before the Crisis**

As we have seen in Sect. 2, before the crisis the French economy witnessed a tendency of the adjusted wage share to fall and of the top income shares to rise, whereas the Gini coefficients for households' market and disposable incomes remained roughly stable.[15] Again, we apply our model from Sect. 3 in order to assess the effects of financialisation on functional income shares.

Reviewing the sectoral composition channel for the distributional effects of financialisation, we have found that the share of the financial corporate sector in gross value added slightly declined from the early 1990s until the crisis, which was associated with a slight increase in the share of non-financial corporations. The profit share in the financial corporate sector decreased from the 1990s until the years before the crisis, when it reached the level of the non-financial corporate sector. Therefore, we can deny any relevance of the sectoral composition channel for the fall in the aggregate adjusted wage share in France.

For the financial overheads/rentiers' profits claim channel, we have also found no effect on the aggregate wages share. From the early 1990s until the crisis, the share of rentiers' income (net property income) in net national income rather saw a slight tendency to fall, which allowed

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[15] For a broader assessment of financialisation and the financial and economic crisis in France, see Cournilleau and Creel (2016), for example.

for a slight increase in the share of retained earnings, associated with only a very modest fall in the wage share. Looking at the composition of rentiers' income, we have seen a rise in the share of dividend incomes, which, however, was overcompensated by a fall in the share of net interest income in net national income.

Regarding the bargaining power channel, we have found mixed results for the period from the early 1990s until the crisis. Unemployment rates had a tendency to fall before the crisis. Union density was particularly low and even slightly decreased before the crisis. However, bargaining coverage was rising and almost reached 100 per cent before the crisis, due to the French legal extensions of bargaining agreements. Employment protection decreased somewhat, but only for temporary contracts. Unemployment benefit replacement rates also slightly decreased. Trade openness modestly increased, compared to some of the other countries in our data set, and household debt-to-GDP ratios increased somewhat, but from a very low level in international comparison.

Finally, looking at our two indicators for shareholder value orientation of management in non-financial corporations, we have found strong support for both in the run-up to the crisis. The share of property incomes received relative to the operating surplus strongly increased, indicating rising relevance of financial investment as compared to investments in the real capital stock of the firm. The property incomes distributed in relation to the operating surplus also increased, driven in particular by rising dividend payments to shareholders. Each of these developments was detrimental to workers' and trade unions' bargaining power on the corporate level, and thus put pressure on the wage share. This finding has been confirmed by a study by Alvarez (2015), using firm-level data of the French non-financial corporate sector for the period 2004–13. According to this study, the dependence on financial profits has been likely to decrease the wage share in non-financial corporations because of the dampening effects on labour's bargaining power.

Summing up the French case before the crisis, we can argue that neither any sectoral composition channel nor any financial overheads/rentiers' profit claims channel contributed to the fall in the wage share. The latter can be related only to a fall in workers' bargaining power, in particular, due to rising shareholder value orientation in non-financial corporations.

## France in the Course of and After the Crisis

France is the only country in our data set that has seen a tendency of the wage share to increase in the course and after the crisis. Furthermore, the top income share has remained constant, and the Gini coefficients for households' market and disposable incomes have even seen a tendency to fall.

Examining our channels through which financialisation might affect income shares, we have found that the sectoral composition has remained roughly constant in the period after the crisis. For the profit share of financial corporations, a slight recovery has been observed so that it has again exceeded the profit share of non-financial corporations since 2010. This should have put some downward pressure on the aggregate wage share, but the sectoral composition channel as such has had no effect on the development of income shares after the crisis.

Regarding the financial overheads/rentiers' profit claims channel, the share of financial profits in national income has declined considerably, indicating a fall in financial overheads/rentiers' profit claims, and the share of dividends has also fallen slightly. The wage share has risen considerably, associated with a fall of the share of retained earnings. This is pointing to improvements in workers' and trade unions' bargaining power.

Looking at our indicators for bargaining power, we have observed that unemployment rates have slightly increased, but bargaining coverage has remained at a level close to 100 per cent, while employment protection has been downsized somewhat, and the unemployment benefit replacement rates have remained constant. Furthermore, the trade openness of the French economy has only slightly increased, and the household debt-to-GDP ratio has increased somewhat, but is still the lowest in our data set. Most importantly, however, the degree of shareholder value orientation of management of non-financial corporations has declined considerably. The relevance of property income received has decreased, as has the importance of property incomes paid out, in particular, the dividends.

Taken together, the decline in financial overheads and rentiers' profit claims and the stabilisation and partial improvement of workers' and trade unions' bargaining power, associated with the fall in shareholder

value orientation of non-financial corporations, seem to have allowed for the wage share to increase somewhat after the crisis—and also for income inequality at the individual or household level to decrease somewhat.

## 5     Comparison

With the help of Table 2 we can now compare our country-specific findings and reassess the relationship between financialisation and income distribution, applying the Kaleckian theoretical approach towards the determination of functional income distribution in finance-dominated capitalism outlined in Sect. 2.

Looking first at the period from the early 1990s until the crisis, each of the countries saw a tendency of the adjusted wage share to decline, with the only exception of the UK, where the tendency remained rather constant in this period. Top income shares were rising in each of the countries. Gini coefficients for market and disposable income also increased, with the exception of Spain and France, where they remained roughly

**Table 2**  Distribution trends and effects of financialisation on these trends before and after the financial and economic crisis of 2007–9

|  |  |  | USA | UK | Spain | Germany | Sweden | France |
|---|---|---|---|---|---|---|---|---|
| Distribution trends | Adjusted wage share | Before | – | 0 | – | – | – | – |
|  |  | After | – | – | – | 0 | 0 | + |
|  | Top income share | Before | + | + | + | + | + | + |
|  |  | After | + | – | – | ? | 0 | 0 |
|  | Gini coefficients | Before | + | + | 0 | + | + | 0 |
|  |  | After | + | 0 | + | + | 0 | – |
| Channels for the effects of financialisation | Sectoral composition | Before | + | + | + | 0 | 0 | 0 |
|  |  | After | + | – | – | 0 | 0 | 0 |
|  | Financial overheads | Before | + | – | – | + | 0 | – |
|  |  | After | + | – | + | – | 0 | – |
|  | Bargaining power | Before | – | –/+ | – | – | – | 0/– |
|  |  | After | –/+ | – | – | –/+ | –/+ | 0/+ |

Source: Our presentation

Notes: '+' denotes a tendency to increase, '–' denotes a tendency to decrease, '0' indicates no tendency, '?' indicates no data, '–/+' or '0/–' or '0/+' denotes ambiguous tendencies for different indicators

Before: early 1990s until the crisis of 2007–9; After: after the crisis of 2007–9

constant. Generally, 'debt-led private demand boom', 'export-led mercantilist' and 'domestic-demand-led' countries had to face similar developments in terms of income redistribution.

Assessing the channels through which financialisation may affect functional income shares, some differences are obvious. Each of the 'debt-led private demand boom' countries before the crisis, the USA, the UK and Spain, saw a change in the sectoral composition of the economy towards the financial corporate sector with higher profit shares. However, only in the USA financial overheads and rentiers' profit claims were rising, whereas in the UK and Spain, the reverse was true. The fall in workers' and trade unions' bargaining power contributed significantly to the fall in the wage share in the USA and in Spain. In the UK, however, there was no such general fall in workers' bargaining power, and together with the reduction in financial overheads and rentiers' profit claims, this allowed for a stable wage share before the crisis.

For the 'export-led mercantilist' countries, Germany and Sweden, and for the 'domestic-demand-led' economy, France, the fall in the wage share before the crisis cannot be attributed to a change in the sectoral composition of the economy towards a financial sector with higher profit shares. Moreover, only in Germany have we found a rise in financial overheads and rentiers' profit claims, whereas in Sweden there was no such effect and in France financial overheads and rentiers' profit claims were rather falling before the crisis. For Germany and Sweden, the fall in workers' and trade unions' bargaining power is a major explanation for the fall in the wage share before the crisis, and for France, a falling wage share can only be related to falling workers' bargaining power in the non-financial corporate sector due to rising shareholder value of management.

For the period since the crisis, the former 'debt-led private demand boom' economies, the USA, the UK and Spain, have seen a further decline in the wage share. Top income shares and Gini coefficients for the distribution of household incomes, however, do not show a unique pattern in this group. Top income shares have only been rising in the USA but falling in the UK and Spain, and Gini coefficients have been rising in the USA and Spain, but have remained constant in the UK.

Explaining the fall in the wage share after the crisis, what these countries have in common is the deterioration of workers' bargaining power, applying both economy-wide indicators and specific indicators for shareholder value orientation of management and hence bargaining power of workers in the non-financial corporate sector. Only in the USA did we find a few indicators among several others which show an improvement of workers' bargaining power, albeit from a low level. In addition, the post-crisis fall in the wage share in the USA can also be attributed to the further change in the sectoral composition towards the financial corporate sector with a higher profit share, as well as to the rise in financial overheads and rentiers' profit claims. In the UK, however, these two channels would rather have allowed for a rise in the wage share. This has also been true for the change in the sectoral composition in Spain, whereas the rise in financial overheads and rentiers' profit claims has contributed to the fall in the wage share in that country.

The 'export-led mercantilist' countries, Germany and Sweden, as well as the 'domestic-demand-led' country, France, managed to stop the tendency of the wage share to fall after the crisis. In France, the wage share has even seen a rising tendency since then, whereas in Germany and Sweden, it has remained roughly constant. Top income shares have remained constant in Sweden and France (for Germany there is a lack of data), and the Gini coefficients for household incomes have been falling in France, while they remained constant in Sweden and have continued to rise in Germany.

Looking at the determinants of the stabilising or even rising tendency of the wage share, we can see that in none of the three countries has there been a change in the sectoral composition towards the financial corporate sector. Furthermore, financial overheads and rentiers' profit claims have either been falling, as in Germany and France, or remained constant, as in Sweden. Therefore, from these two channels, there has not been exerted any further pressure on the wage share. Finally, selective improvements of workers' bargaining power, related to reduced shareholder value orientation at the non-financial corporate level, in particular, have allowed for the stabilisation of the wage share in Germany and Sweden and for its improvement in France.

# 6     Summary and Conclusions

In this contribution, we have analysed the effects of financialisation on income distribution, before and after the financial crisis and the Great Recession. The focus has been on functional income distribution and thus on the relationship between financialisation and the wage or the gross profit share, in particular. The analysis has been based on a Kaleckian theory of income distribution adapted to the conditions of financialisation. From our analysis, we can conclude that the relationship between financialisation and income distribution has played out differently in the countries of our data set. Broadly speaking, we have two groups, the former 'debt-led private demand boom' countries before the crisis, the USA, the UK and Spain, on the one hand, and the 'export-led mercantilist' countries, Germany and Sweden, and the 'domestic-demand-led' economy of France, on the other. Whereas all countries, but the UK, saw a decline in the wage share in the period from the early 1990s until the crisis, the underlying driving forces differed somewhat. In the first group, the sectoral change towards the financial corporate sector with higher profit shares was a contributor in all countries, as was the fall in workers' and trade unions' bargaining power, with the exception of the UK, which explains the constancy of the wage share here. For the USA also rising financial overheads and rentiers' profit claims contributed to the falling wage share. In the second group, changes in the sectoral composition of the economy were irrelevant for the explanation of the falling wage share, and also the financial overheads/rentiers' profit claims channel was relevant only for Germany. What was important for the falling wage share in all three countries was the (partial) deterioration of workers' and trade unions' bargaining power.

These differences between the two country groups have carried through to the period after the crisis. The former 'debt-led private demand boom' economies have seen a (further) fall in the wage shares, mainly driven by deteriorating workers' and trade unions' bargaining power and also by rising financial overheads and rentiers' profit claims, with the exception of the UK, and by a sectoral change towards the financial corporations with higher profit shares in the USA. In the 'export-led mercantilist' and

'domestic-demand-led' countries, however, the wage shares stopped falling in Germany and Sweden and have even increased in France. The major reason for this has been improved bargaining power of workers and trade unions, reduced (or constant but not rising) financial overheads and rentiers' profit claims, as well as a constant sectoral composition of the economy.

Improvements in income distribution in favour of labour were thus related to slight 'de-financialisation', on the one hand, and a recovery of workers' bargaining power, on the other. The relationship between the development patterns of income shares and indicators for personal or household distribution (top income shares and Gini coefficients) derived from our analysis do not seem to be as clear-cut as expected, and thus need further research. However, the stabilisation or even the increase in wage shares in Germany, Sweden and France after the crisis has also been associated with a stabilisation or even improvement towards lower inequality of some of the indicators for personal distribution. Therefore, the following provisional economic policy implications can be drawn from our analysis. Policies of re-regulation of the financial sector, aiming at reducing the profitability pressures imposed by finance on the non-financial sector, in particular, together with structural labour market policies and employment stabilising aggregate demand management, which favour workers' and trade unions' bargaining power, will contribute to stabilising income distribution and even lowering inequality. And this should then feed back positively on aggregate demand, sustainable growth and economic development.

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# Investment, Unemployment and the Cyber Revolution

**Michelle Baddeley**

**Abstract**  Internet and mobile technologies have brought many benefits, including productivity rises, more effective co-ordination of economic and financial activities, and new market opportunities. However, negative impacts are often ignored. Labour productivity, wages and life satisfaction may decline if workers struggle with, or are replaced by, new technologies. Online social networks, easily accessible via mobile technologies, create opportunities for distractions and shirking at work. Automation of an increasing range of jobs dampens labour demand and accelerates substitution of capital for labour. This chapter explores one facet of potential implications, specifically the impacts on long-term unemployment, as a proxy for secular stagnation. Relationships between gross fixed capital formation, computing investment and long-term unemployment for 17 OECD (Organisation for Economic Co-operation and Development) countries over the period 2000–2010 are analysed using panel estimation techniques. The findings suggest that increases in computing investment

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are associated with rises in long-term unemployment. The chapter concludes with an analysis of policy implications and potential solutions.

**Keywords** Computing investment • Long-term unemployment • Digital economy

**JEL Codes** L14 • L6 • O33

# 1     Introduction

Computerisation is undoubtedly the most pervasive technological change in the last 50 years, driving economic and financial innovations from the mid-twentieth century onwards, and arguably the most significant technological change of this era (Yang and Brynjolfsson 2001). Few commentators at the end of the twentieth century could have predicted how pervasive new-generation computing, mobile and other technologies would become. Almost all of our everyday activities—from paying for shopping bills to organising our bank accounts—are now mediated via fast-moving and difficult-to-regulate mobile and Internet technologies. In manufacturing, production activities are increasingly depending on robotics, artificial intelligence (AI), 3D printing and other cutting-edge technologies. In construction, building information modelling (BIM), including blockchain innovations, is transforming the industry. A series of increasing sophisticated and esoteric innovations associated with computer networks have been introduced—exemplified in the Internet and now mobile phone networks. Also, computer-based financial innovations such as Electronic Funds Transfer at Point of Sale (EFTPOS), Automated Clearing House (ACH) systems, Fast Payments and WiFi-enabled contactless transactions are essential to modern financial transactions. Entrepreneurial innovations in financial services in the form of financial technology (FinTech) are generating shifts in the delivery of financial services and the use of substitutes for conventional money and cash. For policy implications in the post-financial crisis era, control of the financial system is likely to be harder with faster, globalised payment systems. For productivity and output, the new robotics and AI innovations are further likely to transform manufacturing and other industries, and

also to introduce a range of new entrepreneurial opportunities, if they are not constrained by the availability of finance.

A large volume of computing investment has been diverted into these new ways of producing, consuming and working—but what are the net effects? This chapter will explore some of the links between computerisation and macroeconomic performance since the Great Financial Crisis—focusing particularly on relationships between computing investment and long-term unemployment, as a proxy for secular stagnation. This chapter aims in part to analyse the impacts of the digital economy on computing investment and structural unemployment, as proxied by long-term unemployment. In Sect. 2, background issues and implications of computing investment will be outlined. In Sect. 3, microeconomic implications for workers, employers and entrepreneurs will be explored, alongside an assessment of the likely impacts on the macroeconomy and financial systems. In Sect. 4, a baseline model of computing investment will be developed and extended to incorporate distinctive features of computing investment in the digital economy—and analysed to capture the likely impacts on unemployment. For the empirical analysis in Sect. 5, the theoretical model will be estimated using fixed-effects panel estimation techniques applied to OECD data on long-term unemployment, computing investment and gross fixed capital formation for 17 countries over the period 2000–2010. Policy implications will be explored in Sect. 6, with key conclusions outlined in Sect. 7.

## 2    The Cyber Revolution and the Digital Economy

Whilst computers have been in use since the early 1950s, widespread computerisation of economic activity began when Intel marketed its first microprocessor chip, in 1971. As a result, powerful personal computers took over work and home lives—as these innovations spread they connected in with other, more sophisticated IT technologies, products and services—especially those associated with social media. The basic computerisation of economic activity just in the form of word-processing, spreadsheet and accounting packages eventually spread to much more sophisticated and deeply founded methods of working and living. Technological progress and innovation was rapid.

These technological changes have been more far-reaching than initially expected—the technical capability of today's digital investments is far in excess of what was expected in the 1970s. To capture this exponential growth in computing capability, Moore's Law is often invoked to describe the way in which computer technologies have diffused—enabled by the rapid increase in computing power. Moore's Law is that growth in computing power grows exponentially. In the early years of Moore's Law, microprocessing power doubled every 18 months. This reflects developments in technology, which allowed increasingly large numbers of transistors to be built into a computer's motherboard: the number of transistors contained in ordinary household computers was, on average, around 1000 transistors in 1971. In 2017, some integrated circuits contain around 30 billion transistors, and whilst the exponential efficiency improvements for standard transistors now seem to be slowing down, new technologies around quantum computing look likely to ensure that Moore's Law still has a way to run.

Alongside this rapid growth in computer power, inevitably, there were substantial falls in computing investment costs, and this created a complex set of feedbacks—falling costs encouraged technological changes, driving further falls in computing costs and then further innovations, and so on. Thus, IT technologies spread rapidly and also spread through into other, related technologies—for example, mobile payment technologies, including mobile wallets and recent innovations in contactless payment—linking together IT in computing with IT in telecommunications industries. With the rapid increase in processing power, what we used to have in large computers can now be squeezed into our mobile phones, and this has transformed our everyday lives as consumers and workers. Entrepreneurial opportunities have grown exponentially too, especially for smaller businesses that can now build their businesses via social media and online activity in far more nimble and less capital-intensive ways than before. Innovations are now overlapping industries. As noted above, specifically for financial services, it has also enabled the growth of financial technology entrepreneurship (FinTech), and the likely impacts of this are revolutionising the ways in which we spend, borrow and save—with crucial implications for monetary policy too.

All these IT innovations have precipitated seismic changes in macroeconomic and financial systems. In the 1990s, the growth of what was then known as the 'New Economy' was relatively disappointing in terms of its

impacts on macroeconomic productivity, though Temple (2002) presents a more optimistic view of the early impacts. Defining the New Economy is not straightforward, and there is no universally accepted definition (DeLong and Summers, 2001). The common language use of the term refers to high-tech knowledge-based industries—taking off particularly in areas such as cyber security. According to some definitions, the New Economy also includes biotechnology companies, but the IT sector has been a key driver—especially in recent years with the evolution of FinTech in the financial services sector.

Initially, the range of technological innovations was relatively narrow and focused on computing investment in computer hardware and peripherals. Those were, for most of the latter part of the twentieth century, some of the most dominant and fast-changing elements in firms' new investment expenditure. The US Department of Commerce estimated that high-technology industries fed through into more than a third of growth in GDP from 1995 to 1999; specifically, high-technology products contributed 24% to real GDP growth, though effectively measuring high-technology investment and its impacts is problematic and so this may be underestimated. Also, as this period was associated with the dotcom bubble, it is likely to be associated with a greater proportion of high-tech investment (Gordon 2000; Whelan 2002; Landefeld and Fraumeni 2000). This dominance has fallen, and in 2015, high-tech industries accounted for around 17% of US GDP growth—perhaps reflecting the fact that what were once innovative new technologies are now widely dispersed and used across all industries. Fast modern computers and mobile phones are no longer a novelty, and today's innovative technologies, still chip-enabled but in a more diffuse way, are transforming manufacturing and construction—for example, with the growth of robotics, AI and 3D printing, as well as new digital construction technologies such as BIM.

In terms of wider macroeconomic impacts, the dominance of IT has driven changes in productivity, employment/unemployment and real wages. Growth in computing output was associated with declines in UK unemployment in the 1980s (Baddeley 2008). Also, Dunne (1991) argues that any costs will be balanced by benefits if the manufacturing plants using computer-aided technology pay workers two-thirds more than traditional plants in the same industry because of productivity gains, though Dunne's analysis does not allow that this will tend to price unemployed outsiders out of a job.

International trade in computers and other related goods such as semi-conductors, mobile innovations and smart, wireless devices are likely to increase in parallel with household wealth. In the 1990s, this trade was magnified by the dot-com boom, and more recently driven by a second wave of growth in digital service and logistics provision—including airbnb, Uber, eBay and Amazon.

Following the dot-com boom, share price gains translated into large increases in household wealth—for example, US household wealth doubled in 1990s, reflecting increases in share prices (Landefeld and Fraumeni 2000). But with the collapse of the dot-com bubble in 2001, these gains were quickly reversed, though with the growth of new opportunities in social media and mobile technologies similar trends are emerging again—with mixed results. Companies such as Uber and airbnb have effectively harnessed the technological power of online social networks—to great effect in terms of profits, though the benefits for their 'partners' in terms of employment protection and workers' rights are less clear—as recent controversies over the inequitable treatment of Uber drivers have illustrated. Other companies are less successful—a particularly salient example from the dot-com boom was the fashion start-up Boo.com—an organisation whose founders used all money raised in building the firm to finance their own personal expenditures.[1] More recently, profits are slow to materialise for modern social media firms such as Twitter. Newer companies may have limited prospects in terms of future profits—like some of the dot-coms of the 1990s, initial public offerings (IPOs) may reflect expectations of profits that, in fact, are unlikely to be realised.

Specifically, cyber investments in information and communication technologies (ICT)—computing investments in both hardware and software—have a number of distinctive features, such as rapid depreciation (exacerbated by built-in/planned obsolescence, lock-in effects and bundling—e.g. as used by Microsoft and Apple), reduced inventory investment and network effects. Numerous innovations have spread over the past 15 years, including those associated with computer networking and the Internet, mobile phone technologies and computer-based financial innovations; just a few examples include EFTPOS and ACH systems. Whilst proponents of Solow's 'com-

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[1] Details were publicised in the news, e.g. see https://www.theguardian.com/technology/2005/may/16/media.business

puter paradox' (Robert Solow's (1987) observation that computerisation took a while to work its way into more widespread economic performance) would disagree with this assertion, nonetheless after allowing for lags, adjustment costs and the contributions of intangible assets, it seems that the IT Revolution has had significant impacts; they have just taken a while to surface in the productivity statistics (Yang and Brynjolfsson 2001).

Computing innovations have improved economic performance, culminating in large increases in productivity and growth in the 1990s, particularly in the USA. Overall total factor productivity (TFP) growth is underestimated because it is difficult to capture contributions, particularly intangible contributions, from computing capital, and so inputs are understated (Griliches 1979). Some estimates indicate that once intangible investments are properly accounted for, measured productivity rose through the 1970s, 1980s and 1990s (Hobijn and Jovanovic 2001; Yang and Brynjolfsson 2001). There is also some evidence that the IT revolution promoted increasing productivity, real GDP growth and reduced volatility in GDP (Gordon 2000; Whelan 2002).

The relationships between investment, innovation and technological change are particularly complicated and multi-faceted for computing investment in the New Economy. The large number of IT innovations that have emerged since the release of the first Intel microprocessor chip in 1971 has, in turn, led to large increases in computing investment relative to other types of investment. Annual growth in computer hardware inputs averaged 46% of average annual growth in the second half of the 1990s (Cecchetti 2002). Yang and Brynjolfsson (2001) estimate that once intangible investments are included, total computer-related investments accounted for about 10% of GDP in the late 1990s. The dominance of computing investment was ensured by the mid-1990s, by which time computing investment accounted for almost 50% of total equipment and software investment; by comparison, in 1959, total investment in equipment and software accounted for less than 15% of total investment.

Up until 2000, businesses did well out of their computing investments; some estimates indicate that each dollar spent on computing investment generated an increase in firms' market valuations of $5–$20 (Yang and Brynjolfsson 2001). Innovative businesses did particularly well, and once the contribution of intangible investments is taken into

account, these businesses experienced above average productivity growth from computing investments in comparison with more conservative industries (Carrado and Slifman 1999; Jorgenson and Stiroh 2000). Cecchetti (2002), Whelan (2002) and Gordon (2000) argue that, from the 1990s, the IT revolution encouraged more macroeconomic resilience and flexibility. They argue that new innovations in inventory control allowed firms to respond quickly to changes in current economic conditions. Economies also weathered the aftermath of the September 2001 terrorist attacks much more effectively than was initially predicted: US Bureau of Economic Analysis (BEA) data showed that although US annual real GDP growth slowed to 1.7% in the last quarter of 2001, by the first quarter of 2002 it had recovered to 5.6%. According to Cecchetti (2002), this relative stability could be partly attributed to the growth of computing investment, though other factors such as the monetary and fiscal stimuli applied in the aftermath of 9/11 would also have played a role. This may explain why the mini-recession in the USA from 2000 to 2001 was surprisingly short and subdued in the immediate aftermath of 9/11, at least until the Global Financial Crisis hit world economies in 2007–2008.

But according to others, the historical record was not unremittingly rosy and there is also some evidence of the wasteful and disruptive effects of the dot-com boom. When the US dot-com investment bubble burst following the 2001 NASDAQ crash, surplus computers stockpiled, exacerbated by the fact that access to cheap finance had encouraged an unsustainable over-investment in computing resources and investments in networks. The introduction of new processes had involved substantial intangible costs, including negative impacts on labour relations with evidence suggesting that computers displace white-collar workers generating resistance to change even amongst employees in 'old economy' firms, particularly in the managerial and non-production sectors (Hobijn and Jovanovic 2001).

More recently, the impacts of computing investment in the digital economy have become more diffuse and harder to pinpoint because digital technologies are now so deeply embedded in every aspect of our daily lives. In the UK, financial services and technology sectors spent around £319 billion on IT investments in 2014 and made significant contributions to

the macroeconomy—with financial services contributing approximately 9.4% to GDP and just the Internet industry alone (excluding other technology sectors) contributed about 8.4% to GDP (Blackett Review 2015). The US BEA data suggest that computing investment accounted for 9.2% of GDP growth in 2015.[2] This reflected both falling costs and the move of activity away from conventional computing, but subsequent impacts are harder to quantify as computing investment is now so much more diffuse and harder to measure, as will be explored in the empirical section below.

The focus in the digital economy has shifted from investment in computing hardware and software to the widespread adoption of mobile technologies, including the rapid growth in the use of apps. This has made the economic impacts of new digital technologies far harder to pinpoint, but it seems clear that the penetration of mobile technologies into our daily lives has been comprehensive, and this is true now not just for advanced economies, but also for developing economies, where a large majority of adult populations have access to some sort of mobile phone, though smartphone penetration is still relatively low in the poorest parts of the world. World Bank (2016) estimates indicate that the number of Internet users has increased from a billion in 2005 to an estimated 3.2 billion by the end of 2015, and over 80% of the adult population in the developing world has access to a mobile phone.

## 3      Economic Implications

Economic implications from the cyber revolution are wide-reaching and, at a microeconomic level, will affect consumers, workers and employers in the labour market, as well as entrepreneurs and producers. It also drives significant changes in the macroeconomy and financial system too, as explored below.

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[2] Source: US Bureau of Economic Analysis, Contributions to Real GDP for Final Sales of Computers, Software, and Communications Equipment, *Prices and Output for Information and Communication Technologies*, US Department of Commerce. Available at: www.bea.gov/iTable/iTable.cfm?reqid=12&step=3&isuri=1&1203=2079#reqid=12&step=3&isuri=1&1203=2079. Available at: www.bea.gov/iTable/iTable.cfm?reqid=12&step=3&isuri=1&1203=2079#reqid=12&step=3&isuri=1&1203=2079.

## 3.1    Consumers

For consumers, there is no doubt that computers, mobile phones and Internet technologies allow greater price transparency and reduced search costs—price comparison sites, social media and online shopping are ubiquitous, and the range of choices we face every day has grown rapidly. Business to consumer (B2C) e-commerce in 2016 was worth US$1.922 billion (Source: Statistica). However, the range and ease of buying choices enable impulsive, ill-considered purchasing choices which consumers may regret. In addition, cyber privacy and security are key concerns. With the advent of Big Data, commercial organisations, especially social media organisations such as Facebook, Google and Twitter, are now in command of large volumes of personal data—which they can use for their own commercial ends, especially when effective regulation of these organisations across international boundaries is difficult. Protection of the personal data held by governments and commercial organisations is key concern—hackers are frequently able to access large databases and stores of private information from government and commercial sources. A related concern for consumers is the problem of cyber security—with the rapid growth of online and mobile banking, risks from cyber-security breaches are growing. In addition, online frauds and scams are affecting an increasingly large range of our daily activities—from banking through to dating through to online shopping.

These cyber-security concerns are likely to magnify in the coming years—especially with the growth of the Internet of Things. An increasingly wide range of our digital devices are now connected—not just our computers, mobiles and watches, but also our household equipment, including boilers and fridges. All of this makes the ordinary consumer vulnerable to substantial disruption, and when the threats of cyber terrorism are taken into account (e.g. energy and water infrastructures are vulnerable to these threats), the potential threats for consumers are large. Balancing these threats against the undoubted convenience and satisfaction that digital technologies bring is tricky, especially as the risks from cyber-security and privacy breaches are hard to quantify.

## 3.2    Workers and Employers

As for consumers, for workers, computing technologies—including mobile technologies—have transformed our working lives, and labour markets more generally too. With the diffusion of smartphones and apps, our work email is now in our pockets all the time. For employees, work emails can dominate their lives, and in a computerised economy, it may be difficult to escape the expectations of colleagues and employers to respond to emails and other electronic messaging almost instantaneously. Employees are generally immediately accessible via email, no matter where they are or what time or day it is. The likely implications for labour productivity are mixed because whilst our unofficial working hours are undoubtedly much longer, whether this translates to real increases in productivity is unclear because accessibility via online social networks can provide new social distractions during working hours.

Protection of workers' rights has often been undermined because the dividing line between employment and self-employment has become blurred—for example, in the UK, Uber drivers were not entitled to any of the usual rights for holiday pay, sick pay and a minimum wage because they were classified as self-employed, until UK courts ruled that they are effectively employees and so entitled to the same workers' rights as other workers. There are negative knock-ons for those working for businesses that service the digital economy—for example, the delivery services essential to online shopping. In the UK again, Parcelforce couriers are obliged to pay a penalty of up to £250 a day if they cannot find cover for their shifts when they are off sick—again, they are being treated as small businesses, when in reality the essence of their work is more like a traditional employer–employee relationship.

Alongside the economic hardship by gaps between wages and unemployment benefits, there will be psychic costs too. If machines reduce the demand for labour in modern economies, then a sense of purposefulness and usefulness will be lost. This underscores the idea that work is not just about foregoing leisure to earn money—work has a purpose of its own and gives satisfaction in its own terms—though studies have shown that life satisfaction as well as productivity can be reduced significantly for those workers devoting more than 40 hours per week to work (Cassells

2017; Oswald et al. 2015; Dockery 2003). This links to modern literatures on well-being, for example, see Layard (2011) and O'Donnell et al. (2014); if work plays a key role in our well-being and life satisfaction, then the physical process of capital accumulation, if it replaces labour in production, will leave many with gaps in life satisfaction.

Another key concern in the context of labour markets is the likely impacts on unemployed outsiders—because capital is replacing labour via both digital technologies and also robotics. With insiders working longer hours than previous generations (and in a way that is difficult to measure as they can do so much more 'out of the office'), this may be removing opportunities for unemployed outsiders to fill vacancies. An additional problem is skills mismatch—as manufacturing declines and/ or human workers are replaced by robots, the opportunities for unskilled workers are diminishing all the time. So even if working hours for digitally connected insiders were somehow reduced, it is not clear whether the unemployed outsiders would be in a good position to fill their jobs.

These ideas about the replacement of workers are not new, and Keynes (1930) famously predicted that technology and substitution of capital for labour would lead us in the future to be working much reduced hours because of technological progress and the accumulation of capital—with insights that have much resonance today when applied to impacts of the ICT revolution on macroeconomies, which Keynes (op. cit.) himself could not have envisaged in the 1930s. He noted that rapidly changing economic structures create tensions in the process of adjustment and structural change. When the pace of technical progress is much more rapid than the absorption of labour, then unemployment will accelerate. As Keynes observed:

'We are being afflicted with a new disease of … technological unemployment. This means unemployment due to our discovery of means of economising the use of labour outrunning the pace at which we can find new uses for labour.' (Keynes 1930, p. 1)

Keynes (1930) does give some reason for optimism—in terms of the ways in which technological progress will free up the time of workers, allowing them to improve their standards of living so the tensions caused in the process of adjustment will be temporary. Thus, Keynes predicts: "... that the standard of life in progressive countries one hundred years hence will be between four and eight times as high as it is to-day. There would be nothing surprising in this even in the light of our present knowledge. It

would not be foolish to contemplate the possibility of a far greater progress still" (p. 3). This has not materialised and some of Keynes's (1930) analysis did predict that the gains in terms of more leisure time would not necessarily translate into a better standard of living for everyone, especially if a sense of purpose and achievement in life cannot be found outside work—foreshadowing modern analyses of links between work and life satisfaction, as noted above. Keynes observes that "…there is no country and no people, I think, who can look forward to the age of leisure and of abundance without a dread. For we have been trained too long to strive and not to enjoy. It is a fearful problem for the ordinary person, with no special talents, to occupy himself, especially if he no longer has roots in the soil or in custom or in the beloved conventions of a traditional society" (p. 5).

Keynes (1930) acknowledged that there would be, in modern language, winners and losers, and the consequences in terms of meeting 'insatiable' human needs are complex because partly these needs are dictated by absolute and relative inequalities. If new divides develop favouring those who are beneficiaries of technological progress, then they will want to sustain inequalities that link to their sense of superiority. Keynes asserted that needs

'which are relative in the sense that we feel them only if their satisfaction lifts us above, makes us feel superior to, our fellows .. [those needs] which satisfy the desire for superiority, may indeed be insatiable.' (p. 4)

Contributing to these divisions would be people's resentment of inequality and hierarchy—a theme that has resonances in modern behavioural economics literatures on inequity aversion and also links to themes in development economics around attitudes towards inequality, for example, as explored by Piketty (2014). Keynes's (1930) view was that this problem would be one of adjustment rather than permanent structural change—he observes that it is not 'the permanent problem of the human race', but to what extent has technology contributed to rising unemployment, particularly long-term unemployment?

Whilst the new business models and new business opportunities created by the digital economy allow extra opportunities and flexibility, the costs come as principles around workers' rights start to seem old-fashioned to some, even though there are potential significant negative implications in terms of exploitation—whether in terms of lower wages,

longer working hours or zero hour contracts. The modern inability to escape computers in our lives may lead to all sorts of negative consequences from the negative impacts on well-being and life satisfaction to increasing levels of stress for workers who cannot escape.

So overall, for workers, the digital economy has mixed implications for life satisfaction and stress levels, and work opportunities may not be shared as widely as they could be. With more people working longer hours, the employment opportunities for unemployed outsiders, especially those without the requisite technology education and skills, are significantly reduced. From the employer's point of view too, the likely benefits are mixed. The potential for shirking at work is increased by the prevalence and easy access of social media for most employees.

## 3.3    Entrepreneurs and Businesses

New opportunities have been created with the growth of the digital economy—especially as these new technologies have transformed ways of doing business. With the growth of the Internet initially, and now the growth of mobile technologies, the location of physical fixed assets, a head office and local resources is less important, reflecting the fact that the digital economy is associated with innovations and investments that are a-spatial and knowledge-driven. Research and innovation are driven by brain-power and high level skills, and not by abundant labour supplies. This means that the digital economy has quite a different nature and character relative to the old economy. In the 1990s, the New Economy grew alongside globalisation with significant feedback between globalisation and computerisation. Being able instantaneously to communicate and trade with the support of computer and mobile technologies has had large impacts on globalised economic activity and trade. In this sense, the growth of the digital economy has complemented the process of globalisation—trading and communicating with customers and businesses in almost any part of the world is now possible, easy and even instantaneous. One key drawback will be that those workers without technical skills, including some older workers, are likely to suffer disproportionately from falling wages and falling employment opportunities.

## 3.4 Financial Constraints

Whilst the digital economy has created a wide range of new entrepreneurial opportunities, particularly for small businesses that no longer need the physical business investments on which they would previously have had to rely, a key constraint comes in financing new business investments. In terms of business finance, following the Global Financial Crisis, financing new entrepreneurial investment in cyber technologies experienced temporary lulls. Whilst the New Economy grew rapidly in the 1990s—helped significantly by venture capital injections in the form of equity finance—in the aftermath of the financial crisis, finance is harder to find, especially given the new restrictions on bank lending imposed after the crisis. Venture capitalists' supplies of funds are more limited, and the credit constraints on new borrowing, especially for innovative new ventures, are much constrained. From 2007–2008 onwards, following the bank bailouts, bank lending was harder to find for small businesses as banks were more inclined to lend for mortgages because of the relatively lower risks associated with mortgage lending versus business lending. It is much easier to track the financial and credit history of an owner-occupier, especially with the growth of credit rating agencies such as Experian. In addition, the value of housing assets is easier to predict than the likely success of an innovative new business.

The drying-up of business lending in the aftermath of the financial crisis penalised particularly a younger generation of entrepreneurs, many of whom are responsible for a substantial proportion of New Economy investments (with a small number of notable exceptions—perhaps most famously Facebook's Mark Zuckerberg). But the more common younger entrepreneurs have less access to financial capital, especially as fewer of them have access to the collateral that housing wealth provides. One solution has emerged in the form of new financial technologies—known as FinTech. Young entrepreneurs leading new high-tech companies do not have retained profits to fund investments because they cannot tap into existing production. With the drying-up of venture capital funds, they have suffered disproportionately.

New firms will play a particularly important role in the development of the New Economy. For example, in their analysis of the biotech sector, Darby and Zucker (2002) note that 512 of 700 biotech firms in their sample of firms founded up to 1990 were new entrants, though Darby and Zucker

do not define precisely what they mean by 'new'. If financial constraints are not binding, then new firms will have more flexibility than old firms to take advantage of new high-tech investments, both in terms of producing innovative goods and in terms of purchasing new high-tech equipment. New firms are likely to be more prominent because old firms have a capital stock in place, consisting of machines of many vintages; existing firms may not be able or willing quickly to introduce new production techniques. Hobijn and Jovanovic (2001) present empirical evidence to support their hypothesis that the IT revolution has adversely affected old firms, showing that the overall market capitalisation of firms listed on NYSE, AMEX and NASDAQ largely reflects the activity of newly formed firms. After allowing for the impact of mergers, they calculate the contribution to market capitalisations of older firms (i.e. those existing in 1972) versus newer firms. They find that the market capitalisations for older firms did not increase by much between 1972 and 2000 even though aggregate market capitalisations (as a percentage of GDP) almost doubled during the same period. They conclude that the source of new value must be coming from innovative new firms.

However, the dominance of new firm activity requires access to venture capital equity finance funds. New entrants into the high-tech production sectors will be dependent upon such funding because they will have limited financial resources of their own, in the form of retained profits, with which to develop and produce expensive high-tech products. Retained profits will take a while to come on-stream. Asymmetric information will limit corporate financing via borrowing. Problems of moral hazard and adverse selection mean that most traditionally conservative lenders will be unwilling to take the risks involved in financing investment ventures when little or no concrete information exists about the potential future returns from innovative new investments (Bebczuk 2003). For these reasons, it is difficult to overestimate the importance of venture capital funding to developments in the New Economy, particularly the IT sector. Without venture capital funding, the diffusion of new innovations would be constrained, unless governments step in.

Developments in the computing industry had a profound impact on venture capital disbursements in the USA in the late 1990s. Venture capitalists operate by spreading their risks across a number of different innovative proposals, with the expectation that even if a small proportion of the investments deliver the goods, then the profits will be ensured. This is not to say

that venture capitalists will invest in anything: Market conditions, the usefulness and marketability of the potential products, and the personal qualities of companies' business founders and/or principal star scientists are carefully assessed. They will also concentrate their efforts on new high-tech industries.

Growth in venture capital disbursements through the 1990s largely reflected Internet-related innovations; in 1999, 42% of US venture capital disbursements were allocated to Internet-related businesses. Total venture capital disbursements in the USA tripled between 1998 and 2000, illustrating the importance of the symbiotic relationship between venture capitalists and IT innovators.

## 3.5    Macroeconomic Implications

Most of these benefits and costs dominate at a microeconomic level, but what are the wider macroeconomic implications? Whilst the range of choices, the ease of purchasing and the flexibility of working have undoubtedly improved, along with these benefits come significant costs, which are all but impossible to measure using traditional macroeconomic statistics. It is undoubtedly true that IT investments are associated with greater labour productivity, translating into improved macroeconomic performance when narrowly defined using monetary measures such as GDP. An additional concern is that computerisation's positive impacts have not been dispersed evenly across occupational and demographic groups, regions and nations. In the case of the UK, the growth of the digital economy has been accompanied by growing regional divides. For example, whilst the FinTech sector has been growing very successfully, and is one of the UK government's priorities, FinTech activity is largely concentrated around the South East—especially in areas connecting the Silicon Roundabout in London with the Silicon Fen in Cambridge.

Understanding of what constitutes good macroeconomic performance is changing too—with an increasing number of governments and statistical agencies developing new data and statistics as alternatives to traditional measures of macroeconomic performance based around GDP—a monetary measure that has a significant number of limitations in terms of its coverage and also its capacity to capture inequality and standards of living conceived in broader terms. In measuring and capturing macroeconomic

performance, the focus has shifted away from purely monetary measures towards capturing life satisfaction, well-being and happiness in addition to traditional GDP measures (Layard 2011; O'Donnell et al. 2014).

These new measures are being captured via the use of surveys of life satisfaction by the OECD, and some national governments—including in the UK and France. For the digital economy, the macroeconomic implications of internet technologies in terms of well-being, inequality and general life satisfaction are likely to be variable (OECD 2015). With an increasing proportion of our lives spent engaging with mobile phones and digital technologies, the opportunities for community and family engagement may be diminishing. As the boundary between our work lives and home lives is becoming increasingly fuzzy, reflecting our extensive use of digital technologies, the impacts on life satisfaction are in some ways likely to be negative, though in terms of the growth of digital health technologies, there will be benefits in terms of improving fitness and preventative medicine as well as impacts on education and learning technologies. The balance between these different factors is difficult to capture using the new macroeconomic statistics focused on life satisfaction—in essence because of their qualitative and subjective nature—but nonetheless it is clear that the benefits and costs, at both the microeconomic and macroeconomic scales, are likely to be mixed and unclear.

# 4    Computing Investment in the Digital Economy

This chapter focuses specifically on the macroeconomic impacts from computing investment in terms of aggregate investment, unemployment and the relationships between them in the post-financial crisis era. Many of the determinants of investment in the 'old' economy operate in the same way for New Economy investment. But in understanding the impact of computing investment in the development of the New Economy, it is important to recognise that computing investment has several features that distinguish it from other investments. Rapid technological change has affected patterns of investment. Network effects have

had distinctive impacts on computing investment. Patterns of investment are different: Computerisation has decreased the importance of inventory investment whilst accelerating the rate of replacement investment via more rapid obsolescence in computing equipment and software. In addition, the venture capital funding and intangible investments have particular implications for innovative computing investment. Furthermore, assessing the potential rewards from innovative computing investments will become more difficult because uncertainty will be more profound.

## 4.1    Technological Change

Schumpeter (1911, 1939) argued that technological competition by oligopolistic firms generates a business cycle because the clustering of innovations creates 'bursts' of entrepreneurial and innovative activity. Initially, innovators make excess profits, and as they take factors and financing away from existing firms, prices for existing products will increase, offset by declining costs and prices of new products. Technological innovation generates booms as clusters of innovations stimulate further bursts of entrepreneurial activity, leading to bandwagon effects and imitative activity in new industries. Rising profits encourage new entrants and herds of imitative entrepreneurs enter industries in order to exploit new innovations. Technological herding will emerge as new innovations by technological leaders encourage further imitative investment activity within the same industry: As one innovative new firm enters an industry so others will follow. In addition, feedback effects will operate between investment and technological changes: Investment activity responds to technical innovations as firms race to acquire more productive capital goods, and in the process of accumulating new types of plant, machinery and equipment, technological innovations diffuse through the economy and other firms learn about new innovations.

Mensch (1979) argued that innovative phases were essential in overcoming recessions; when old technologies outlived their potential, there was pressure for new basic innovations to overcome recessions. But once the initial burst of activity took hold, profit margins began to fall as more and more people sought to exploit the diffusion of technological inno-

vations. So a downswing emerged as the inevitable consequence of the innovations that generated the upswing. The length of the downswing was determined by the nature of new investments. If gestation lags were long and/or if investments were particularly 'lumpy', then the downswing would be prolonged.

## 4.2    Network Effects

The growth of digital technologies has enabled much greater connectivity, including via growing networks—especially online networks—which are much more significant and endemic in the digital economy. These network effects have affected computing investment too. As explained in the preceding section, Schumpeterian models of technological change explain how herding takes hold as more and more entrepreneurs try to take advantage of the profits available from new innovations. These technologically-led herding tendencies will be particularly profound and complex for computing investment when there are significant network effects too.

Alongside the online social networks on which an increasing proportion of the population spend much time, a large proportion of modern computing technologies are tapping into computing networks of one sort or another, from fax machines, VCRs and Local Area Networks (LANs) to the Internet and electronic payment systems. These networks generate both positive and negative network externalities. A positive network externality occurs when an increase in the number of users of a networked product increases the value of that product for other existing producers and/or consumers. If these positive network effects are substantial, then networked goods and services will be under-used at current prices and investment in networked products will be insufficient relative to the social optimum. Positive externalities may also emerge with the diffusion of innovations. For example, investments in intangible assets (such as human capital investments, in training of staff) may have benefits for other firms (if skilled workers move between jobs).

There are also substantial negative network externalities, however. If there are benefits in waiting to innovate, for example, if a firm is able to

free-ride on an earlier entrant's network investments. If so, then this will create a negative externality for the pioneering innovators and create a 'second mover advantage' for imitators (Katz and Shapiro 1986). Negative network externalities may operate to deter innovative producers in new financial technologies (Glazer et al. 2002). Gowrisankaran and Stavins (2002) present an analysis of investment in electronic payments systems. They observe that as pioneering innovators build up electronic payments systems, imitator firms free-ride on pioneers' networks, although, as electronic payment systems evolve, the pioneer firms nonetheless stand to gain from the wider acceptability of their facilities. Negative network externalities may also exist if innovators destroy the value of their competitors' assets when they introduce new technologies.

Another important source of negative network externalities links into technological innovation. Given the network nature of modern computing, technological leaders—whether IBM in the 1970s/1980s, Microsoft from the 1990s or Apple Inc. today—will be able to exploit technological monopolies and dictate the production and investment decisions of other firms. This means that firms' investment strategies will exacerbate the herding patterns mentioned above because innovative industries can lead other firms by encouraging dependence on networked products. Technological leaders are able to use their technological advantage to force accelerated obsolescence and frequent product upgrades so that obsolescence becomes built into certain types of software and hardware (Cecchetti 2002). Firms follow other firms in investing in the latest versions of computing products because these are widely used by their customers, competitors and suppliers. Frequent software upgrades require increasingly powerful hardware too, creating obsolescence in a large proportion of older hardware as well as software (Cecchetti 2002). And so all forms of computing are replaced more frequently than necessary. Accelerating replacement investment in computing reflects not only a rapid technological process, but also the presence of the network externalities.

High levels of aggregate computing investment will encourage higher levels of production within the computing industries. In essence, the high-technology computing sector is operating as a herd leader because network externalities force higher levels of computing investment than

is necessary: Leaders in the computing and office machinery sector can propel excessively high levels of computing investment on their own, and other industries may be able to lead the whole economy by encouraging dependence on new products. Herding behaviours will become more intense when innovative industries can lead the whole economy by encouraging dependence on networked products.

The empirical evidence confirms that replacement investment has accelerated with computerisation. And a lot of that investment is not in completely new hardware and software. Some authors estimate that approximately 60% of corporate IT budgets go towards product upgrades and the replacement of outdated equipment and software (Roach 1998). So increasing investment is not necessarily accompanied by increases in the net capital stock, and accelerated depreciation arises as the 'dark side' of network externalities. Landefeld and Fraumeni (2000) show that deprecation (captured by the margin between Gross Domestic Product and Net Domestic Product) has been increasing with accelerated replacement, imposing otherwise avoidable costs on modern businesses. This accelerated rate of depreciation and replacement in computing equipment can be confirmed by examining data on the average ages of various types of equipment. The typical age of computing machinery, as captured by the median age of different types of computing equipment, is 1.7 years. The average life of a typical piece of 'old economy' machinery, for example, metalworking machinery, is considerably greater than the average lives of two typical types of 'New Economy' equipment, that is, mainframe computers and pre-packaged software. The peaks and troughs in the series partly reflect accounting write-offs, lumpy investments, cyclical factors and also heavy scrapping. Rapid falls in the average life of software came soon after the 1985 release of Microsoft Windows, and software life has not increased much since then. In the 1990s, the average ages for both software and hardware stabilised at lower levels, suggesting that the differences reflect accelerated depreciation and not just that businesses are investing in these types of assets for the first time.

## 4.3    Impacts from Inventory Investment

Whelan (2002) and Gordon (2000) argue that the development of new systems for inventory control has been one of the reasons underlying increased macroeconomic flexibility. In the mid-1980s, 'just-in-time' inventory control methods were developed, allowing the computerised tracking of manufactured goods through all stages from production to retail distribution. As a consequence, firms no longer had to store up large volumes of inventories because they could adjust their production relatively quickly in response to changes in demand, thereby making economies more resilient in the face of shocks (McConnell and Quiros 2000). As inventory investment is the most volatile component of investment, so it could be that decreases in inventory investment contributed to declining GDP volatility and reducing inflationary pressures (Cecchetti 2002).

## 4.4    The Role of Intangible Investments

Yang and Brynjolfsson (2001) show that intangible investment is mathematically equivalent to the adjustment and installation costs associated with the introduction of new equipment. Intangible assets are costly to create, but they do yield a stream of benefits over time. However, these costs are treated as current expenses in the traditional accounting framework. Yang and Brynjolfsson estimate that for some computerised planning systems, the internal and external costs of implementing these systems; for example, the large staffing budgets needed to pay staff to develop and implement changes can be up to 20 times the hardware costs. More typically for computing investments overall, the intangible costs amount to about ten times the hardware cost (Yang and Brynjolfsson 2001).

In addition, intangible assets are omitted from conventional balance sheets, exacerbating difficulties in capturing the New Economy's contribution to TFP growth (Basu et al. 2003). Whilst these benefits will deliver future capital gains to entrepreneurs, they may not be quickly reflected in current economic indicators. If financial markets are efficient,

then stock markets will capture the potential future intangible benefits from innovative investments more quickly than other economic institutions. Even so, it still takes a while for innovative industries to launch their IPOs, and until they have, aggregate market capitalisations will not fully reflect the present value of potential future dividends for the macroeconomy; a chunk of the future dividend yielding capital stock will be missing from stock market capitalisations, meaning that even stock markets will underestimate the future potential of innovative activity, at least until the market value of innovative new firms is capitalised by IPO launches (Hobijn and Jovanovic 2001). In many cases, dot-com companies have been grossly overvalued—contributing to the financial fragility of the system.

## 4.5    Information and Uncertainty

All investment decisions are complicated by the presence of uncertainty and asymmetric information (Dixit and Pindyck 1994; Baddeley 2002, 2003). The expected future benefits of current investment projects will be probabilistic and ordinal, not absolute and precise. For innovative investments, these problems become more profound. Uncertainty generates "a society of individuals each of whom is endeavoring to copy the others [because] knowing that our own individual judgement is worthless, we endeavor to fall back on the judgement of the rest of the world which is perhaps better informed" (Keynes 1937, p. 214). In a world of technological change, the incentives to follow others become even more pronounced as uncertainty increases. Judging the potential of an investment in a bakery—a business with plenty of prior examples over centuries for novice bakers to learn from—is far easier than judging the potential of an investment in a mobile wallets company.

Banerjee (1992) and Bikhchandani et al. (1992) develop models of Bayes rational herding as a social learning device—and these insights can be applied to computing investment too. Others' actions are assumed to provide valuable information, given uncertainty about the future, and judgements are adjusted in an objective and systematic way via the application of Bayes's rule. Rational herding involves systematically incorpo-

rating others' actions into an individual investor's information sets, but this means that private information is ignored.[3] Therefore, information cascades and herds develop as a consequence, reflecting the fact that rational agents are ignoring private information.

Topol (1991) applies a model of 'mimetic contagion' to financial investment, also focusing on the actions of others as a source of information in an uncertain world. Asset prices will reflect fundamental values but also the bid and ask prices of other investors, with weightings on these different sources of information varying with general uncertainty. When uncertainty is endemic, the information revealed via the prices paid by others will predominate over an individual's subjective perception of value, especially as an objective fundamental value will not exist with fundamental uncertainty (Davidson 1995; Davis 1997, 1998). In a world of asymmetric information, herding behaviour can reflect an attempt to learn from others about the state of an industry and/or the macroeconomy. Acemoglu (1993) explains how signals can be extracted about unobservable factors from the observed outcomes of others' actions. The extraction of signals about the investments of other firms from reported production/output is consistent with accelerator models of investment in which investment is defined as a function of output growth in the macroeconomy. One of the important factors within this model is technological externalities; technological change generates spillover effects and external economies and so the output and investment of each firm will be a function of an aggregate variable. Given uncertainty, businesses will use output growth as a signal of investment activity by other firms.

## 4.6    A Baseline Model of Computing Investment

Some of these influences can be analysed and applied to computing investment. Jorgenson (1963) analysed the investment decisions of profit-maximising firms investing whilst the net present value of their production and investment activities is positive. Assuming an infinite time horizon, the value of production and investment activities (V) can

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[3] Chamley (2003) provides an overview of Bayes's rational herding models.

be represented as the integral of discounted net receipts from the firm's activities:

$$V_t = Y_t\left(K_t, L_t\right) - w_t L_t - C_t K_t,$$ (1)

where

$$C = r - \dot{p}_k^e + \delta$$ (2)

and

$$Y_t\left(K, L\right) = A K_t^\alpha L_t^\beta.$$ (3)

$Y(K,L)$ is the value of output, $K$ and $L$ are inputs of capital and labour, $A$ represents technological change, $w$ is the wage rate, $C$ is the user cost of capital capturing the opportunity costs of holding capital assets and $\dot{p}_k^e$ is the expected appreciation in the relative price of capital goods. The profit-maximising firm will continue to augment its capital stock until $\dfrac{dV}{dK} = 0,$ and the profit-maximising position is determined where

$$MP_k = \frac{dY}{dK} = C = r + \partial - \dot{p}_k^e.$$ (4)

From Eq. (3), we have

$$\frac{dY}{dK} = \alpha \frac{Y}{K} = C.$$ (5)

Therefore, capital accumulation will be

$$\Delta K_t = \alpha \Delta \frac{Y_t}{C_t}.$$ (6)

The above baseline model can be extended to capture some of the influences outlined in the preceding section, focusing on special features associated with technological advance associated with the digital economy. Assume the following aggregate production function:

$$Y_{it}\left(K_{it},L_{it}\right)=\left(\bar{A}A_t\right)K_{it}^{\alpha}L_{it}^{\beta}. \tag{7}$$

The technological parameter is decomposed here into two components: $A$, the usual technological constant, and $\bar{A}$, the contribution of specifically high-tech technology, with a multiplicative form incorporated to capture the feedback effects between computing and non-computing technologies. This can be approximated in logs as follows:

$$y_t = \bar{a} + a_t + \alpha k_t + \beta l_t, \tag{8}$$

$$\Delta y_t = \Delta a_t + \alpha \Delta k_t + \beta \Delta l_t. \tag{9}$$

Equation (5) gives

$$\frac{dY}{dK} = \alpha \frac{Y}{K} = C. \tag{10}$$

This can be expressed in log form as

$$\ln \alpha + y_t - k_t = c_t, \tag{11}$$

$$\Delta y_t - \Delta k_t = \Delta c_t. \tag{12}$$

Putting together Eqs. (9) and (12) gives

$$\Delta a_t + \beta \Delta l_t - \Delta c_t = \left(1-\alpha\right)\Delta k_t, \tag{13}$$

given $\Delta k_k = \dfrac{K_{t+1} - K_t}{K_t} = \dfrac{I_t}{K_t},$

$$\frac{I_t}{K_t} = \Delta k_t = \frac{1}{1-\alpha}\big[\Delta a_t - \Delta c_t + \beta \Delta l_t\big]. \qquad (14)$$

Assuming that employment is stable, that is, $\Delta l_t = 0$, gives

$$\frac{I_t}{K_t} = \Delta k_t = \frac{1}{1-\alpha}\big[\Delta a_t - \Delta c_t\big]. \qquad (15)$$

As explained in the preceding section, in the context of computing investment in the digital economy, investors are following a leader industry—for example, computing companies whose innovations diffuse into other industries, driven by technological innovation and concomitant productivity gains. Here it is assumed that this industry is the computing industry and computing productivity growth is defined as $\Delta a_{ct}$, where the subscript $c$ denotes that this productivity growth is for the computing industry. This will proxy for the effects of technological change on the investment rate, and the time-series relationship outlined in Eqs. (1)–(15) can be disaggregated to give an industry-specific model as follows:

$$\frac{I_t}{K_t} = \Delta k_{it} = \frac{1}{1-\alpha}\big[\Delta a_{ct} - \Delta c_{it}\big], \qquad (16)$$

where the subscript $i$ denotes the specific industry.

Acemoglu's (1993) accelerator approach to signal extraction, as discussed above, focuses on the idea that investment actions of firm $j$ are unobservable to firm $i$. But firm $i$ will be able to infer these decisions by extracting a signal from the output growth of firm $j$: Firm $i$ will extract a signal about firm $j$'s investment decisions from the output of firm $j$. In this way, Acemoglu (op. cit.) explains how accelerator models can be reconciled with ideas about information asymmetry and signal extraction; output growth in other industries is a useful component of their information set in a world of uncertainty.

Network herding will emerge because firms are forced to follow their customers, suppliers and others with new product upgrades. Network

externalities and signal extraction can be amalgamated, adapted and transposed into the model of computing investment by using the rate of output growth for the high-tech industries ($\Delta y_{ct}$) as a measure of the power of leader industries to generate negative network externalities, giving

$$\frac{I_{it}}{K_{it}} = \Delta k_{it} = \frac{1}{1-\alpha}\left[\Delta a_{ct} - \Delta c_{it}\right] + \Delta y_{ct}. \tag{17}$$

This idea can be extended into a small world network context following the ideas of Watts and Strogatz (1998) and Watts (2004), with firm $j$ copying other firms too, and so the actions of these firms will have an indirect impact via firm $j$ on the actions of firm $i$. Overall, firms further removed within a network will have an influence that declines as the degree of separation increases. Incorporating the signal extraction ideas as applied to neighbourhood herding gives the following model:

$$\frac{I_{it}}{K_{it}} = \frac{1}{1-\alpha}\left[\Delta a_{ct} - \Delta c_{it}\right] + \Delta y_{ct} + \sum \gamma^s \Delta y_{i-s,t}, \tag{18}$$

where $j = i-s$, with $s$ defined as the degree of separation from a 'neighbouring' firm $j$. 'Neighbourhood' industries are identified via their standard industrial classifications (SICs). Neighbourhood herding effects are captured via a power function: Assuming $0 < \gamma < 1$, then as $s \to \infty$, $\gamma^s \to 0$: The further away is industry $j$, the less will be its impact on industry $i$. So if firm $j$ is the next firm along, then its output growth will be $\gamma \Delta y_{i-1,t}$; if firm $q$ is not next door to firm $i$ but is to firm $j$, then its output growth will be $\gamma^2 \Delta y_{i-2,t}$.

## 4.7 Implications for Employment and Unemployment

In assessing the likely implications of computing investment for unemployment, there will be two sets of influences: first, the impact of computerisation and other digital technologies on TFP—as captured by A. The impact of this is likely to be unequivocally positive, and so as the produc-

tion possibilities' frontier shifts outwards with the advent of new digital technologies, employment will increase concomitantly, and unemployment will decline. A second impact will depend on the extent to which the new digital capital stock will replace workers, which would lead to a reduction in employment and a rise in unemployment. In assessing these impacts, a key question will be the extent to which labour and capital are substitutes versus complements. In Jorgenson's (1963) neo-classical investment theory, capital and labour are assumed to be perfectly substitutable, and so if capital in the form of computing investment becomes much cheaper (e.g. with the operation of Moore's Law), then there will be an elastic response with computing equipment quickly substituting for labour. On the other hand, if capital and labour are complements and enter the production function with fixed capital-to-labour ratios, then cheaper computing equipment will not lead to substitutability because computers and workers are used in fixed proportions. Limited substitutability emerges for a range of reasons, but lags, adjustment costs, irreversibility and uncertainty are likely to slow the extent to which machines can quickly substitute for labour.

In the digital economy, the relationships between capital and labour, and the degrees of substitutability between them, are likely to be complex. Standalone computers are no longer dominant in the technologies in the workplace—more workers are using smartphones and laptops, and these types of computing/mobile equipment are cheaper. Given the relatively low sunk costs associated with these types of equipment, together with the fact that the growth of networks has meant that we are no longer dependent on one computer for our computing power, the fixed proportions and complementarity of capital and labour will be more fuzzy. On the other hand, adjustment costs are likely to be quite large with new technologies and lags might be complex—especially financing lags, though delivery lags are likely to be shorter than in previous decades. So, overall, it is likely that the elasticity of factor substitution between capital and labour in the context of the digital economy is likely to be somewhere between 0 and 1.

An additional complication is that labour is not homogeneous, and the investment model outlined above does not allow that the digital economy requires workers with particular types of skills. Workers in today's

digital economy need a sophisticated level of technical knowledge, and this means that workers without sophisticated technical skills are unlikely to be able to flexibly enter the new employment opportunities emerging from the growth in the digital economy and the new opportunities that digital capital will generate. So whilst it is possible that employment, overall, could increase with new digital opportunities, particular groups of workers are likely to be excluded, and this will lead to rises in unemployment within certain groups. It will also contribute to the rise in long-term unemployment and unemployment hysteresis because those workers who are unemployed outsiders are unlikely to have opportunities to maintain the skills that they already have, unless subsidised training is available; and the longer they remain unemployed, the more their skills will deteriorate and so the probability that they will remain unemployed will increase. In addition, if digital employment opportunities are concentrated geographically, rises in unemployment may be concentrated in particular regions, exacerbating regional inequalities, for example, the North–South divide in the UK. Given this heterogeneous pattern of consequences for insiders versus outsiders and technically skilled versus unskilled workers, patterns of unemployment and inequality are likely to change, with increasing unemployment and inequality concentrated in particular groups and regions.

# 5       Empirical Analysis

The previous sections have explored how workers, employers and entrepreneurs are affected by the growth of the digital economy, and the preceding section has explored the implications for investment and unemployment, and for the capital–labour mix. This section explores some of the empirical trends, and the econometric analysis focuses on how cyber investment in the digital economy, as proxied by ICT investment, has fed into long-term unemployment.

In these econometric analyses, it is important to emphasise some data limitations. Empirical analyses of computing investment in the digital economy are constrained by a number of data difficulties, and the results reported are conditional on this caveat. Measuring innovation is difficult; strictly speaking, it is defined as the process via which new technolo-

gies are developed into saleable new computing products. Innovation has both tangible and intangible facets, and the latter make its measurement difficult. Computing power has grown exponentially since 1971, reflecting the operation of 'Moore's Law', as noted above. This increasing power has fostered rapid falls in the cost of computing equipment. Measuring the impacts is also constrained by the fact that there is no commonly accepted definition of the New Economy that has driven the cyber revolution. The term 'New Economy' is generally used to refer to the different sort of economy that has emerged as a result of innovations in high technology, namely knowledge-based sectors of the economy.

Data sources relating to the New Economy are not well developed. For example, detailed product categories for goods and services in high-tech industries are not available, and so it is difficult to measure the links between high-tech production and non-high-tech production. The output variable in this econometric analysis is measured using traditional conventional accounting techniques, which are prone to limitations (see Rowlatt et al. 2002). Also, conventional price indexes do not capture quality improvements in computer goods, and hedonic pricing methods, used to capture computing speed and memory, are not comprehensive, though Spencer (2002) does argue that price surrogates based on the law of one price are acceptable. So inflationary pressures may be overestimated because quality improvements are underestimated. This measurement problem may also explain why reported productivity statistics for high-tech industries are surprisingly low; when quality adjusted price indexes are used, estimated productivity growth in high-tech industries is higher (Jorgenson and Stiroh 2000).

Another key problem that may affect the reliability of investment equations relates to the measurement of intangible capital assets. As companies innovate, a large proportion of their investment activity will involve intangible, non-physical investments affecting parts of R&D expenditure, patents, training of workers, new business processes, managerial know-how and other organisational changes complementary to the implementation of innovative processes. Computing investment as measured here will exclude these intangibles. In addition, conventional growth accounting techniques exclude the installation costs associated with intangible investments, which will affect the data on output. A final

limitation is in the restricted range of variables included in the estimations. Unfortunately, OECD data on Internet penetration, that is, percentage of homes with Internet access, are very patchy and could not be used in this analysis.

The estimations outlined below assess the impact of ICT investment on long-term unemployment, with growth in gross fixed capital formation (GFCF) included in the estimations to capture the impact of overall investment on long-term labour market conditions, as measured by the long-term unemployment rate. It could be expected that as GFCF grows, the capacity of the economy to absorb workers will increase; therefore, a negative relationship between long-term unemployment and GFCF growth is expected. For the ICT investment variable, we would expect that if the New Economy is replacing people with physical capital as a feature of the cyber revolution, then ICT investment will be positively correlated with long-term unemployment.

For the econometric estimations, OECD data from 17 countries for the period 2000–2010 were used (see the Appendix for details of countries, data sources and data definitions). The period 2000–2010 has been selected because of the constraints on data, which were truncated at both ends. The earliest available OECD computing investment data start in 2000 and finish in 2010, by which time the full impacts on long-term unemployment specifically and global recession generally would not have worked their way through the economy to long-term unemployment. Unfortunately, there is a long lag on the release of OECD GFCF data—especially for computing investment, and 2010 is the most recent year available at this time—but future research will develop the approach over a longer time period.

The data were initially estimated using pooled estimation techniques (simple OLS), as summarised in Table 1. This does not take account of country-specific fixed effects, and so it is likely to suffer econometric problems reflecting omission of country-specific effects, and endogeneity is likely to create bias. For this reason, standard panel estimation techniques have been used, including fixed-effects panel estimation (least-squares dummy variable estimation—LSDV) and random-effects (RE) panel estimations, as summarised in Table 2.

**Table 1** ICT investment impacts on unemployment. OLS Estimation. Dependent variable—long-term unemployment 2000–2010, 17 countries

| OLS model—pooled estimation | Coefficient | Standard error |
|---|---|---|
| ICT investment | −0.0135202 | 0.0016976 |
| GFCF (growth) | −0.0013313 | 0.0015814 |
| Constant | 0.6716331 | 0.0320141 |
| Adj $R$-squared = 0.2520 | $F$-test of explanatory power = 4.226 [$p$ = 0.000] | |

| OLS estimation diagnostics | | |
|---|---|---|
| Breusch–Pagan (heteroscedasticity) | chi-square(1) = 0.46 [$p$ = 0.4987] | |
| Ramsey RESET (no omitted variables) | $F(3, 181)$ = 0.50 [$p$ = 0.6806] | |
| Cameron–Trivedi IM decomposition | Heteroscedasticity | 9.37 [$p$ = 0.0951] |
| | Skewness | 1.18 [$p$ = 0.5541] |
| | Kurtosis | 5.7 [$p$ = 0.017] |
| | Total | 16.25 [$p$ = 0.0389] |

**Table 2** ICT investment impacts on unemployment—panel estimations. Dependent variable—long-term unemployment 2000–2010, 17 countries

| Fixed-effects estimation—LSDV | | | | | | |
|---|---|---|---|---|---|---|
| | Coefficient | Standard error | $t$ | $P > \lvert t \rvert$ | 95% confidence interval | |
| ICT investment | 0.007 | 0.002 | 3.06 | 0.003 | 0.002 | 0.011 |
| GFCF (growth) | 0.001 | 0.001 | 1.62 | 0.107 | 0 | 0.003 |
| Constant | 0.301 | 0.041 | 7.44 | 0 | 0.221 | 0.381 |
| $F$-test $u_i = 0$: $F(16, 168) = 48.51$ [$p = 0.000$] | | | | | | |

| Random effects estimation—RE | | | | | | |
|---|---|---|---|---|---|---|
| | Coefficient | Standard error | $t$ | $P > \lvert t \rvert$ | 95% confidence interval | |
| ICT investment | 0.003 | 0.002 | 1.22 | 0.221 | −0.002 | 0.007 |
| GFCF (growth) | 0.001 | 0.001 | 1.47 | 0.143 | 0.000 | 0.003 |
| Constant | 0.377 | 0.047 | 8.05 | 0.000 | 0.286 | 0.469 |
| Wald chi-square(2) = 3.76 | | | | | | |

The LSDV estimation does show signs that the errors are not identically and independently distributed, suggesting that RE estimation is more efficient, but the parameter estimates across both are similar, suggesting that the specification is robust. Further dynamic panel estimations were conducted to properly account for the temporal dimension estimated using unadjusted and robust standard errors, as reported in Table 3.

The findings from the panel estimations are likely to be most robust (in comparison with the simple pooling procedure), and all these estimations confirm a positive relationship between long-term unemployment and ICT investment, thereby confirming the overall hypothesis that the cyber revolution has the potential to undermine real economic activity and contribute to long-term unemployment as a symptom of secular stagnation, though further research is needed to explore this finding across a longer time span. Also, signs of heteroscedasticity and kurtosis suggest that further work is needed in improving these econometric estimations.

**Table 3** ICT investment impacts on unemployment—dynamic estimations. Dependent variable—long-term unemployment 2000–2010, 17 countries

| Dynamic panel estimation (DPE)—unadjusted standard errors | | | | | | |
|---|---|---|---|---|---|---|
| | Coefficient | Standard error | t | P > \|t\| | 95% confidence interval | |
| ICT investment | 0.0076105 | 0.0028153 | 2.7 | 0.007 | 0.0020927 | 0.0131283 |
| GFCF (growth) | 0.0014029 | 0.0001235 | 11.36 | 0 | 0.0011608 | 0.0016449 |
| Constant | 0.2897458 | 0.0579289 | 5 | 0 | 0.1762073 | 0.4032843 |
| Wald chi-square(2) = 130.46 [$p$ = 0.000] | | | | | | |

| Dynamic panel estimation (DPE)—robust standard errors | | | | | | |
|---|---|---|---|---|---|---|
| | Coefficient | Standard error | t | P>\|t\| | 95% confidence interval | |
| ICT investment | 0.0076105 | 0.0451604 | 0.17 | 0.866 | −0.0809024 | 0.0961233 |
| GFCF (growth) | 0.0014029 | 0.0008903 | 1.58 | 0.115 | −0.0003421 | 0.0031478 |
| Constant | 0.2897458 | 0.8935069 | 0.32 | 0.746 | −1.461495 | 2.040987 |
| Wald chi-square(2) = 2.53 [$p$ =0.2825] | | | | | | |

# 6    Policy Implications

The findings outlined above have shown that ICT investment is associated with rising long-term unemployment. This is unsurprising if ICT is generating alternative ways of working and producing. Optimists might argue that falling employment would be accompanied by rising entrepreneurship and self-employment, which would balance out the problem; however, the evidence provided in this contribution suggests that ICT investment is likely to have contributed to rising long-term unemployment, and this suggests that replaced workers are not moving into other forms of activity.

Policy solutions could focus on providing alternative styles of working, for example, via self-employment and small business entrepreneurship. For the UK at least, a promising route is via the growth of new technologies, including FinTech. A recent Blackett Review in 2015 explored some of the impacts of FinTech for the macroeconomy (Blackett Review 2015). FinTech could be a key source of potential future growth and new employment opportunities if FinTech entrepreneurship grows rapidly. As more economic activity shifts to the Internet and e-commerce, this will

create many new commercial opportunities for ICT entrepreneurs more generally too, assuming that there is a demand for the outputs produced. New Economy innovations are revolutionising the way we work and operate businesses. ICT investment has fed changes in economic structures, and this structural change has emerged not only via standard, well-explored ICT innovations, including the Internet, but also via indirect routes, for example, online social networks. These have revolutionised not only the consumption side of economic activity, but also the business side—for example, as operators such as Uber, TripAdvisor and airbnb have changed consumption markets and replaced the traditional relationships between consumer and producer, and employer and employee. They have also created many new opportunities for small-scale entrepreneurship, but an erosion of workers' rights at the same time. So there are many complex pros and cons to explore in policy terms—in terms of protecting individuals.

The specific policy implications from the cyber revolution and the growth of the digital economy are far-reaching and relevant to almost every aspect of our modern lives. For consumers, a key concern is the pervasive nature of digital technologies and, in particular, the implications for cyber privacy and security-related problems of cybercrime and cyber fraud. The fact that cybercrime is so cheap to engineer and perpetrate is a central problem; in the modern world, it costs almost nothing to send a scam to thousands, and even if only one attempt succeeds, the benefits justify the costs. Governments across the world are increasingly exploring some of these implications, as are commercial organisations such as banks. A key issue will be to ensure that populations have as high a degree of digital literacy as possible so that people are able to protect themselves as effectively as possible. A wider concern is the extent to which public infrastructure is vulnerable to cybercrime and cyber terrorism. The only obvious solution to this is to develop technologies to protect infrastructure, but the problem remains that essentially it is an arms race—each time new security technology is developed, cybercriminals and attackers can find ways to subvert it.

Turning to the implications for labour markets, employment and unemployment, the central focus of this chapter, a range of complex challenges face policy-makers. The empirical analysis has shown that computing

investment is associated with a rise in unemployment, and this will reflect the substitution of new technology via a number a channels. The new technology embedded in capital investments will substitute for labour, and this tendency is likely to increase as new labour-saving technologies such as robotics and AI develop and spread. In addition, if insiders in employment are working increasingly long hours—in an informal and unplanned way that is difficult to monitor—then policy-making needs to shift to support outsiders, particularly the long-term unemployed. Possibly the most crucial policy initiative will come in the form of providing skills and training support for unemployed outsiders, particularly those from groups that are likely to be excluded from the new digital economy opportunities available. The implications of new technologies such as robotics and AI need to be assessed carefully, particularly focusing on the negative externalities that accompany their wider adoption. These will be associated not only with replacement of workers and their traditional economic benefits including wages and working hours, but also in terms of the life satisfaction that comes from working and contributing to the economy. If there are significant negative externalities, then a tax could be introduced, perhaps hypothecated so that the revenue could be diverted to providing new skills and training opportunities for displaced workers.

As noted above, alongside the regional and occupational inequalities that might emerge from the digital economy, regional divides may also contribute to rising inequality. This represents an opportunity if government subsidies could be dispersed so that digital economy investment, employment and skills/training programmes are targeted at particular regions suffering economic decline. Given the a-spatial nature of new digital technologies, the implementation of such programmes in areas that are relatively excluded in economic growth should be relatively easy. In terms of policies relevant in the aftermath of the Global Financial Crisis, digital technologies have a lot of potential to transform our monetary and financial systems. As noted above, FinTech is a key area of financial services that, in the UK particularly, has received some government support, even if more rhetorical than financial. Specifically, in terms of labour market implications, the growth of FinTech could have the potential to ameliorate unemployment problems too, if new jobs are created in the FinTech sector. In the context of the UK post-Brexit, as UK financial

services deal with the aftermath of the shock of the EU referendum vote, and then the actual withdrawal from the EU as Brexit is implemented, FinTech and other related digital technologies could provide an important route for new employment and entrepreneurship opportunities as European financial services activity withdraws to other financial hubs in the EU, such as Frankfurt and Dublin.

The problem for FinTech and other financial digital technologies is that their strength is also their weakness. FinTech has enabled disintermediation so that the big commercial banks and other financial institutions no longer have the strangle-hold on lending and saving, as is illustrated, for example, in the growth of peer-to-peer (P2P) lending and crowdfunding. This creates new weaknesses as these small FinTech companies will be far harder to regulate and co-ordinate than the traditional banking sector. Wider implications will come because the new financial technologies—particularly those focused around disintermediation—may distort monetary policy.

Overall, FinTech has the potential to transform the provision of financial services in the UK economy, but it is also likely to be the catalyst to transformative changes in the operation of the monetary transmission mechanism and the effectiveness of traditional monetary policies. With globalisation, financial deregulation and computerisation, particularly of financial services, national monetary policy tools have become blunt instruments: For example, the UK's Bank of England's Monetary Policy Committee as it is currently constituted is far less able to control inflation/deflation, borrowing rates and/or availability of finance than previously; it has overshot or undershot its inflation target most of the time because inflation is driven by forces beyond the control of national policy-makers. Growth in digital finance is likely to intensify this loss of monetary control.

Part of the problems centres around the fact that digital finance generally, and electronic currencies specifically, has distinctive features that are substantively different from traditional money (Baddeley 2004; Baddeley and Fontana 2006). Versions of electronic currencies have been around for a while but recently have reached some sort of tipping point as seen in the recent rapid growth in Bitcoin trading and acceptability. In theory, there are various ways in which a central bank can manip-

ulate the cost and availability of finance, but textbook theory is based on an assumption that central banks are the only significant issuers of currency. (Whilst there are a plenty of historical examples of informal currencies, e.g. sea-shells, these have been limited in impact and scale.) The fact that a monetary authority can control the money supply more broadly is an assumption that can be easily challenged—but to illustrate the point: Monetary policy depends on the ability of central banks to control interest rates and the money supply (e.g. via quantitative easing). Policy-makers assume that this will feed through the monetary transmission mechanism to have impacts on real economy output, employment and growth. In the digital economy, the rapid growth in the everyday use of virtual currencies such as Bitcoin and its newer rivals, and increasing disintermediation associated with the growth in P2P lending, is a challenge to central banks' tradition role as a monopoly provider of currency.

Digital money and finance might disrupt this structure in three ways: first, by supplanting the central banks' monopoly role as the supplier of money as a unit of exchange; second, by allowing businesses and households to find other routes for financing beyond that of commercial banks, thus limiting the central bank's control of the money supply (assuming that they have much control in the real world anyway and depending on how money supply is defined); and third, by altering the monetary transmission mechanism from monetary policy to the real economy. This reflects not that new digital monies affect credit creation but that they represent leakages from the credit creation process, dampening the money multiplier. Within fractional reserve banking systems, as are used in much of the developed world, commercial banks lend out much more than they hold in their reserve accounts with the central bank. By manipulating leverage ratios, the central bank has the power to alter the money supply in the wider economy. So changes in leverage ratios are not just about prudential regulation; they are also about controlling bank lending. But with new digital technologies increasingly dominating financial services and the rise in disintermediation, this control of monetary transmission will be affected because changes in leverage ratios will not affect more informal monetary technologies associated with FinTech and other small-scale digital financial companies. More generally, informal digital finance will have impacts in dampening

the money multiplier and thus the central bank's control of the money supply and the monetary transmission mechanism because innovations such as P2P lending and crowdfunding are equivalent to leakages from the monetary transmission mechanism generated when people decide to hold cash.

Given the potential of finance in the digital economy to transform the UK's financial services sector, policy-making tensions, including implications for the control of money and credit, should be analysed carefully: not only at a microeconomic level in terms of the cost and availability of finance offered by commercial banks and other financial institutions to individual households and businesses, but also in terms of macroeconomic outcomes that emerge if/when FinTech transforms the landscape of financial services. Recognising that it has limited control over the money supply, monetary transmission and therefore inflation, central banks could move away from a focus on inflation targeting towards newer monetary policy approaches, potentially harnessing financial innovations from digital finance designed to improve information and increase transparency. Monetary policy-makers will have limited direct control over the money supply, its cost and its use. So effective supervision, prudential regulation and reduction of systemic risks should be a major priority in reducing the vulnerabilities and interdependencies that are likely to emerge directly and indirectly as a consequence of rapid financial innovation.

# 7     Summary and Conclusions

This chapter has explored the ways in which the growth of the digital economy has affected economic and financial systems, specifically in the context of long-term unemployment. There can be little doubt that the rapid pace of computerisation over the last two decades has allowed businesses to respond more quickly to changing conditions. Internet and mobile technologies have brought many benefits, including productivity rises and new market opportunities. New business models and new, much cheaper ways of doing business have created new opportunities for entrepreneurs and self-employment too.

The impacts have been widespread, affecting a wide range of groups. Consumers, whose lives are heavily dependent on digital technologies and social media, are affected by the life satisfaction impacts and also by the cyber privacy and security threats associated with having a digitally dependent life. On a macroeconomic scale, negative impacts from secular stagnation, productivity losses, falling employment and rising unemployment—especially long-term unemployment—will have wider macroeconomic implications. Labour productivity and wages will decline if workers are obliged to spend time complying with complex and unwieldy security policies. Online social networks, easily accessible via mobile technologies, create opportunities for distractions and shirking at work. Automation of an increasing range of jobs dampens labour demand and accelerates substitution of capital for labour, with implications for consumer demand, employment and unemployment.

In exploring the relationships between computerisation, the digital economy and labour markets, the empirical evidence reported here has shown that there is a significant negative association between employment and computing investment, at least over the period 2000–2010 in the 17 OECD countries covered in the panel estimations. This can be explained by the technological changes in the computing industry specifically and the digital economy more widely, which have had knock-on effects for investment and employment across industries. The rise in long-term unemployment associated with computing investment is unsurprising if ICT is generating alternative ways of working and producing. Optimists might argue that falling employment would be accompanied by rising enterpreneurship; Entrepreneurship and self-employment would balance out the problem, but the evidence outlined here suggests that computing investment is likely to have contributed to rising long-term unemployment, and this suggests that replaced workers are not moving into other forms of activity.

Overall, the results presented above do suggest that traditional analyses of relationships between capital and labour provide only part of the story in explaining why and how computing investment has evolved, and the impacts it has on employment versus unemployment, particularly

long-term unemployment, versus impacts on self-employment and entrepreneurship. Further research is needed to see how computing investment and the digital economy more broadly have affected small business start-ups and entrepreneurship, particularly in the high-tech and FinTech sectors. In addition, broader measures of Internet penetration could give some useful insights into the impact of the cyber revolution more generally on our standards of living.

In terms of wider implications for policy-makers and ordinary citizens, the impacts of the cyber revolution on the digital economy are likely to be mixed and unevenly distributed. Groups with higher levels of computer and technical literacy, including younger and more educated groups, are more likely to be the winners from the economic and financial disruptions associated with the cyber revolution, at least in terms of employability. Older and less educated groups are more likely to suffer, especially if they are working or have worked in industries that are facing challenges from the latest technologies such as robotics. For these groups, digital and computing capital will be a challenge to their job opportunities. The likely consequences of this will be complex. If jobs are displaced, the newly unemployed workers will suffer monetary and psychological stresses. These will be exacerbated following the loss of a steady stream of wages, and the unemployed will also suffer because the psychic rewards in terms of general life satisfaction associated with making a contribution to society will be lost. The difficulties in measuring some of these impacts mean that impacts will not be captured in standard measures of economic performance such as GDP. For the long-term unemployed, the outcomes are likely to be severe, especially if the digital economy intensifies tendencies towards unemployment hysteresis. Given the high level of skills required to thrive in the digital economy, any period of unemployment is likely to see significant skills deterioration, and this will be particularly marked for groups who do not have a strong background in the digital economy. Either way, in broader macroeconomic terms, the impacts are likely to be deleterious, unless policy-makers are able to find ways in which workers, entrepreneurs and the self-employed can be effectively protected from the consequences of the cyber revolution, and enabled to leverage its power.

# Appendix

Data sources (2000–2010), 17 countries: Australia, Austria, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, New Zealand, Spain, Sweden, Switzerland, the UK and the USA.

All data downloaded from the OECD database:

*Long-term unemployment*

Unemployment of 6 months or more, as a proportion of total unemployment.

Calculated from OECD labour market data on unemployment duration.

*Source*: OECD database.

https://data.oecd.org/unemp/long-term-unemployment-rate.htm

*ICT investment*

Measured as a proportion of total investment.

*Source*: OECD database

https://data.oecd.org/ict/ict-investment.htm

*Gross fixed capital formation*

Gross fixed capital formation (GFCF) measured as growth rate.

*Source*: OECD database, Investment (GFCF)

https://data.oecd.org/gdp/investment-gfcf.htm     (indicator).     doi: 10.1787/b6793677-en

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# Back to the Future? UK Industrial Policy After the Great Financial Crisis

**David Bailey and Philip R. Tomlinson**

**Abstract**  In the aftermath of the Global Financial Crisis (GFC) (2008), debates began to shift towards perspectives on the 'rebalancing' of mature economies with a particular emphasis on promoting more sustainable productive activities. In the UK, this led to an initial acceptance—among some policy-makers—that the state could in a positive way utilise 'industrial policy' to revitalise manufacturing. However, while some of the early industrial policy initiatives—such as the Automotive Council and the Catapults—have been promising, the Coalition and then Conservative government's stance on industrial policy has been at best 'muddled' and at worst is often 'empty rhetoric'. In this chapter, we explore and evaluate the role of UK industrial policy since the GFC, paying particular emphasis on initiatives at technological, regional and sectoral levels. We conclude with some suggestions for the future course of UK industrial policy, in the post-Brexit era, given the government's recent green paper.

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# 1    Introduction[1]

In the aftermath of the Global Financial Crisis (GFC, 2007–2008) and the ensuing Great Recession (2008–2013), there was a rekindling of interest—particularly in the UK but also across the wider European Union (EU)—in 'industrial policy' (or to use the modern parlance, 'industrial strategy'). This revival of industrial policy into the UK political lexicon represented a sharp departure from the neo-liberal economic model, which had initially arose in the USA and UK, and had become entrenched in socio-economic policy-making since the late 1970s. The neo-liberal model, with its overly zealous emphasis on privatisation, de-regulation and free-market fetishism (with a limited role for the state), had finally unravelled to be nothing more than a chimera for delivering long-run, inclusive and sustainable prosperity (Bailey et al. 2015a). In contrast, the recent comparative success of the BRICs (Brazil, Russia, India and China) and previously acclaimed industrial policies of countries such as Japan, South Korea and Germany gave credence to the role of the state in economic development (Chang 2002a, b). In the UK, this new dialogue around industrial policy was underpinned by genuine concerns—among many economic commentators and policy-makers—over perceived challenges posed by a weak and fragile UK economy, ridden not only by high levels of public and private debt, but also by systemic imbalances, a much reduced manufacturing capacity and long-run deterioration in its trade balance and growing regional inequalities (Wade 2009; Cowling and Tomlinson 2011a; Hutton and Lee 2012). Indeed, the political desire for a rebalancing of the UK economy was given particular prominence when—in closing his 2011 budget—the then Conservative Chancellor George Osborne proclaimed his vision for a 'march of the makers' (Hansard 2011).

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[1] We would like to dedicate this chapter to the memory of Professor Keith Cowling (1936–2016), who inspired both of us and many others in the field of Industrial Policy.

Industrial policy itself is a wide-ranging concept. Pitelis (2015), for example, offers an encompassing, contemporary definition, referring to industrial policy as "a set of measures taken by a government that aim to influence the performance of firms, sectors, industries, and clusters towards a desired objective as well as the financial, human and organizational resources, and organizational and contingency arrangements made in order to implement this objective" (p. 18). Such measures would include (but are not limited to) support for 'infant industry', trade policies, science and technology policies, state procurement, regulation (and de-regulation) and anti-trust policy, merger policy, policies in relation to foreign direct investment, intellectual property rights, the allocation of financial resources, and, in recent years, the development of clusters and regions (see also Cimoli et al. 2009). While traditionally such measures have supported manufacturing, modern industrial policy recognises (and supports) sectoral interdependencies "between manufacturing and services, and even agriculture" (Pitelis, ibid., p. 18). There is also a distinction between *vertical* industrial policies, which are geared towards supporting specific sectors, and *horizontal* industrial policies, which are non-discriminatory and aim to promote an enabling and competitive environment for business growth (Bartlett 2014). For policy-makers, the salient question is to assess the scale (and likely effectiveness) of all types of industrial policies in meeting desired objectives before their implementation.

With industrial policy, after a long hiatus, apparently back in vogue, the main challenge since the GFC has been in the design of an appropriate industrial policy framework to rebalance the UK economy. This objective has been given greater credence as it is recognised that manufacturing is a key source of innovation and productivity, while countries with stronger manufacturing bases were not only more resilient (to the GFC), but have been able to reset their economies more quickly. Since 2008, successive UK governments have introduced a range of industrial policy initiatives largely focusing upon sectors, regions and technology. Some of these responsibilities now come under the remit of the rebranded (2016) UK Department for Business, Energy and Industrial Strategy.

Yet, almost a decade after the GFC, there remains much ambivalence about the UK government's industrial policy. Furthermore, since the GFC, leading business and economic indicators have worsened. Business

investment has been sluggish (falling again in the last quarter of 2016) and remaining below its pre-GFC peak (ONS 2016). This has translated into a poor UK productivity record, which (in 2014) was 18% below the average productivity performance of the other six countries comprising the G7 (Guardian 18/2/2016a). Similarly, industrial output (a broad measure including mining and quarrying) remains 8.1% lower, while manufacturing output, in particular, is 4.7% lower than in February 2008 at the onset of the GFC (ONS 2016). Indeed, since the GFC, manufacturing has entered several sporadic periods of recession (Guardian 11/5/2016c). The UK's long-running trade deficit also reached an unprecedented (post-Second World War) high of 6% of GDP in the final quarter of 2015 (Guardian 31/3/2016b). More broadly, Blanchflower (The Independent 3/8/2014) described the UK's economic recovery (from the GFC) as the slowest on record since the South Sea Bubble crisis of 1720. The situation has become even more critical in the context of the result of the Brexit referendum held on 23 June 2016, and recent indications from the UK Prime Minister, Theresa May, that the UK will leave the EU Single Market could have significant implications for the UK's manufacturing base (Bailey and De Propris 2017). Partly to militate against the risks of Brexit, the government recently published a new green paper entitled 'Building our Industrial Strategy' (HMG 2017).

In this chapter, we explore and evaluate the role of UK industrial policy since the GFC, focusing specifically upon three core areas: technology and innovation, places and sectors. We begin in Sect. 2 by exploring historical perspectives, especially the evolution of industrial policy in the UK and the EU (and wider world) since the Second World War. Section 3 provides a comprehensive review of UK technology and innovation policy, focusing specifically upon the introduction of the Catapult centres, while Sect. 4 looks at the notion of smart specialisation and developments in 'place-based' regional policy. Section 5 then examines recent UK sectoral policy initiatives (using the automotive sector as a case example). In Sect. 6, we then consider the issue of Brexit and the likely impact of leaving the Single Market for UK manufacturers, before commenting on the prospects for the government's newly launched industrial strategy green paper, where we offer some of our suggestions for ways forward. Finally, Sect. 7 offers concluding remarks.

## 2    Historical Perspectives

The rationale and focus of industrial policy in developed economies has evolved considerably over the last 80 years. In the immediate aftermath of the Second World War, arguments around (developing) infant industries and a new desire for state ownership and (more) state planning were in favour (Warwick 2013). This reflected both the changing socio-political climate—in the UK a distinctly socialist government was elected in 1945—and the economic necessity to restore the foundations of war-time economies where the consensus was that market forces (on their own) were unable to deliver stable growth (Coates 2015). This was the 'golden age' of Keynesian macro-economics, Bretton Woods and relatively 'managed' international trade and investment flows; governments had—or appeared to have—some degree of control over policy levers and the direction of the economy (Booth 1983).

During this era, industrial policy was predominantly 'vertical' or—as Warwick (2013) puts it—'selective', being targeted on specific sectors and industries. Policy was a mix of nationalisation and other forms of state aid and 'hard' policy instruments—such as direct subsidies, tariffs/quotas and use of state procurement—to benefit particular domestic firms and industries (Pryce 2012). The selection criteria were often discretionary, being in part a government desire to strategically 'pick winners' (in 'sunrise' industries) and thus promote 'national champions' and in other cases to safeguard employment in (regional) industries in long-term decline. The most proactive countries adopting such measures were, in Europe, France and, in the Far East, Japan, which by the late 1970s and—through clear state administrative guidance—became the world's second largest economy (see Johnson 1982; Bailey et al. 2007). In the UK, the peak point of this type of (vertical) industrial policy was the period 1964–1979, where both the Wilson and Heath governments enacted a series of selective measures to try and avert the UK's relative industrial decline. These measures included partial and full nationalisation of 'failing firms' for which responsibility eventually fell under the National Enterprise Board (NEB) (established in 1975), and whose wider remit was to provide funds for long-run industrial investment. The most notable nationalisations in this period were British Leyland, British Aerospace and Rolls Royce, and sev-

eral firms (typically in financial difficulty) received significant public subsidies, not least Leyland and Chrysler (see Coates 2015).

It has generally become accepted that the British experience of industrial policy during this period was a 'failure', although interestingly both British Aerospace and Rolls Royce have since become highly successful (private) businesses in their own right. Nevertheless, the approach drew significant criticism, not least that it encouraged rent-seeking behaviour by firms and a high degree of (inappropriate) lobbying by weak (though often large) corporate firms that were losing out in international markets (Baldwin and Robert-Nicoud 2007). Moreover, there were economic governance issues with the UK government often in a weak position in negotiating with major transnational corporations involved in British industry, who were often reluctant to allow their (global) strategies to become subservient to the wider industrial objectives of the British state (Coates 2015). In summary, industrial policy became associated with sinking significant sums of public money—in a period of tight public budget constraints—into 'lame duck industries'. This view of industrial policy still persists in some quarters to this day (Warwick 2013).[2]

The reaction was a retreat from large-scale interventionist industrial policy and instead, with the election of the Thatcher government in 1979, the widespread adoption of neo-liberal economics, which promoted extensive market de-regulation, privatisation and liberalisation. This approach became synonymous with the 'Washington Consensus' since it was widely advocated by the major policy-making Washington institutions such as the International Monetary Fund and the World Bank (Williamson 1990). Insofar as the UK had an industrial policy, it (arguably) was 'horizontal' with the role of the state being to facilitate an enabling business environment "by setting the rules of the game, ensuring the rule of law, and generally creating a market free of preferential subsidies in which all compete on an equal basis" (Bartlett 2014, p. 5). These 'horizontal' measures would include generic support for education

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[2] The comparative success of Japan is interesting. Japanese industrial policy was largely lauded for its role in developing a modern high-tech industrial economy, with the country nurturing prominent and (globally) successful national champions such as Toyota and Sony (Johnson 1982). This was largely achieved in an era when the Japanese state was able to exert close strategic control over its companies and industrial base. As (global) markets opened up, these 'national champions' began to increasingly move their operations off-shore, leading to concerns of a hollowing out of the country's industrial base in the 1990s–2000s (Cowling and Tomlinson 2000, 2011b; Tomlinson 2002).

and skills training, infrastructure and the use of tax incentives to promote entrepreneurship, investment and Research and Development (R&D), with the aim of raising UK productivity (see Warwick 2013). A critical view is that these 'horizontal' measures still held an inherent 'vertical' element, albeit one specifically favouring larger (corporate) firms that were in a stronger market position to appropriate much of the benefits from such initiatives (see also Christopherson and Clark 2007). Moreover, vertical policies were still used occasionally and explicitly, especially with regard to attracting inward Foreign Direct Investment (FDI) through public subsidies and other selective 'sweeteners' (such as preferable land sites and reductions in local business rates) to foreign firms, with the Nissan case being a notable example (see Hudson 2002). Elsewhere, industrial policy was subtly targeted (often through public procurement)—particularly in the USA—towards space- and defence-led industries (Kitson 2005).

Nevertheless, horizontal industrial policy became the only permissible obvious means of intervention in the rules governing the EU Single Market, an initiative in which the UK was at the forefront, and launched on 1 January 1993. The Single Market prohibited direct state aid to firms and industries and, among other things, had strict rules regarding public procurement to ensure equal treatment and transparency (across the EU) in awarding contracts to private operators in the public sector. This, arguably, nullified the ability of EU nation states favouring domestic firms (Sánchez Graells 2015). From the late 1990s onwards, EU and, by association, UK industrial policy moved more towards decentralised (horizontal) territorial policies through EU regional policy and the use of the European Regional Development Fund, which was part of the EU structural and investment funds (Begg and Mayes 2000).[3] In this regard, EU industrial policy began to be largely influenced by what Warwick (2013) refers to as a 'systems approach', which emphasises the importance of the generation, absorption and exploitation of knowledge as the source of growth. This is very much rooted in endogenous growth theory, theories of spatial learning and clusters (the 'learning economy'), and Schumpeterian institutionalist and evolutionary theories of growth; as such it represented a (nuanced) departure from neo-classical economics, which viewed the world as 'flat' with knowledge easily (and widely) disseminated. Instead,

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[3] For further details of the EU Regional Development and Cohesion Funds and how these funds are allocated and programmes evaluated see http://ec.europa.eu/regional_policy/index.cfm/en/.

the systems approach views knowledge as "heterogeneous, context [space] specific, tacit and sticky…with actors facing uncertainty, to which they adapt" (Warwick 2013, p. 21; own words in italics). Thus, to facilitate innovation-led growth, the EU—through the Lisbon Agenda (2000)—set out to promote regional innovation systems, and facilitate improved networking among (largely local) actors in regional clusters and closer links with public research and higher education bodies to enhance 'learning' and 'knowledge transfer' (see also Bartlett 2014).

The Lisbon strategy (2000), however, failed to improve EU (and UK) competitiveness or facilitate an inclusive and sustainable growth path. In part, it struggled with a lack of compliance and policy coordination across Europe, a reflection of a fragmented set of policy instruments and a lack of an overall cohesive industrial strategy (Tausch 2010). The underlying policy framework remained largely underpinned by a neo-liberal logic and notion of comparative advantage, where developed high-cost EU countries could specialise in (high-value-added) innovative value-creation activities (i.e. research, design, marketing and logistics), while commoditised manufacturing would be sourced from low-cost emerging economies, particularly in Asia. The extent of this international division of labour saw a decoupling of innovation and manufacture, leading to an erosion of the EU's industrial base, and in a number of EU countries—the UK being a prime example—an over-reliance upon untradeable sectors that left these economies more vulnerable during the GFC. Recent research has suggested that manufacturing processes and innovation are in reality not that easy to decouple and be relocated independent of each other. Off-shoring can thus pull along more innovation-intensive activities and destabilise the EU's innovation base [as has occurred in pharmaceuticals, advanced engineering, and information and communications technologies (ICT)]; the demise of manufacturing results in an impoverished 'industrial commons' (Pisano and Shih 2009; Ketovivi and Ali-Yrkko 2009).

More broadly, since the GFC, and in an effort to rebalance economies, both the EU—in its Europe 2020 strategy—and the UK have begun to revisit the notion of vertical industrial policy and 'non-neutral' modes of intervention, while seeking to maintain a 'level competitive playing field'. In the UK, this has seen a range of (inter-related) initiatives at sectoral and regional levels and in technological domains. The following sections provide a comprehensive review, starting with technology and innovation policy.

# 3 Technology and Innovation Policy

## 3.1 Rationale and Innovate UK

The rationale for the state to have an active technology and innovation policy is well established and stems from a series of market and systemic failures (Stoneman and Vickers 1988). An important adjunct is that any public investment in innovation activities has to demonstrate 'additionality'; that is, it needs to demonstrate an (socio-economic) impact over and above what the private sector would achieve without any (state) intervention (see Luukkonen 2000). This requires policies that target technological domains where there are barriers to private sector activity, and for which there are significant socio-economic benefits.

The market failures leading to sub-optimal private sector investment in R&D and innovation activity are multi-faceted. They include the higher levels of uncertainty associated with the time-scale and (long-run) potential returns to innovation. This issue becomes particularly acute in economies such as the UK, where the lack of patient finance (for innovation) is perceived as an endemic problem (Mazzucato 2013a).[4] In addition, the public goods element of innovation and the potential for (positive) knowledge spill-overs means it is impossible for private firms to appropriate the full value of their R&D investments; thus they will tend to underinvest and R&D will be conducted in a closed manner. There may also be natural monopoly considerations where some technologies with high fixed costs and (potentially dynamic) increasing returns to scale prohibit (wide) private sector investment in R&D; product market demand is such that only one firm can be supported. This is especially true for small- and medium-sized enterprises (SMEs), but also holds for larger firms when other factors such as uncertainty are also taken into account (Stoneman and Vickers 1988). The market may also not be able to coordinate effective collaboration (over innovation) between firms, univer-

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[4] UK industry has long been over-reliant upon short-term (equity) capital, where there is an overprevalence of investment incentives favouring short-term (equity) market movements at the expense of financing long-term investment, support for growing SMEs and long-term value creation (see Kay Review 2012, and also Sawyer 2015). The UK Treasury is currently undertaking a new review into patient finance which is being led by Sir Damon Buffini (The Telegraph, 21/11/2016).

sities and state agencies at national and international levels; the state may act as a neutral convener to connect and build such links to enhance innovative activity. Incomplete information (and lack of knowledge) about new technologies and their applications hamper market demand and can inhibit profitable R&D and technological diffusion. Again, state agencies can help to bridge this gap, by validating and demonstrating technologies to boost market confidence (Hauser 2014). Finally, there is a role for the state to address wider societal missions that go beyond the private/social wedge and where a (very) long-term vision is required (Mazzucato 2013b). These include state (and supra-national state) funding—and indeed from international funding—for major (macro) projects from space discovery and the development of the Internet to the design of more efficient transport systems and harnessing satellite data to better understand climate change and predict climate events.

The UK faces a something of a conundrum. It is a respected world leader in scientific research, hosting four out of world's top ten universities and has a citations record second only to that of the USA. However, the country's ability to translate new knowledge into commercial products and services is relatively weak, with (low) levels of expenditure in this stage of technological development no more than a small country such as Finland (Hauser 2014). Moreover, since the early 1990s, total UK investment in R&D has remained static at around 1.8% of GDP, well below that of competitor nations such as the USA, France and Germany, which are closer to 3% and South Korea at 4.0%. This reflects the fact that research-intensive sectors comprise a smaller part of the UK economy (vis-à-vis other nations) and the UK having lower levels of research conducted within these sectors. There are also concerns about significant UK weaknesses in basic skills, particularly in the science, technology, engineering and mathematics (STEM) subjects (BIS 2014). Low UK innovative capacity in turn translates into a low productivity–low-wage economy.

The responsibility for the implementation of UK innovation policy largely resides with Innovate UK—formerly the Technology Strategy Board (TSB)—a non-governmental public body, which was originally established in 2004. Innovate UK is the prime agency for prioritising funding (and supporting) UK innovative activity. Since 2007, it has com-

mitted over £1.8 billion to innovation projects, which has been matched by a similar amount in partner and business funding, and assisted more than 7600 organisations with projects, contributing over £11.5 billion to the UK economy and creating 55,000 extra new jobs.[5] One of Innovate UK's main partners is the Knowledge Transfer Network, which seeks to connect firms, universities, funders and other agencies to stimulate innovation. Innovate UK also oversees and partially funds the UK Catapult Centres and is playing a significant role in framing the UK's smart specialisation strategy (see Sect. 4). These have been the two major UK technology and innovation policy initiatives since the GFC, and we consider these in further detail below.

## 3.2    UK Catapult Centres

The UK Catapult Centres are a relatively new network of elite technology and innovation centres with a remit to 'transform great research into commercial success' (TSB 2013). They arose out of the Hauser Report (2010), which was commissioned by Lord Mandelson (then Secretary of State for Business, Innovation and Skills) towards the end of the last Labour government, 1997–2010 and examined the operation of Technology and Innovation Centres (TICs) across 12 countries. The Hauser Report noted how TICs were prominent in innovation ecosystems (in these countries) and typically focused upon a specific (scientific) domain, acting simultaneously as knowledge mediators and producers. They enabled the building of partnerships between academia, industry, government and other (innovation) intermediaries, and facilitated knowledge flows between scientific researchers and industry. In addition, TICs were able to enhance demand for new technologies among sophisticated buyers through technological diffusion initiatives, including demonstration events, seminars and conferences; thus, they raise awareness (and confidence) among firms of new technologies that can enhance business competitiveness (Hepburn and Wolfe 2014).

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[5] Details from https://www.gov.uk/government/organisations/innovate-uk/about (accessed 10/3/2017).

The rationale for the UK Catapults was to address "the gap between early stage publicly funded basic research and privately funded research at the commercialisation stage; many (UK) firms had struggled to bridge this void where innovation is stifled due to a lack of translational research in the middle stage of the technological readiness scale" (Hauser 2014, p. 10). While the UK has a significant number of 'Research and Technology Organisations' (RTOs) operating in various sectors at this intermediate stage of the innovation process, many of these "are capital constrained and [without public support] had become focused upon less risky activities closer to the market in established sectors rather than on emerging technologies and innovation areas which are riskier, but offer larger potential social and economic returns" (ibid., p. 13). This leads to a sub-optimal level of UK (based) investment and activity in potentially fruitful areas of innovation, adversely affecting the nation's growth trajectory.

The UK Catapults are based in part on the successful German *Fraunhofer* model, which began in the early 1950s and with a staff of over 24,500 now operates 67 distinct institutes and research units in Germany (and a further seven in its American subsidiary in the USA). Like the *Fraunhofer* institutes, the UK Catapults focus upon scientific and technological domains where the UK can gain a significant comparative advantage and provide a more direct link between academic research and industry to support the commercialisation of new technologies. In 2010, the New Coalition government committed £200 million over four years to establish six Catapults, and as of March 2017, there are 11 Catapult centres: Cell and Gene Therapy, Compound Semiconductor Applications, Digital, Energy Systems, Future Cities, High Value Manufacturing, Medicines Discovery, Offshore Renewable Energy, Precision Medicine, Satellite Applications and Transport Systems.[6] In a subsequent review, Hauser (2014) has recommended the UK establish around one or two new Catapults per year, so that by 2030 there will be 30 in total. To fund this objective will require the Innovate UK budget to be doubled to around £1 billion per annum by 2020, though such funding is unlikely to be forthcoming in an era of tight public budget constraints. The criteria

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[6] For further details, see https://catapult.org.uk/.

for choosing the themes for the Catapult centres—set out by Hauser (2010)—are as follows: (i) a large global market to exploit; (ii) a UK global lead in research capability; (iii) a platform technology of benefit to many UK-based companies; and (iv) the necessary absorptive capacity to commercially exploit in the UK.

Each Catapult centre is an independent legal entity, limited by guarantee, and is led by a Chief Executive Officer from industry with a Board composed of business users and experts in the respective technological domain. The Catapults are expected to raise funds equally—in keeping with international best practice—from three sources: (i) business-funded R&D contracts, (ii) collaborative applied R&D projects from the UK (research funding councils) and Europe (the H2020 programme) and funded jointly by the public and private sectors (also won competitively) and (iii) core UK public funding (via Innovate UK). This three-way split in funding arrangements is to ensure that the burden of risks is shared and the centres are allowed to focus upon developing the most advanced (and risky) technologies with the highest commercial potential. In this regard, ongoing public funding is critical to allow the Catapults to undertake research in new (high potential) areas which are either too large or risky for independent private sector actors. While private funding is important to maintain a market perspective, an over-reliance from this source (private funding) might shift the Catapults' priorities towards short-term projects, including consulting (rather than R&D/technology transfer), where there are few spill-overs and where there is already an established market. In this regard, the High Value Manufacturing Catapult (HVMC) currently attracts around 45% of its income from the private sector; while industry engagement is welcome, there is a risk that it could shift priorities towards shorter term projects. It is thus important to match this with increased levels of public support to ensure a balanced funding portfolio, and the HVMC Catapult maintains a critical mass of activity and capabilities in cutting-edge technologies.

In terms of services, the UK Catapults are said to be geared to provide business with "specialist technical expertise and skills across sectors to SMEs and supply chains, access to high value specialist equipment, facilities and infrastructure, technology and sector leadership, and long term investment in technology platforms or demonstrators" (BIS 2015,

pp. 6–7). This helps to address the natural monopoly problem, where no single firm (or supply chain) has the capital to finance a facility and its equipment at the leading edge of technology over time; this issue is especially acute for SMEs who also lack technical know-how. Indeed, the UK Catapults provide unique facilities with equipment often described as being 'one-of-a-kind' in the UK that can assist in the technological development of business and supply chains (Hauser 2014).

It is far too early for a full evaluation of the Catapults; the programme is a long-term initiative, where the seeds (of investment) may take decades to come to fruition. Indeed, innovation itself is a complex, multi-faceted process involving a range of actors, products and processes through which knowledge disseminates and is used in different ways. This is difficult to trace and measure, which means that a holistic approach to evaluation is required (Aranguren et al. 2016). The government has begun to identify some Knowledge Performance Indicators (KPIs) to capture inputs and activities from each centre to provide early measures of success (and weakness). The Hauser Review (2014) reports evidence from these early KPIs, which suggest the more established Catapults have been able to recruit high-calibre staff and are fully engaged in R&D with academia and business, while also making important contributions to skills training through apprenticeships and university research student placements. As the Catapults become more established, Hauser (2014) recommends that more sophisticated KPIs and a transparent performance framework will need to be developed which incentivise impact and engagement with industry, but still ensures Catapults maintain their role as being ahead of the market.

There are several early examples of how Catapults have been demonstrating their 'additionality'. For instance, Hauser (2014) reports how the Cell and Gene Therapy Catapult worked closely with ReNeuron, a leading UK cell therapy firm, on successfully developing (and validating) the manufacturing processes for the CTX stem cell line to be commercially ready. This enabled the company to attract £33 million in new (private) funding, allowing it to establish itself as a global leader in stem cell development, while the Catapults acquired new expertise in this area. ReNeuron had been considering relocating some of its opera-

tions overseas, but have decided to remain in the UK to maintain the partnership with the Catapults. Indeed, it is anticipated that Catapults will act as an anchor for new investment into the UK, as (global) firms will seek to locate their operations in economies with high-tech facilities and expertise. This will be especially important in the context of Brexit, which sits as a possible cloud on the horizon (see Sect. 6). A key role of the Catapults is in the testing, demonstration and validation (at scale) of new technologies (for wider societal benefit) in a collaborative process. Thus, the Future Cities Catapult in its 'Cities Unlocked' project has been instrumental in bringing together leading private sector actors and charities to test new technologies which assist visually impaired people to better navigate cities. Such partnerships bring different and unique skills (and perspectives) to the innovation process, and build confidence in the technology.

Despite these promising signs, the Catapults still face significant challenges going forward. These primarily relate to funding, not only in terms of ring fencing and extending public funding, but also in terms of ensuring that funding portfolios are sufficiently balanced to protect the Catapults' long-term remit. Increasing pressures on the public finances could compromise this position. At the micro level, the Hauser review (2014) also notes the Catapults' current lack of engagement with SMEs. Given the potential role of SMEs as facilitators of innovation, this is a missed opportunity. In part this reflects a lack of information and knowledge (among the SME sector) about the role of Catapults and how they can assist in SMEs in technology-related (business) growth. Overcoming such barriers will require Catapults adopting a dedicated SME strategy, which may include working closely with local government and business groups (possibly in regional clusters) to develop new (SME) partnerships. Similarly, the Catapults' links with the research base (particularly universities) will need to become more consistently embedded across the (Catapults) network, with increasing collaboration with international university partners (and other research institutes) (Hauser 2014). Accessing global sources of knowledge and fusing it with local knowledge expertise can enhance innovation and growth (Bathelt and Cohendet 2014).

# 4    Smart Specialisation and Place-Based Regional Policy

## 4.1    The Concept of Smart Specialisation

One of the main regional policy initiatives to emerge at the EU level since the GFC revolves around the notion of 'smart specialisation'. This is based on the idea that economic units (e.g. sectors or regions) can build on their own comparative advantages to generate new specialisms through the 'discovery of new domains of opportunity and local concentration and agglomeration of resources and competencies in these domains' (Foray 2015, p. 1). In this way, these economic units can exploit the potential to re-invigorate themselves, enhance their innovation and productivity performance, and move onto a more dynamic growth trajectory. The concept itself emerged from the Knowledge for Growth (K4G) network (2005–2009), a group of prominent (innovation) economists appointed by EU Commissioner Janez Potočnik to explore the ways in which policy could enhance European knowledge creation/transfer and promote innovation-led growth. It has since assumed a more spatial dimension, in part due to economic geographers and regional studies experts aligning the logic of its policy framework to the development of clusters and regional systems of innovation (Barca 2009; Ketels 2013; McCann and Ortega-Argilès 2015). Consequently, and in a short space of time, 'smart specialisation' has become the major component in the EU's 2020 flagship 'Innovation Union' programme and wider EU 2014–2020 Cohesion policy—known as RIS3 (Research and Innovation Strategies for Smart Specialisation).

There are significant features of 'smart specialisation', which have a traditional industrial policy flavour. First, it is a return to a more vertical and non-neutral mode of policy in that it advocates prioritising state support for particular technologies, fields or domains identified as having potential for 'entrepreneurial discoveries' which facilitate innovation and commercial exploitation (Foray 2013). Indeed, the role of entrepreneurs is crucial within the smart specialisation process, since they are often best placed to discover new opportunities (and technological domains). Thus,

while the concept does not advocate state support for particular sectors per se, the focus of support is upon specific 'activities' (within sectors, within technological fields or at the interstices of sectors) where there is potential for technological development, knowledge spill-overs, scale and agglomeration economies and market opportunities, but which would otherwise be under-funded privately because of classic market and coordination failures. These market failures relate to the weak appropriability of private returns from the discovery process (arising from information externalities) and for which the use of intellectual property rights (i.e. patents) is inappropriate. This is because achieving the (much) higher social returns from 'new discoveries' (as opposed to a simple innovation, which might be covered by a patent) requires information spill-overs to be maximised and widely dispersed (Hirshleifer 1971; Foray 2015). In addition, there are also higher levels of uncertainty associated with the discovery process, causing firms to underinvest and aligned to this, the (weak) access to finance and a higher cost of capital often assigned to such activities (Dasgupta 1988; Hall and Lerner 2010). State agencies can help to bridge these funding gaps by assessing the future potential of 'entrepreneurial discoveries' and allocating resources to the strongest cases.

Secondly, smart specialisation has also become a place-based strategy (see sub-section 4.2), which recognises that 'new entrepreneurial discoveries' often emerge from existing technologies and regionally based specialisms. This aligns with the concept—from economic geography—of 'related variety' whereby a region is able to unlock its existing expertise, competencies and knowledge bases and fuse these with new, complementary ideas and technologies in adjacent (and related) sectors (Frenken et al. 2007). Thus, the UK ceramics industry largely based in North Staffordshire is not an example of smart specialisation in practice because of the concentration of ceramics production in the region. However, applied material research activities such as those carried out by Lucideon, the industry's research centre [through its Applied Materials Research, Innovation and Commercialisation Company, which is based in the region], which seek to transform materials (including ceramics, metals and polymers), processes and technologies into new types of products and solutions to improve industrial efficiency and for commercial use can become a kind of smart specialisation if these new activities attract

new firms specialising in this field and bring new competitive advantages to the region (Tomlinson and Branston 2014). Such structural changes open up the possibility of regions moving onto more dynamic trajectories (Menzel and Fornahl, 2010; Asheim et.al. 2011; Neffke et al. 2011).

The challenges of smart specialisation primarily relate to the identification and prioritisation of activities for support, while simultaneously harnessing entrepreneurial endeavour and avoiding government failures emanating from bureaucratic, top-down allocation procedures. Foray (2013) offers five generic principles to guide policy-makers in identifying priorities: granularity, entrepreneurial discovery, evolving priority portfolios, inclusivity and evaluation. These are summarised in Fig. 1 and are relatively self-explanatory.

For regional policy, there is a risk that the smart specialisation logic naturally favours more dynamic regions where there are greater entrepreneurial and technological capabilities and good networks to facilitate knowledge diffusion. If this translates into the state providing greater support for leading regions (vis-à-vis weaker regions), it can exacerbate



**Granularity**
- Identify priorities at the right level between sectors and (very) micro-activities i.e. activities involving a group of firms exploring new technological/market domains with the potential to transform (in a positive way) the regional economy.

**Entrepreneurial Discovery**
- Identify priorities via interactive process involving entrepreneurs and state agencies and the sharing information.

**Evolving Priority Portfolios**
- Incorporate flexibility in policy to alter the provision of support and prioritisation of activities as the environment changes i.e. priorities will change overtime, and those prime activities emerging at present will/should not be supported indefinitely.

**Inclusivity**
- Ensure equal opportunities for all regions to participate in smart specialisation strategies to aid balanced growth.

**Evaluation**
- Establish suitable benchmarks (and criteria) and collate appropriate data on smart specialisation activities for analysis and evaluation thus mitigating the risk that support for activities are not dis-continued too early or carried on for too long.

**Fig. 1** Foray's (2013) guiding principles for identifying and prioritising 'smart specialisation' activities

regional imbalances and, indeed, would run counter to current EU (regional) cohesion policy (McCann and Ortega-Argilés 2015). Foray's (2013) 'inclusivity' principle (see Fig. 1) is thus particularly important, reminding policy-makers to develop mechanisms to ensure there are equal opportunities for weaker regions (where identifying new activities is more difficult) to put forward suitable cases for support. In practice, this will require carefully targeted (and additional) regional policies to upgrade capabilities (and promote opportunities) within lagging regions. McCann and Ortega-Argilés (2015) provide some guidance based around enhancing skills within existing regionally embedded industries, promoting a (regional) diversification strategy within a specialised technological domain (so as to encourage synergies in related technologies), and improving regional and inter-regional networks to facilitate learning linkages and knowledge flows. Such an approach complements the place-based aspects of smart specialisation, being tailored towards building upon a region's existing industrial commons as opposed to the more standard 'one-size-fits-all' (spatial-blind) policy solutions (see also Bailey et.al 2015b).

As noted, the European Commission has embarked upon building a platform of services (S3) to support EU regions in their efforts to devise and implement a smart specialisation strategy. In England, this process is largely being overseen by the Smart Specialisation Advisory Hub (S3AH) established in 2014. The Hub works closely with England's 39 Local Economic Partnerships (LEPs) in seeking to identify and target regional smart specialisation projects for state support. Projects earmarked for support are being partly funded by the European Regional Development Fund and the UK's Local Growth Fund. In order to inform decision-making and the allocation of funding, the Hub has thus begun to build a Data Observatory on UK (innovative) capabilities and on where they are concentrated. This is a major challenge since the existing evidence base is fragmented, with data limitations, including lags in data release (on innovation capabilities/activities) and limited information on granularity at the sectoral (and regional) levels. In addition, the Hub's analytics also need to combine hard data on R&D assets, with measures that capture a region's soft capacity such as people, skills, and, critically, the size and quality of networks (which are critical to the success of smart

specialisation projects) for which many of the indicators are currently lacking, particularly at the LEP level. These data limitations can all hinder smart specialisation strategies, which require good, up-to-date data for early identification of emerging technological domains. To militate against this, the Hub is currently involved in a large-scale data curation exercise utilising a wide range of secondary data sources (including the UK government's 2015 innovation mapping exercise) and engaging with a range of stakeholders to identify suitable indicators of innovative capacity (and performance) at different levels of geographical coverage (see Bailey 2016). This is a work in progress—the data currently collated can be accessed from the Observatory's website.[7]

The place-based emphasis of smart specialisation has meant that LEPs have become the prime focus for identifying and implementing smart specialisation strategies. It, however, remains to be seen how this all plays out, and as to whether the LEPs will lead (on local innovation) or whether this 'lead' will be largely 'tokenistic', given the majority of LEPs are relatively small in terms of geography and often lack funding to shape a smart specialisation approach (Willcocks 2014). Consequently, several LEPs (alongside other actors) have begun to collaborate and pool some resources. For instance, the Midlands Engine is a recent collaboration involving 11 LEPs, 86 local authorities, 27 universities and 25 science parks (covering 11.5 million people), which works on collaborative funding bids and on developing the region's innovation ecosystem, which includes identifying strengths in science and innovation and building skills, networks and knowledge exchange (Waddell 2016). The ability of LEPs or not to develop a 'place-based' policy is explored below.

## 4.2    Place-Based Versus Space Blind Policy?[8]

It can be argued that the 'back end' of the Labour Administration in office until 2010, and the subsequent Coalition government in office from 2010 to –2015, began to consider industrial policy more in line with contemporary thinking on industrial policy internationally (see,

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[7] Available at: http://smartspecialisationhub.org/observatory/.
[8] This section draws on Bailey et al. (2016).

e.g. Rodrik 2004, 2008) and with developments in place-based thinking, including smart specialisation (described above) at the level of the EU. Under this perspective, industrial policy is viewed as a 'process of discovery' requiring strategic collaboration between the private sector and state, where policy ideally has the quality of 'embedded autonomy'. It is not captured by firms and sectors, but focuses on the discovery process where firms and the state learn about underlying costs and opportunities and engage in strategic coordination. This perspective has close parallels with how modern 'place-based' policy has developed.

This is in contrast with 'space-neutral' frameworks long advocated by prominent institutions such as the World Bank (2009), where industrial and regional policy interventions are seen as being of limited value. Under 'space-neutral' approaches, key elements of policy should focus upon space- and sector-neutral interventions, such as on (i) supporting disadvantaged people to achieve better individual outcomes, through horizontal measures targeted at education, skills and welfare, regardless of where they live; (ii) fostering greater geographic mobility to make it easier for people to move to growing areas; and (iii) reducing the barriers to the expansion of economically successful places (Overman and Gibbons 2011; Crowley et al. 2012). This approach argues that left to themselves, markets will adjust if the barriers preventing them doing so are addressed. In terms of industrial and economic development, the view is taken that it is better to allow the market to work by itself, rather than for the State to in anyway actively intervene (e.g. through an industrial policy). Indeed, a smaller public sector is seen as potentially creating more space for the private sector to grow (Faggio and Overman 2012) and hence is seen as beneficial, whereas industrial and regional policies and their accompanying institutions are regarded as ineffective (Overman 2012).

A 'place-based' approach sees things rather differently. In part, this is because place-based approaches recognise knowledge as critical for effective policy development (Barca et al. 2012; Barca 2011). Yet within this perspective, it is also recognised that such knowledge is not already known either by the state, firms or local stakeholders. As a result, there is a positive role for policy in aiming to stimulate new knowledge and ideas through interactions between local groups (endogenously) and external actors (exogenously) (ibid.) as in the 'smart specialisation' approach

described above. In particular, in terms of regional policy, it has been used to emphasise the need to exploit related variety, build regional embeddedness and enable strategic diversification (McCann and Ortega-Argilés 2015). In so doing, it stresses the need for regional actors (government, firms, universities, research institutions) to collaborate, recognising the current starting point for the region in terms of skills, technologies and institutional governance and then to build on these capabilities rather than trying to start 'from scratch' (Wolfe 2011).

This approach thus sees the capacity of territories to root their economic activity into the local institutional fabric as being at the heart of their economic success, through the generation, acquisition and exchange of knowledge. Yet such knowledge is, in turn, uncertain and is embedded within localities and needs to be uncovered through participatory and bottom-up processes to build consensus and trust (Barca et al. 2012). Under this approach, the tendency of the 'state' is to lack both an understanding and knowledge of local places (it lacks a 'sense of community'; e.g. Barca et al. 2012; Hildreth and Bailey 2013; Bailey et al. 2016), with a consequent weakness in its capacity to adapt its approach towards local places and mediate local consensus and trust between local actors as well as to mobilise local resources effectively. This is no longer about 'picking winners' or propping up failing firms or industries but rather, as the IPPR (Institute for Public Policy Research) and Northern Economic Futures Commission (2012) note, about "seeking to identify and support the elements of comparative advantage within the economy that enable innovation and new technologies to take root and companies to grow" (p. 9).

In this regard, there is an institutional and capacity failure inherent at the national level in terms of the lack of resources to design industrial policy interventions. As Froud et al. (2011b) note, on industrial policy there is a:

> large gap between the old interventionism of 'picking winners' on the one hand, and the generic neo-liberal enterprise policies that have failed us for the last thirty years. But this is a gap that urgently needs to be bridged. It's an area of ignorance, a knowledge space that needs to be fashioned, if the UK is to start to create the successful industrial policies needed for regeneration. (p. 20)

Given the lack of resources at a national level to develop such policies, and the capacity constraints of many LEPs outside of major cities, there would appear to be a role for an intermediate tier in bringing 'place' and 'sectors' together in terms of industrial and regional policy development, a point which has been highlighted by the IPPR and Northern Economic Futures Commission (2012).[9] This has examined what a 'northern' industrial strategy might look like, identifying sectoral trends, analysing emerging strengths and opportunities identified by LEPs, and carrying out analysis of the export potential of key sectors in which the North already holds emergent strengths and which can be built on in a 'smart specialisation' sense. Indeed, as the report notes, the results of this analysis offer some cause for optimism: Despite an ongoing decline in traditional sectors such as manufacturing and extraction, new sectoral strengths are seen as emerging in related fields such as advanced manufacturing, pharmaceuticals and bio-health. The report goes on to note that LEPs and local authorities need to continue to develop their intelligence on key sub-sectors that are seen as having potential locally, but that between the LEP level and the national level there is scope (or space in our terms) for "a clear northern innovation agenda that is based on a small number of priorities and strategic assets and which addresses some of the North's cross-cutting innovation challenges" (ibid, p. 9).

The wider point is that filling this missing space requires regionally based industrial development strategies promoting 'related diversification'. Such strategies need to recognise (i) the need to bring together different but related activities in a region; and (ii) the differing potentials of regions to diversify, due to different industrial, knowledge and institutional structures linked to specific regional historical trajectories. Rather than 'starting from scratch' or applying 'one-size-fits-all policies', regional industrial

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[9] At this point, it is worth mentioning the Coalition government (2010–2015) commissioned the Heseltine Review (2012), led by the Conservative peer, Lord Michael Heseltine, who has long been a champion of industrial policy. This report focused upon generating local growth (across the country) and among other things, called for a large £49 billion transfer of central government funding to a Single Local Growth Fund over a four-year period. While a number of small recommendations were accepted/partially accepted by the government, the Treasury largely blocked its major ambitions allocating just £2 billion for 2015/16 as well as in subsequent year of the 2015–20 Parliament (1/6th of that recommended) for local growth initiatives. The implementation has been described as 'disappointingly timid' (see Coffey and Thornley 2015).

strategies instead require tailor-made policy actions embedded in, and linked to the specific needs and available resources of regions, starting with the existing knowledge and institutional base in that region. These need to capitalise on region-specific assets, rather than attempting to replicate and apply policies that may have worked in quite different places.

This 'missing space' can also be seen in terms of the industrial policy capacity that has been lost with the Coalition's governments (2010–2015) abolition of the Regional Development Agencies (RDAs). In particular, the removal of RDAs has effectively removed a tier of governance that was—in some cases at least—engaged in attempts to exploit related variety, build regional embeddedness and enable strategic diversification.[10] In essence, the subsequent policy 'base' here is 'space-neutral', emphasising the importance of London and the Greater South East (Hildreth and Bailey 2013; Bailey et al. 2016). It is difficult to see how this shift to a policy of 'centralised localism' will actually help, for example, clusters in mature industrial regions like the West Midlands (or the North) to compete in the high-skill and high-technology niches that they increasingly occupy (Bentley et al. 2010). Indeed, it is in the areas of cluster and innovation policy where there may be particular challenges. Part of the problem is that what remains of industrial policy post-RDAs is centralised in London, where civil servants are removed from events on the ground and—as noted—they generally lack the capacity to develop appropriate industrial policies for the reconstruction of the manufacturing base (Froud et al. 2011a, b). The key point here is that RDAs (which operated between 1998 and 2010) were often better positioned to make sound judgements about how best to offer support and to which clusters (and/or technologies) as they had a superior information base than central government. By way of example, the RDA Advantage West Midlands supported the Niche Vehicles Network, comprising a network of stakeholders across the region which collaborates on the application of new technologies in low-volume vehicle production. This classic open-innovation-type approach (Bailey and MacNeill 2008) is too fine tuned in scale to have visibility and relevance in Whitehall, yet offers much oppor-

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[10] As one leader of a combined authority stated to us in an interview, *'LEPs talk place but BIS talks sectors'.*

tunity for this region's automotive cluster in shifting from low-value volume work to niche high-value low-carbon activities. Here regional-level industrial policy was critical to helping to develop a 'phoenix industry' linked to trends in open innovation, and which might be seen as a good example of place-based 'smart specialisation' in operation (Amison and Bailey 2014).

An important lesson is that there remains a key role for the coordination of LEPs' economic and cluster strategies, most obviously via some sort of intermediate-tier infrastructure. The need for joint LEP working can also be evidenced in the regional data and intelligence legacy of the RDAs. Whilst this was retained in core cities such as Birmingham and Manchester, it is not clear whether other parts of their wider regions (the Midlands and North West) still have access to such data and intelligence. The key point is that if smart specialisation is an important element of place-based approaches, then questions remain as to whether LEPs have the powers, resources and governance arrangements necessary to deliver such an approach. This is especially pertinent if, as Barca et al. (2012) suggest, 'place-based' development strategies require mechanisms which build on local capabilities and promote innovative ideas through the interaction of local and general knowledge and of endogenous and exogenous actors.

# 5　Sectoral Policies

## 5.1　The Automotive Case

In targeting certain key sectors again in the wake of the GFC, the UK government has begun—in some sectors (such as automotive and aerospace)—to develop institutions that seek to bring together government, industry and other actors so as to discover tacit knowledge and then develop appropriate policy instruments. One example is the work of the Automotive Council. The Council is a collaborative effort that brings together Original Equipment Manufacturers (OEMs), governments and universities to explore challenges facing the sector. The Council has been involved in a number of work streams, such as developing roadmaps for critical new technologies (which have been used to then guide investment

via the Higher Education system and businesses, thus offering a degree of commitment and certainty for firms, and underpinning private sector investment). The Council has also undertaken work on issues such as skills and in attempting to rebuild the UK's fractured supply chains. On the latter, the Council has mapped the supply chain's relative competitiveness and identified opportunities where UK capabilities can be retained and built upon, for example, identifying some £3 billion worth (later increased to £4bn) of potential contracts which car manufacturers would like to place in the UK (Automotive Council 2012, 2015). So as to exploit this opportunity, the Society of Motor Manufacturers and Traders (SMMT) has tried to bring together assemblers and suppliers to see whether more components can be sourced locally. As the Automotive Council discovered, the main reason why auto assemblers purchase in the UK is proximity (including lower logistics cost, the configuration of parts and the support of UK-built vehicles) (ibid). However, what components suppliers consider as their competitive advantage, and whether that matches what the view of assemblers, is less clear.

In assembly terms at least, the transport (and particularly automotive) sector has seen a significant upturn in output since 2009, with output rising by over 60%. The sector has also seen around £8bn of investment over the last three years (The Smith Institute and SMMT 2012; SMMT 2015). Given the perceived 're-shoring opportunity', the UK's coalition government over the period 2010–2015 developed, over four rounds, a £245-million Advanced Manufacturing Supply Chain Initiative (AMSCI) to help develop local suppliers around the UK's major manufacturers, with a focus on automotive. The fund was aimed at supply chain companies and could be used for capital expenditure, skills and training, and R&D projects. The scheme aimed to build on an earlier auto-focused Regional Growth Fund bid by several LEPs. While a welcome start, the overall amount of funding on offer (£245 million in total across manufacturing by 2015) was limited. In addition, due to the minimum project threshold value of £2 million, bids often needed to be from several companies clustering together. Extending the scheme so that smaller firms could directly access the support available seems critical, especially when the lack of access to finance is a major issue for such firms.

Critically, access to finance has been a major issue for many firms in the automotive supply chain in the wake of the GFC. The Smith Institute

and the SMMT (2012) highlighted a 'window of opportunity' to expand outputs and create jobs in the automotive supply sector, but that access to finance remained a real problem, which was effectively thwarting the realisation of such potential (ibid). Drawing on a survey of firms operating at different levels in the UK auto supply chain, the report found that 60% of firms were aspiring to grow in the future, one-third so rapidly. However, they faced significant financial challenges, including fractured relationships with the banks, a gap in growth finance (many have to fund investment through internal cash-flow), problems in funding tooling development costs, payment and finance across the supply chain, and the nature of SME owner managers. The report stresses that, on the whole, the UK banking system has a poor understanding of the sector.

'Tooling up' in the automotive supply chain represented a particular challenge, given the uncertainty over future vehicle volumes, the asset specificity of the tool (which means that lenders have been reluctant to accept it as collateral, and a lack of specialist knowledge in the banking system over how to evaluate proposals). In tackling such issues, the report calls for a 'step change' in the engagement of the UK financial sector with the automotive industry. Financial initiatives must be streamlined by the government, the authors note, a taskforce launched to look at finance for tooling up, and a move made towards more long-term policy arrangements to ensure sure finance is available. At some point, a dedicated automotive (and manufacturing) loan fund—backed by the state—may be required to overcome failures in the financial system. On this, in mid-2014 the coalition government launched a £24m National Tooling Fund to assist toolmakers and component manufacturers to fund the design, development and manufacturing of tools following a firm order from an OEM. These are small examples of how the Automotive Council began to identify some key challenges in rebuilding supply chains and policy innovations designed to overcome them.

More recently, Sajid Javid's tenure as the UK's Business Secretary was disappointing in terms of sectoral policy. While the Automotive Council continued to operate, Sajid Javid cut several of its functions, including a range of previous (modest) interventions to boost skills, rebuild supply chains and encourage investment in the industry, such as through the Regional Growth Fund, the AMSCI, the Manufacturing Advisory Service (MAS) and MAS' Tooling up Fund to support investment in tools in the

Supply Chain. In our view, this was short-sighted, since where policy was reasonably well developed in the sector, it really did make a difference. For example, interventions such as the AMSCI and Tooling Up Fund involved small amounts of public money (£245m and £12m respectively) but had a significant (positive) impact upon the sector.

The ongoing work of the Automotive Council can nevertheless be seen as a good example of how industrial policy can enable firms and governments deliver universal benefits. Such activities could usefully be extended, both in the auto case and to other industries (e.g. into the Marine Industries Leadership Council, the Industrial Biotechnology Leadership Forum, the Aerospace Business Leaders group and/or in smaller (local) industries such as the Ceramic Development Group), with such groups helping to identify key fractures in industry supply chains and how to address them. This is no longer about industrial policy 'picking winners', but rather helping the private sector identify weaknesses and then addressing them. The work of the Council is in line with how industrial policy design is conceived of in modern debates (see Rodrik 2008), where policy ideally has the quality of 'embedded autonomy'. It is not captured by firms and sectors, but focuses on the discovery process where firms and the state learn about underlying costs and opportunities and engage in strategic coordination. In the context of re-shoring possibilities for UK manufacturing, for example, it might mean government working with industry to identify key fractures and gaps in the supply chain and how to address them. In this regard, there is an institutional and capacity failure inherent at the national level in terms of the lack of policy conviction and a lack of resources to design pro-manufacturing industrial policy interventions.

# 6    Brexit and the New Industrial Strategy

## 6.1    Brexit: The Elephant in the Room?

The future role and potential efficacy of UK industrial policy needs to be considered in the wider context of the country's June 2016 referendum decision to exit the EU (or 'Brexit' as it is commonly referred to).

As yet, full details of the UK's future relationship with the EU are unclear though the prime minister has indicated that the UK is likely to leave both the Single Market and the Customs Union to maintain controls on immigration and pursue its own bilateral trade deals (Financial Times 8/1/2017). While 'special (tailored) trade deals' with the USA and other countries (e.g. India) have been touted, none of these can be negotiated (and agreed) until the UK is formally out of the EU, and being the smaller partner in such negotiations, the UK is unlikely to be able to secure favourable access to these other markets.[11] As economists' gravity models have long demonstrated, the reality is Europe will remain the UK's most important market(s) (there will just be less trade), and the failure to reach a satisfactory deal with the EU means the UK risks leaving the Bloc reliant upon the myriad complexities of the World Trade Organization (WTO) rules (Dunt 2016).

This so-called 'Hard Brexit' is likely to have serious implications for UK business, trade and investment, particularly in industries such as automotive and aerospace, where complex supply chains are fully embedded within the Single Market (with components criss-crossing between the UK and other EU borders several times) and which rely upon free-trade to operate efficiently. A 'Hard Brexit' threatens to severely disrupt these supply chains, with high tariffs (in the case of automotive engines, rising to 10%) and a plethora of non-tariff barriers for British exporters to contend with. In turn, reduced trade threatens to significantly hamper inward FDI into the UK since the loss of free access to the Single Market makes the country less attractive to foreign investors (Dhingra et al. 2016; Driffield and Karolglou 2016). This would be a major blow to the UK's existing manufacturing base, which—ironically—is most likely to be felt in regions outside London that predominantly voted to leave the EU and disproportionately suffered from the GFC (and before that the impact of globalisation and de-industrialisation in the 1980s and 1990s) (Los et al. 2017). Many of these are lagging regions, and are proportionately more reliant upon EU structural funds for regeneration, which will no

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[11] Indeed, concerns have been raised that any deal with the USA is likely to be detrimental to UK interests. Tariffs are already low between the countries, and any deal is likely to give greater opportunities to US corporations to manipulate and expropriate contracts in UK public services, including the NHS.

longer be forthcoming. There is also uncertainty as to whether the UK will remain part of the European Research Area (ERA), and be able to participate in and access funding through programmes such as Horizon 2020 (and also Erasmus for student exchange). Leaving the ERA will make the UK less attractive for international scientists and researchers, and will ultimately undermine the UK's strategies for innovation and smart specialisation.

There remains much ambiguity, confusion and uncertainty on how things will play out. For instance, in late 2016, the UK government reached a 'deal' with Nissan over investment at its Sunderland plant to produce the Nissan Qashqai and XTrail models from 2020 onwards (by which time the UK will have left the EU). This 'deal' is shrouded in secrecy as it is not clear what the government offered Nissan and, moreover, what does it tell us about the government's new industrial strategy and (more broadly) its negotiating stance on Brexit? On this we have learned a little from the new Business Secretary, Dr Greg Clark, who has made it clear that a key UK objective in Brexit talks will be to avoid tariff barriers with the EU. He also repeatedly made reference to industry sectors and their different needs, implying that the UK would seek to negotiate sector-by-sector deals with the EU. That could see the UK trying to avoid non-tariff barriers in certain sectors like automotive, effectively giving those sectors something akin to access to the Single Market (The Guardian, 30/11/2016d). While realising such deals will depend upon the agreement of the EU—and that might be difficult across 27 nations (and Wallonia Parliaments!)—it at least suggests that Greg Clark views access to the EU Single Market as a key negotiating objective.[12]

Greg Clark's comments raise a number of points on Brexit on which the government has been vague so far. First, Clark seemed to imply that—as a minimum—the UK could remain in a customs union with the EU. This would go a long way to reassuring the automotive industry on tariffs. Secondly, if the UK really does want to trade without tariffs and non-tariff barriers, then the EU may well extract a 'price' in the form of a contribution to the EU budget, as made by Norway and Switzerland

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[12] Whether Dr Liam Fox, the International Trade Secretary, and/or David Davis, the Brexit Secretary, agree with this position is another matter.

(Dunt 2016). Thirdly, some form of 'referee' may be needed to determine whether the UK is playing by the rules of whatever trade deal is done with the EU. This might be the WTO or a body linked to the EU. Fourthly, despite Nissan wanting 'compensation' if tariffs are imposed, Clark appeared to suggest that may not be possible under WTO rules.

## 6.2    The New Industrial Strategy

It is beyond the scope of this chapter to deliberate much further on the wide-ranging impacts of Brexit; for a fuller discussion of these issues, see Bailey and Budd (2017). Nevertheless, in the context of industrial policy, it is clear that Britain needs to strike more than a new trade deal with the EU (Bailey and De Propris 2017). The government appears to partially recognise this and, indeed, on 23rd January 2017 launched a green paper entitled 'Building our Industrial Strategy'. The green paper prioritises ten pillars to drive forward the government's industrial strategy. These are as follows: (i) investment in science, research and innovation; (ii) developing skills; (iii) upgrading infrastructure; (iv) business support; (v) procurement; (vi) trade and investment; (vii) affordable energy (and clean growth); (viii) cultivating world-leading sectors; (ix) balanced growth (across the country); and (x) aligning sectors and places. Focusing on these pillars is a laudable objective, though much of the green paper does appear to reiterate measures that are already being pursued across several government departments.

Nevertheless, the tone of the document seems to represent a shift in the Conservative government's thinking on industrial strategy, with a more interventionist stance (in some quarters at least) now being openly advocated. The green paper also pledges an additional £4.7 billion of government money (by 2020–2021) for R&D funding—the largest increase in any Parliament since 1979—in an effort to raise the chronic gap between UK R&D funding vis-à-vis those in other G7 countries (see Sect. 3). This accompanies government plans to boost STEM skills, digital skills and numeracy, including extending specialist mathematics schools, with £170m to be invested in creating new 'institutes of technology'. The green paper also reiterates the importance of infrastructure (including

broadband and digital) to support balanced growth; investment here will rise from £14 billion in 2016–2017 to £22 billion in 2020–2021. This should be put into context, as this 'new money' is partly a reversal of the unprecedented substantive cuts in UK infrastructure spending during the austerity budgets of the Conservative-led Coalition government; between 2009–2010 and 2013–2014, public sector net investment was cut by 42% in real terms, falling from 3.4% to just 1.8% of GDP (Independent 29/9/2016a, b). At least, there is now some acknowledgement within (parts of) government that public investment can 'crowd in' private sector investment, which, in turn, generates growth (Crafts 2009).[13]

There are, however, several notable weaknesses in the green paper.[14] From the outset, the paper appears to have an outdated view of manufacturing, and makes no reference to recent developments surrounding Industry 4.0. This is a new manufacturing paradigm, based around firms utilising the latest digital, cyber and information technologies to reorganise manufacturing within so-called 'smart factories', alongside a closer alignment of services (including design and post-sale services) and customised products (commonly referred to as 'servitisation'). These trends are likely to place a greater emphasis upon small batch and local production, which will not only reduce environmental footprints, but also offer an opportunity for a re-coupling of manufacturing and innovation (Bailey and De Propris 2014). Related to this is that the R&D pillar is very 'sector focused' and largely fails to identify the higher level and enabling technologies (such as robotics and artificial intelligence) that cut across sectors (and places). In this regard, the UK's industrial strategy needs to be more ambitious in setting out a roadmap for how existing sectors (and places) can be transformed by these enabling technologies over the next 10–20 years. There also needs to be a greater appreciation of the spatial and systemic aspects of R&D; the private sector is currently underinvesting as risks are not being shared by the government and other public institutions (such as universities) (see Sect. 2).

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[13] Most recently the 2017 Budget committed £270m to supporting a range of disruptive technologies including driverless cars and battery technology (HM Treasury, 2017).

[14] We are grateful for discussions with Lisa De Propris, Philip McCann and Paul Hildreth in relation to the points below in this sub-section.

In addition, the text of the green paper (and especially in the dedicated tenth pillar) lacks a truly spatial dimension, and the longstanding disconnect—in UK policy circles—between sectors and places appears to remain. The Coalition's abolition of RDAs—which had a broader coverage of industrial clusters—and their replacement with LEPs led to a fragmentation of policy and resources, with many LEPs being too narrowly focused and lacking the capacity to be effective in implementing the new industrial strategy, especially in relation to developing clusters and supply chains (Pike et al. 2015). As research in the field of regional studies has long demonstrated, appropriate institutions are key to aligning sectors with regions and places, and in this regard, an effective regional institutional framework is essential to delivering balanced growth across the UK. Without such a regional framework, there is the risk that growth will remain concentrated in a few areas of the UK (Hildreth and Bailey 2013). Development bodies—at the regional tier—have the capacity (and information sets) to intervene more widely and strategically, to pursue 'smart specialisation' strategies which cut across sectors in a place-based approach (see Sect. 4). Combined Authorities may be one way to achieve this, perhaps with so-called city-regions evolving; this is an area in which Greg Clark has some expertise. In this regard, competitive public funding might be awarded using a model structured around regional coalitions, which would help to build capacity at the regional level and, in particular, encourage applications from across the country so as to ensure such funding is not concentrated in leading regions which appear to have the best projects (see Sect. 4). Indeed, the green paper is silent on regenerating formerly industrial areas and might have been more explicit on how to revitalise these 'left-behind' regions.

More widely, the green paper largely fails to link themes such as R&D, supply chain development and skills in a place-based institutional approach. With regard to skills, there is currently too great an emphasis on national accreditation, and here the devolution of skills and funding would be a welcome step forward. Local areas and regions need to be able to shape training programmes in line with spatially specific needs and aspirations, as in the case of the new Ceramics Skills Academy in Stoke on Trent (Tomlinson and Branston 2014). A related issue is that the green paper appears to treat supply chains and clusters as separate entities; in reality, both are entwined and again would benefit from policies geared

towards rebuilding skills and revitalising local and regional (knowledge) networks. Similarly, trade and investment would benefit from being devolved to a regional tier; the Department for Trade is heavily centralised, and like its predecessor—UK Trade and Investment—largely ineffective in dealing with vital issues such as developing UK supply chains. The risk of continuing with the status quo is that investment and growth will remain concentrated in London and the South East.

# 7    Concluding Comments

Over the last decade, there has been a revival of interest in industrial policy within the UK, largely as a consequence of the fallout from the GFC and rising dissatisfaction with the dominant neo-liberal model. Modern industrial policy is no longer about 'picking winners', but is smart and largely based around technology and enhancing innovation across sectors and places. In these spheres, there are inherent market failures and there is a strong case for state intervention (Bailey et al. 2015a, b). However, despite the recent industrial strategy green paper and some promising early industrial policy initiatives, such as the Automotive Council and the Catapults, there remains much ambivalence about the UK government's industrial policy. In some aspects, particularly with regards to R&D, skills and promoting balanced regional development, the government's stance on industrial policy has been at best 'muddled' and at worst been 'empty rhetoric'. Indeed, as indicated in the Introduction to this chapter, the UK's performance in manufacturing—on almost every measure—is worse than before the GFC, and the sector lags significantly behind its international rivals. Given much of UK manufacturing is—through its complex supply chains—closely integrated with continental Europe, the shadow of Brexit is the proverbial 'elephant in the room' with regard to the future course and efficacy of UK industrial policy.

In the short term, the recent depreciation in sterling potentially opens up an opportunity for a re-shoring of some manufacturing operations, for example, in the automotive supply chain. However, this will not happen automatically, since there are significant barriers to re-shoring, notably a lack of access to finance among UK SMEs, skills deficiencies, availability

of land and high energy costs (see Bailey and De Propris 2014). Focusing on these issues and developing UK supply chains might bring some medium- to long-term benefits; indeed, there seems to be some recent government commitment in this regard, particularly in the automotive industry, which largely sources (high-value) components from continental Europe (HMG 2017). Related to this, the government could seek to reduce Brexit-induced uncertainty, by stimulating manufacturing investment through instruments such as enhanced capital allowances and by resurrecting something like the AMSCI (preferably on a much wider scale), along with plugging funding gaps for small firms in the supply chain.

Finally, and at a broader level, there is now a strong case, for UK industrial policy to be afforded similar institutional status to both UK monetary policy, which, since 1997, is managed through an independent Bank of England, and fiscal policy, which is monitored by the Office for Fiscal Responsibility (established in 2010). As we have set out in this chapter, an active industrial policy not only creates and sustains domestic employment [thus sustaining demand (via investment and consumption multipliers)], but it can also raise domestic industrial capacity and capabilities (a supply-side measure) for innovation and long-term growth in a balanced, inclusive and sustainable way. At the very least, it should be the subject of regular strategic long-term reviews as the Wright Review (2014) has suggested. By giving it that sort of priority, the government would send out the kind of powerful message that British industry and foreign investors need to hear. This is especially important as the UK economy charters new waters in the post-Brexit era.

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# The Global Financial Crisis and the Labour Markets in Europe: Do Labour Institutions Matter?

**Jesús Ferreiro and Carmen Gómez**

**Abstract**  The Global Financial Crisis (GFC) has had a significant impact on the European labour markets. The objective of this chapter is to analyse whether this impact significantly differs among countries and the reasons behind these differences. We analyse to what extent the differences in the impact of the GFC on the economic activity explain the variation in performances of the European labour markets. Our analysis shows that although this impact is clear, other elements explain these differences. In the second part of the chapter, we study whether the presumed rigidities in the labour markets have contributed to the evolution of the employment and unemployment rates. We conclude that more rigid labour markets have not led to larger declines in employment and increases in unemployment rates, and that more flexible labour markets have contributed to a more rapid recovery of labour markets.

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## 1     Introduction

Although the Global Financial Crisis (GFC) and the subsequent Great Recession (GR) have been a global phenomenon, the European Union (EU) is the region where its impact has been deeper and more long-lasting. Indeed, according to the forecasts of the World Economic Outlook Database (October 2016) of the International Monetary Fund (IMF), the long-term economic growth forecasts (up to the year 2021) show that the forecasts for the EU and the Euro Area (EA) are much lower than those of the other regions of the planet.

According to the IMF (op. cit.) forecasts, the average annual rate of growth of the GDP during the five-year period from 2017 to 2021 will be 1.7 per cent and 1.5 per cent for the EU and the EA, respectively. The dimension of these poor performances is highlighted when they are compared with the figures estimated for the whole world (3.6 per cent) or the group of the emerging market and developing economies (4.6 per cent). Indeed, the European figures lie behind the forecast for the USA, whose forecast of annual rate of growth is 1.9 per cent.

The expectations for a poor performance of the European economies are an added problem to the poor past economic performance since the beginning of the GFC in 2007. According to the World Economic Outlook Database (October 2016) of the IMF, in the year 2016 the real GDP in the EU was 5.33 per cent higher than that recorded ten years earlier, in 2007, whilst in the case of the EA the GDP was only 3 per cent higher than in 2007. The comparison with the economic performance of other regions shows the deepest impact of the economic and financial crisis in Europe. Thus, the world GDP rose by 29.8 per cent between 2007 and 2008, the GDP in the emerging market and developing economies in 2016 was 50 per cent higher than in 2007, and in the case of the emerging and developing Asian economies, their GDP in 2016 was 79 per cent higher than in 2007.

In fact, the European economic performance during the crisis languishes when it is compared to that of the USA, whose GDP was in the year 2016 12 per cent higher than in 2007. However, the impact of the GFC and the GR has not been the same in all the European countries, there existing significant differences in the economic performance among individual economies and also among different groups of European countries (Hein et al. 2016; Carrasco et al. 2016; Ferreiro et al. 2016, 2017). Analysing groups of European economies, Carrasco et al. (2016) show that the impact of the GR was deeper in the euro zone than in the non-euro European countries. Moreover, they also argue that, within the EA, the largest negative impact of the crisis took place in the group of countries that joined the euro after the year 1999.

Instead of analysing groups of countries, Ferreiro et al. (2016) focused their analysis on individual European countries. This analysis confirmed that new euro countries were the most negatively affected by the crisis. However, they also found significant differences among the European countries that are part of the three groups studied in Carrasco et al. (2016), namely, the non-euro countries, the countries that formed the EA in 1999 and the countries that joined the euro after its creation.

The negative impact of the GFC on the economic activity has turned into a negative impact on the labour markets. Thus, if we focus on the unemployment rate, according to the data provided by the Eurostat at the Labour Force Survey, in the EU this rate climbed from 7.2 per cent in 2007 to 10.9 per cent in 2013, falling since then up to 8.5 per cent in 2016. In the case of the EA, the unemployment rate was 7.5 per cent in 2007, peaked to 12 per cent in 2013, and in 2016 it was 10 per cent. It is important to note that although GDP in the EU and the EA is higher in 2016 than in 2007, the current unemployment rates are well above those recorded before the onset of the crisis.

The evolution of total employment presents similar patterns. According to Eurostat, in 2007Q4, total employment in the EU reached 217.9 million, a figure that declined up to 210.4 million in 2013Q1: a decline of 7.5 million (+3.4 per cent). Since then, employment has risen, reaching 218.8 million in 2016Q3, which represents 8.3 million more than in 2013Q1 (+4 per cent). As a consequence, employment in the EU is 0.8 million higher than in 2007Q4.

In the case of the EA, total employment in 2007Q4 reached 144.2 million, a figure that declined up to 138.1 million in 2013Q3: a decline of 6.1 million, that is, a decline of 4.2 per cent. Since then, employment has risen, reaching 143 million in 2016Q3, which represents 4.9 million more than in 2013Q3 (+3.5 per cent). As a consequence, employment in the EA is 1.2 million lower than in 2007Q4.

To get an idea of the dimension of the impact of the crisis on employment in Europe, it is useful to make a comparison with what has happened in the USA. According to the data of the World Economic Outlook Database (October 2016) of the IMF, the unemployment rate in the USA climbed from 4.6 per cent in 2007 to 9.6 per cent in 2010. Since that year unemployment has been falling, reaching 4.9 per cent in 2016, a rate very close to that registered before the crisis. Regarding employment, it fell from 146 million people in 2007 to 139.1 million in 2010 (a decline of 7 million, −4.8 per cent). In 2016, total employment in the USA amounted to 151.3 million, with an employment creation since 2010 of 12.2 million (+8.8 per cent). This figure implies that in 2016 there are 5.2 million working above those in 2007.

It could be argued that the difference in performance of the labour markets in the USA, the EU and the EA is due to the different impact of the GR, first, and the different speeds of recovery later. Thus, we have analysed the real GDP growth (as percentage of change), the change as percentage points of unemployment rate, and the employment growth (as percentage of change) between 2007 and 2015 (last data available).[1] For the USA and the EU and the EA, the whole period has been broken in two sub-periods. In the three cases, the break date corresponds to the period (year-quarter) when the lowest figure of employment was registered in the three cases. Thus, for the USA the two periods are 2007–2010 and 2010–2015, and for the EU and the EA the periods are 2007–2013 and 2013–2015, respectively. The percentage figures for these six cases are as follows:

- USA 2007–2010: −0.6%, +5 p.p., −4.8%
- USA 2010–2015: +10.9%, −4.3 p.p., +7.0%

- EU 2007–2013: −0.5%, +3.7 p.p., −2.7%
- EU 2013–2015: +3.9%, −1.5 p.p., +2.1%
- EA 2007–2013: −1.8%, 4.5 p.p., −3.6%
- EA 2013–2015: +3.2%, −1.1%, +1.4%

where the first percentage figure in each case corresponds to GDP growth, the second one to the change in unemployment rates and the third one to employment growth.

Seemingly, there is a direct relationship between the change in the GDP and the change in the unemployment rate; that is, a higher decline in the economic activity leads to higher unemployment rates, and vice versa. If we focus on the relationship between the GDP growth and the evolution of employment, we reach similar conclusions to those presented earlier: Declines (increases) in the GDP are associated with declines (increases) in employment.

However, these conclusions are biased by the fact that we are analysing aggregate data of two groups of European countries that, moreover, in the case of the euro countries are part of the larger EU. Indeed, these aggregate data, as we will see in the following section, hide the huge differences existing among the EU countries (and also among the euro countries). An analysis of the performance of the economic activity and of the labour markets in Europe shows clearly that the differences in the evolution of total employment and unemployment rates are not only explained by the differences registered in the growth economic activity.

All in all, these data imply that the performances of the labour markets since the onset of the GFC are not only explained by the dynamics of the economic activity. And, therefore, the individual institutional configurations of the respective labour markets would have played a key role in determining the results in terms of unemployment and employment.[2]

Nonetheless, we cannot exclude the hypothesis that the evolution of employment and unemployment is affected not only by the impact of the declining economic activity itself, but also by the implementation of other

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[2] Other elements that would contribute to explain the impact of the crisis on the national labour markets would be the sectorial impact of the crisis (for instance, the impact of the crisis on the housing and construction sectors), or the nature of the crisis, with banking and financial crisis leading to worst performances in the labour markets and the different demographic (ageing, migration, etc.) processes.

measures of economic policy. These measures can be adopted as part of counter-cyclical strategy of economic policy (fiscal and/or monetary policy) or, on the contrary, by other reasons. Thus, for instance, Canale and Liotti (2015), Hernández de Cos and Moral-Benito (2013), Sturn (2014) and Truger (2015), among others, argue that the implementation of discretionary restrictive fiscal policies has contributed to the increase in the unemployment rates.

On the other hand, the performance of labour markets can also be affected by the implementation of structural reforms, among others those affecting the labour market. In this sense, from a mainstream perspective, it is commonly argued that rigid labour markets contribute to exacerbate the negative impact of downturns on unemployment (Bernal-Verdugo et al. 2012; Flaig and Rottmann 2013; Gal and Theising 2015). Thus, elements such as the existence of wage-setting institutions that inhibit the wage adjustment mechanism, or of labour market institutions like Employment Protection Legislation (EPL), the unionization of workers or the duality in labour markets (temporary versus permanent employment contracts, part-time versus full-time employment contracts, etc.) limiting the free functioning of labour markets, and tax and benefit systems distorting the labour demand and supply would contribute to the rise in the figures of structural unemployment and its reaction during recessions. Consequently, according to this view, to reduce unemployment rates it would be necessary to implement measures to reduce the aforementioned rigidity in the labour markets: fostering the flexible responses of wages to labour market conditions, reducing labour market segmentation, promoting active labour market policies, reforming the collective bargaining systems, reforming the tax and social benefit systems, reducing EPL, and so on (Anderton et al. 2015).

Nonetheless, there are a high number of studies which, in opposition to mainstream ones, argue that labour market rigidities are not responsible for the high unemployment and that wide-ranging deregulation of labour market does not have a significant positive impact on unemployment (Avdagic and Salardi 2013; Heyes and Lewis 2015). Indeed, Rubery and Piasna (2016) argue that EPL has a positive macroeconomic impact, and, consequently, a positive impact on labour market performance.

In any case, besides the differences regarding the direction and the intensity of the impact of labour market institutions on employment and unemployment, most, if not all, studies agree that reforming labour mar-

ket institutions does have an impact on the economic activity and the labour market performance (the differences would be found in the direction and intensity of these impacts). Consequently, the evolution of the employment and unemployment rates along the business cycle will be affected by the labour market reforms implemented.

This chapter is structured as follows. The first section analyses the differences in the performances of the national labour markets in the EU. In this section, we study whether the EU countries with the worst performances since the onset of the GFC were also the worst performers before the crisis. Moreover, we will analyse whether the national differences in terms of employment and unemployment are determined by the different impacts of the GFC on economic activity. The second section analyses the role played by rigidities in the labour markets in the evolution of the employment and unemployment. The final section summarizes and concludes.

## 2 The Impact of the Crisis on European Union Labour Markets

The GFC is a phenomenon that has affected all EU countries, and consequently, all EU labour markets have been affected. However, this impact has not been similarly distributed among countries. Regardless of whether the studies are focused on all EU countries or on EA economies, the data show the marked differences among individual countries and groups of countries in terms of the evolution of unemployment and employment, resulting in a rising divergence in the performance of the European labour markets (Anderton et al. 2015, 2012; European Commission Directorate-General for Employment, Social Affairs and Inclusion 2014, 2015; Carrasco and Ferreiro 2016; Ferreiro et al. 2016, 2017; Zwick and Syed 2017).

The figures that the Labour Force Survey of Eurostat provides show the huge differences in the labour market performance of the EU countries. Thus, if we focus on the unemployment rates, in the third quarter of the year 2016 (last available data), the unemployment rates in the EU oscillated between 4 per cent in the Czech Republic and 23.2 per cent in Spain. It is important to notice that these figures are not isolated outliers or extreme values: Five countries recorded unemployment rates below 5 per cent (Czech Republic, Germany, Hungary, Malta and the UK),

and in seven countries, the unemployment rate was above 10 per cent (Croatia, Cyprus, France, Greece, Italy, Portugal and Spain).

These large differences are repeated in the case of the evolution of total employment. The growth of employment between the third quarter of the year 2007 and the third quarter of the year 2016 varied between −19 per cent in Greece and 26.3 per cent in Luxembourg. Thus, the whole EU recorded an increase of total employment amounting to 0.7 per cent. However, total employment fell in the EA by 0.5 per cent. In 12 out of the 28 EU countries (Belgium, Czech Republic, Germany, France, Luxembourg, Hungary, Malta, Austria, Poland, Slovakia, Sweden and the UK), total employment increased in that period, but it fell in the other 16 economies.

It could be argued that these differences are, to a large extent, conditioned (and explained) by the membership of a high number of EU countries to the EA, either because the impact of the GFC in the EA has been different from that in the non-EA economies or because the macroeconomic (fiscal, monetary and exchange rate) and structural policies implemented since the onset of the crisis have differed among these two groups of economies. However, the differences remain when we analyse separately the performances of EA and non-EA countries. Thus, in the non-euro EU countries, the unemployment rate in 2016Q3 oscillated between 4 per cent in Czech Republic and 12 per cent in Croatia. In these countries, the growth of total employment in the last nine years has ranged from −8.4 per cent in Bulgaria and 11.6 per cent in Hungary. In the case of the EA countries, the unemployment rate in 2016Q3 oscillated between 4.1 per cent in Germany and 23.2 per cent in Greece. Regarding the growth of total employment in the last nine years in the EA, it has oscillated between a fall amounting to 19 per cent in Greece and an increase of 26.3 per cent in Luxembourg.

What reasons lie behind these significant differences registered in the performance of the European labour markets? To begin with, three different, although potentially interrelated, explanations could be thought of. Firstly, it could be argued that the differences registered in the evolution of employment and unemployment during the crisis are not a direct consequence of the GFC per se, but that they are the result of the significant structural differences existing among the EU countries. In other words, the countries with the worst performance during the crisis of the

labour markets are, precisely, those whose labour markets also presented the worst performance before the crisis.

The second explanation or hypothesis implies that the performances of the European labour markets are directly, and mainly, determined and explained by the evolution of the economic activity. In this sense, the evolution of the employment and unemployment figures since the onset of the crisis would be directly related to the impact of the crisis on the economic activity. This hypothesis implies that the highest unemployment rates, the highest increases in the unemployment rates and the more intense destruction of jobs would have registered in those economies with the highest declines (or lower increases) in the GDP since the beginning of the crisis, and vice versa. It is important to notice that this hypothesis implies that countries with a similar increase or decline in the GDP would register similar results in terms of the evolution of the unemployment rates and the employment creation (or destruction).[3]

But there is also another third explanation for the differences in the labour market performances of the EU countries, which is related to the different timings of the phases of decline and recovery of the economic activity. This argument is based on the fact that the business cycles of the European (EA and non-EA) economies are not fully synchronized (Benczes and Szent-Ivanyi 2015; Cavallo and Ribba 2015; European Central Bank 2015; Ferroni and Klaus 2015). In this sense, this argument is based on the fact that the length (and also the depth) of the decline and recovery phases of the business cycles in the European countries is not identical. The declining economic activity has been able to last longer in some countries than in others, and, therefore, the recovery of economic activity has been able to start later in some economies. Consequently, the previous conclusions should be interpreted with caution. In this sense, a correct analysis should take into account separately the evolution of employment and unemployment during the recession and expansion phases of the business cycles.

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[3] This conclusion depends on the non-existence of a different impact of the economic structure of the countries. In the case of a recession in two economies, the impact on the employment and unemployment of the declining economic activity would be higher in the economy in which the crisis has affected most deeply the labour-intensive sectors.

## 2.1    Is the Impact of the Crisis on Unemployment Related to the Unemployment Rate Registered Before the Crisis?

The first hypothesis previously posed argues that, to a large extent, the problems of employment and unemployment suffered by some European economies have a structural nature. This argument does not imply that the economic and financial crisis has not affected the European labour markets, but that the existence of problems in some economies is prior to the onset of the crisis. The GFC would have aggravated the problems of high unemployment existing in certain economies, and, consequently, the countries with the highest unemployment rates during the crisis would have been those economies that registered the highest unemployment rates before the crisis.

One striking outcome is that in five countries the unemployment rate registered in the year 2015 was lower than in 2007: Czech Republic (−0.2 percentage points), Hungary (−0.6 percentage points), Malta (−1.1 percentage points), Poland (−2.1 percentage points) and Germany (−3.9 percentage points).

This result is in huge contrast with the huge increase in the unemployment rate registered in other countries. Thus, there are three countries where the unemployment rate has increased between 2007 and 2015 by more than 10 percentage points: Cyprus (+11.1 percentage points), Spain (+13.9 percentage points) and Greece (+16.5 percentage points).

Seemingly, it could be concluded from Table 1 that there is a marked correlation between the performance of the unemployment rates before the crisis and that registered in the year 2015. Underpinning this conclusion would be the fact that out of the eight EU countries that registered the highest unemployment rates in 2015, all of them with unemployment rates above 10 per cent, six of them also suffered the highest unemployment rates in the year 2007, with the only exceptions being Cyprus and Italy. Hence, it could be inferred that the performance of the unemployment in these economies during the crisis had a structural nature, and, therefore, that the crisis in these economies did not create a problem but it exacerbated a prior problem.

**Table 1** Unemployment rates in EU countries (per cent), and change in the real GDP (per cent), employment (per cent) and unemployment rates (percentage points) between 2007 and 2015

| | Unemployment rate 2007 (%) | Unemployment rate 2015 (%) | Change in unemployment rates between 2007 and 2015 (percentage points) | Change in real GDP between 2007 and 2015 (per cent) | Change in employment between 2007 and 2015 (%) |
|---|---|---|---|---|---|
| Belgium | 7.5 | 8.5 | 1.0 | 6.26 | 3.5 |
| Bulgaria | 6.9 | 9.2 | 2.3 | 11.82 | −7.3 |
| Czech Republic | 5.3 | 5.1 | −0.2 | 8.10 | 1.6 |
| Denmark | 3.8 | 6.2 | 2.4 | 2.07 | −2.9 |
| Germany | 8.5 | 4.6 | −3.9 | 7.42 | 4.8 |
| Estonia | 4.6 | 6.2 | 1.6 | −2.08 | −3.0 |
| Ireland | 4.7 | 9.4 | 4.7 | 27.46 | −9.5 |
| Greece | 8.4 | 24.9 | 16.5 | −26.42 | −20.7 |
| Spain | 8.2 | 22.1 | 13.9 | −3.62 | −13.3 |
| France | 8.0 | 10.4 | 2.4 | 3.95 | 0.3 |
| Croatia | 9.9 | 16.3 | 6.4 | −9.32 | −7.7 |
| Italy | 6.1 | 11.9 | 5.8 | −7.90 | −2.4 |
| Cyprus | 3.9 | 15.0 | 11.1 | −5.44 | −4.9 |
| Latvia | 6.1 | 9.9 | 3.8 | −5.28 | −14.6 |
| Lithuania | 4.3 | 9.1 | 4.8 | 6.68 | −8.5 |
| Luxembourg | 4.2 | 6.5 | 2.3 | 14.36 | 25.6 |
| Hungary | 7.4 | 6.8 | −0.6 | 4.13 | 7.9 |
| Malta | 6.5 | 5.4 | −1.1 | 32.38 | 17.4 |
| Netherlands | 4.2 | 6.9 | 2.7 | 3.02 | −2.8 |
| Austria | 4.9 | 5.7 | 0.8 | 4.93 | 5.3 |
| Poland | 9.6 | 7.5 | −2.1 | 28.98 | 5.4 |
| Portugal | 9.1 | 12.6 | 3.5 | −5.41 | −9.4 |
| Romania | 6.4 | 6.8 | 0.4 | 12.80 | −6.9 |
| Slovenia | 4.9 | 9.0 | 4.1 | −1.45 | −5.7 |
| Slovakia | 11.2 | 11.5 | 0.3 | 18.56 | 2.3 |
| Finland | 6.9 | 9.4 | 2.5 | −4.87 | −3.7 |
| Sweden | 6.1 | 7.4 | 1.3 | 10.61 | 4.6 |
| UK | 5.3 | 5.3 | 0.0 | 6.97 | 4.9 |

Source: Our calculations based on Eurostat, National Accounts (ESA 2010), and Eurostat, Employment and Unemployment (Labour Force Survey)

However, this preliminary conclusion must be taken very cautiously. If we pay our attention to the five EU countries with the highest increase of the unemployment rates between the years 2007 and 2009, namely, Greece, Spain, Cyprus, Croatia and Italy, only one country, Croatia, was in the group of the five economies with the highest unemployment rates in 2007. Indeed, a simple OLS regression shows that when we regress the change in the unem-

ployment rates between 2007 and 2015 against the value of the unemployment rate in 2007, the coefficient of the latter (besides being negative) is not significant, and that the relation is non-existing ($R^2$ = 0.0004).[4]

In fact, Table 1 shows a clear performance in a set of countries that helps to firmly reject the hypothesis of the existence of a direct relation between the unemployment rate recorded in 2007 and the evolution of this rate since the onset of the crisis. Thus, for instance, the case of Slovakia is remarkable. In the year 2007, the highest unemployment rate in the EU was recorded in Slovakia: 11.2 per cent. We could think that Slovakia would have suffered one of the largest increases in the unemployment rate. However, between 2007 and 2015 the unemployment rate of Slovakia increased by only 0.3 percentage points, the seventh lowest increase among all the EU countries.

But there are other striking differences among countries with similar unemployment rates before the onset of the crisis. For instance, in 2007 the lowest unemployment rates in the EU were registered in Denmark and Cyprus: 3.8 per cent and 3.9 per cent, respectively. Between 2007 and 2015, the unemployment rate increased in Denmark by 2.4 percentage points. However, in Cyprus this rise was nearly five times higher: 11.1 percentage points.

Another case of significantly different evolution of the unemployment rate has been that of the three countries Germany, Greece and Spain. In the year 2007, the unemployment rates in these countries were nearly identical: 8.5 per cent, 8.4 per cent and 8.2 per cent, respectively, with Germany having the highest rate of these three countries. However, in 2015, the unemployment rate in Germany declined by 3.9 percentage points, whilst it increased by 13.9 percentage points in Spain and 16.5 percentage points in Greece.

Therefore, it cannot be stated that the current situation of unemployment in Europe is directly and mainly related to (and explained by) the situation of unemployment before the crisis. This opens the doors to explanations of the impact of the crisis on the European labour markets based on the differences existing among the EU countries in elements like the magnitude (depth and length) and nature (financial and/or real)

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[4] Results can be obtained from the authors upon request.

of the shocks suffered by the individual countries and the differences in the national labour market institutions (Boeri and Jimeno 2016).

## 2.2    Is the Evolution of Employment and Unemployment Explained by the Changes in the Economic Activity?

A potential explanation to the different performances of the European labour markets since the onset of the financial and economic crisis is related to the differences registered in the impact of that crisis on the EU countries. Thus, the countries with the worst performances of the GDP would be those with the deepest declines in employment and the highest increases in unemployment, and vice versa.

Table 1 shows the changes registered between the years 2007 and 2015 of the real GDP, the unemployment rate and the employment in the EU countries. Seemingly, there would be a direct relation between the growth of the GDP and the growth of the employment and unemployment rates. However, this relation is far from being conclusive.

As Table 1 shows, 12 countries have registered a simultaneous increase in the GDP and total employment: Austria, Belgium, Czech Republic, France, Germany, Luxembourg, Hungary, Malta, Poland, Slovakia, Sweden and the UK. In parallel, there have been ten countries where both the GDP and the total employment have declined: Croatia, Cyprus, Estonia, Finland, Greece, Italy, Latvia, Portugal, Slovenia and Spain. However, it is important to notice that there have also been six countries where employment decrease has taken place despite the increase in the real GDP: Bulgaria, Denmark, Ireland, Lithuania, the Netherlands and Romania.

In turn, within each of the three groups of countries, we can find significant differences among countries with similar performances of the GDP or the employment. Thus, for instance, the decline in the economic activity in Cyprus and Latvia is identical: −5.4 per cent and −5.3 per cent, respectively. However, the decrease in employment has been three times higher in Latvia: In Cyprus, the fall in employment was very similar to the decline in the GDP (−4.9 per cent); however, in Latvia, the employment destruction amounted to 14.6 per cent of the employment existing in 2007.

Similar results exist in the two other groups. In Lithuania and Ireland, the decline in employment was similar: 8.5 per cent and 9.5 per cent, respectively. However, in Lithuania the GDP increased by 6.7 per cent, but in Ireland the GDP increased four times that in Lithuania: 27.5 per cent. Finally, Austria and Poland had a similar increase of employment (5.3 per cent and 5.4 per cent, respectively), although the economic growth in Poland has been six times more intense than in Austria: 29 per cent and 4.9 per cent, respectively.

The results of the analysis of the potential relationship between the evolution of the unemployment rate and the GDP growth mirror those reached in the analysis of the relationship between GDP growth and the employment creation. Between 2007 and 2015, unemployment rates increased in 22 countries, remained unchanged in one country (the UK) and fell in the remaining five economies (Czech Republic, Germany, Hungary, Malta and Poland). In these six countries, there was an increase in the respective GDPs. But regarding the economies where unemployment rates have increased, in ten countries (Croatia, Cyprus, Estonia, Finland, Greece, Italy, Latvia, Portugal, Slovenia and Spain) a declining GDP was registered, while in the remaining 12 economies (Austria, Belgium, Bulgaria, Denmark, France, Ireland, Lithuania, Luxembourg, the Netherlands, Romania, Slovakia and Sweden) the higher unemployment rates have happened despite an increase in the GDP.

Again, we cannot detect a clear relationship between the evolution of the economic activity and the unemployment rates, there existing remarkable differences between countries that share a similar GDP growth or a similar change in the unemployment rates. Thus, for instance, although the growth of the GDP has been eight times higher in Malta (32.4 per cent) than in Hungary (4.1 per cent), the fall in the unemployment rate in these two countries has been similar: 0.6 percentage points in Hungary and 1.1 percentage points in Malta.

Similar results are also present in the group of countries that have registered an increase in the unemployment and a decline of the GDP. For instance, in Estonia the GDP fell 2.1 per cent and the unemployment rate increased by 4.6 percentage points. However, in Spain, with a slightly higher decline in the economic activity (3.6 per cent), the rise of the unemployment rates was three times higher (13.9 percentage points).

**Table 2** OLS estimation results[a]

| | Period 2007–2015 | | Episodes of employment decline | | | Episodes of employment creation | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | Employment rate | Unemployment rate | Employment rate | Unemployment rate | Unemployment rate | Employment rate | Unemployment rate | Unemployment rate |
| Constant | −3.656* | 4.261* | −2.478* | 1.626* | −0.224 | 1.274* | −0.478*** | −0.915*** |
| | (1.213) | (0.707) | (0.679) | (0.578) | (0.234) | (0.452) | (0.247) | (0.459) |
| GDP | 0.452* | −0.235* | 0.780* | −0.642* | | 0.376* | −0.157* | |
| | (0.136) | (0.053) | (0.085) | (0.073) | | (0.122) | (0.049) | |
| Employment | | | | | −0.790* | | | −0.134 |
| | | | | | (0.053) | | | (0.137) |
| $R^2$ | 0.353 | 0.427 | 0.702 | 0.688 | 0.902 | 0.419 | 0.258 | 0.036 |

Standard errors in parentheses
Robust standard errors to heteroscedasticity and serial correlation
*$p$-value < 0.01; **$p$-value < 0.05; ***$p$-value < 0.1
[a]Dependent variables: change in total employment (per cent) and change in unemployment rates (percentage points) registered between the years 2007 and 2015 and during the episodes of employment decline and creation

Finally, in the group of countries where increase in unemployment rates has come with a higher economic activity, we can find two countries, Latvia and Ireland, that, despite the huge differences in the growth of the economic activity (6.7 per cent and 27.5 per cent, respectively), have registered the same increase in their unemployment rates (4.8 and 4.7 percentage points, respectively).

A simple econometric analysis reinforces the above conclusions. As columns 1 and 2 of Table 2 show, the sign of the coefficient of the growth of GDP is the expected one, with GDP growth having a positive impact on the evolution of employment and negative on unemployment rates. However, the size of the impact of GDP growth is small, as the absolute value of the coefficients of this variable shows: A rise in GDP by 1 per cent improves the figure of employment by only 0.45 per cent and reduces the unemployment rate by only 0.24 percentage points. Moreover, the coefficients of correlation are low, showing that other elements rather than economic activity have the (main) determinants of the labour market performances since the onset of the GFC.

## 2.3    Employment and Unemployment During the Phases of Decline and Rise of Employment Since the Onset of the Financial and Economic Crisis

As explained at the beginning of this section, the conclusions reached in the previous sub-sections can be influenced by the different timings of the business cycles in the EU, an aspect that stays hidden when we analyse the behaviour of the economic activity and the labour market since the year 2008. To solve this problem, in this sub-section, our objective is to analyse separately the performances of the European labour markets during the phases of downswing and recovery of EU countries.

In this sub-section, we analyse the relationship between the evolution of employment and unemployment rates and the evolution of the economic activity (measured by the real GDP) in the period 2008–2015. We finish the analysis in 2015 because this is the last year for which annual data of employment and unemployment rates are available.

Usually, the phases of decline and recovery of the economic activity are defined according to the decline or increase of the GDP. Later, the evo-

lution of employment and unemployment rates in these periods is studied. Instead, we have opted for a different procedure. First, we analyse the period (what can be only one year, or more than one year) in which in each of the 28 EU countries there has been an increase or a decline of the total employment. Next, for each of these periods, we analyse how the GDP and the unemployment rate have evolved. Finally, we study the existence of a potential relationship between the change registered in the employment and the economic activity, on the one hand, and between the change in the unemployment rates and economic activity, on the other. This analysis is carried out separately for the periods of decline and creation of employment.

The reason for this procedure is that our interest is to analyse whether the changes (increases and declines) in employment in the EU countries are associated to a certain change (increase or decline) in the economic activity. Moreover, we are also interested in knowing if similar changes in employment or GDP are associated with similar changes in GDP or employment. This analysis is undertaken for the relationship between the changes in the unemployment rates and the changes in the GDP. Finally, we analyse the relationship between the evolution of employment and the changes registered in unemployment rates.

As mentioned earlier, we focus our attention on the periods (that is, years or successive years) in which there has been a creation or destruction of employment in the EU countries. The period analysed has been the years 2008–2015. The source of data has been the Labour Force Survey elaborated by Eurostat, available at the website of the institute.

Thus, after analysing the evolution of the total employment, we have been able to detect the following periods of creation and destruction of employment.

- Periods of creation of employment: Belgium 2008, Belgium 2010–2015, Bulgaria 2008, Bulgaria 2014–2015, Czech Republic 2008, Czech Republic 2012–2015, Denmark 2008, Denmark 2013–2015, Germany 2008, Germany 2011–2015, Estonia 2011–2015, Ireland, 2013–2015, Greece 2008, Greece 2014–2015, Spain 2014–2015, France 2008, France 2010, France 2012, France 2014, Croatia 2008, Croatia 2014–2015, Italy 2008, Italy 2011, Italy 2014–2015, Cyprus 2008–2011, Latvia 2011–2013, Latvia 2015, Lithuania 2011–2015, Luxembourg 2009–2015, Hungary 2011–2015, Malta 2008–2015,

Netherlands 2008, Netherlands 2012, Netherlands 2015, Austria, 2008, Austria 2010–2015, Poland 2008–2009, Poland 2011–2012, Poland 2014–2015, Portugal 2008, Portugal 2014–2015, Romania 2008, Romania 2012, Romania 2014, Slovenia 2008, Slovenia 2014–2015, Slovakia 2008, Slovakia 2012–2015, Finland 2008, Finland 2011–2012, Sweden 2008, Sweden 2010–2015, UK 2008 and UK 2011–2015.

- Periods of destruction of employment: Belgium 2009, Bulgaria 2009–2013, Czech Republic 2009–2011, Denmark 2009–2012, Germany 2009–2010, Estonia 2008–2010, Ireland, 2008–2012, Greece 2009–2013, Spain 2008–2013, France 2009, France 2011, France 2013, France 2015, Croatia 2009–2013, Italy 2009–2010, Italy 2012–2013, Cyprus 2012–2015, Latvia 2008–2010, Latvia 2014, Lithuania 2008–2010, Luxembourg 2008, Hungary 2008–2010, Netherlands 2009–2011, Netherlands 2013–2014, Austria, 2009, Poland 2008–2009, Poland 2010, Poland 2013, Portugal 2009–2013, Romania 2009–2011, Romania 2013, Romania 2015, Slovenia 2009–2013, Slovakia 2009–2011, Finland 2009–2010, Finland 2013–2014, Sweden 2009 and UK 2009–2010.

Our analysis begins with the study of the performances of the labour markets and the GDP during the periods of destruction of employment. Figure 1 shows the evolution of the unemployment rates, the total employment and the GDP during the episodes of destruction of employment registered in the EU between 2008 and 2015. The figure shows the existence of a direct relation between the evolution of the economic activity and the total employment.

However, it is important to notice that out of the 37 episodes of employment decline, in 11 episodes the decline in employment has come in parallel to an increase of the GDP (Bulgaria 2009–2013, France 2011, 2013 and 2015, Latvia 2014, Netherlands 2013–2014, Poland 2010 and 2013, Romania 2013 and 2015, and Slovakia 2009–2011). In some cases, the rate of growth of the GDP has been really high (3.6 per cent in Poland in 2010, and 3.5 per cent and 3.9 per cent in Romania in the years 2013 and 2015, respectively).

Moreover, like in the previous sections, it is easy to detect the existence of episodes in which despite a similar evolution of employment (or eco-
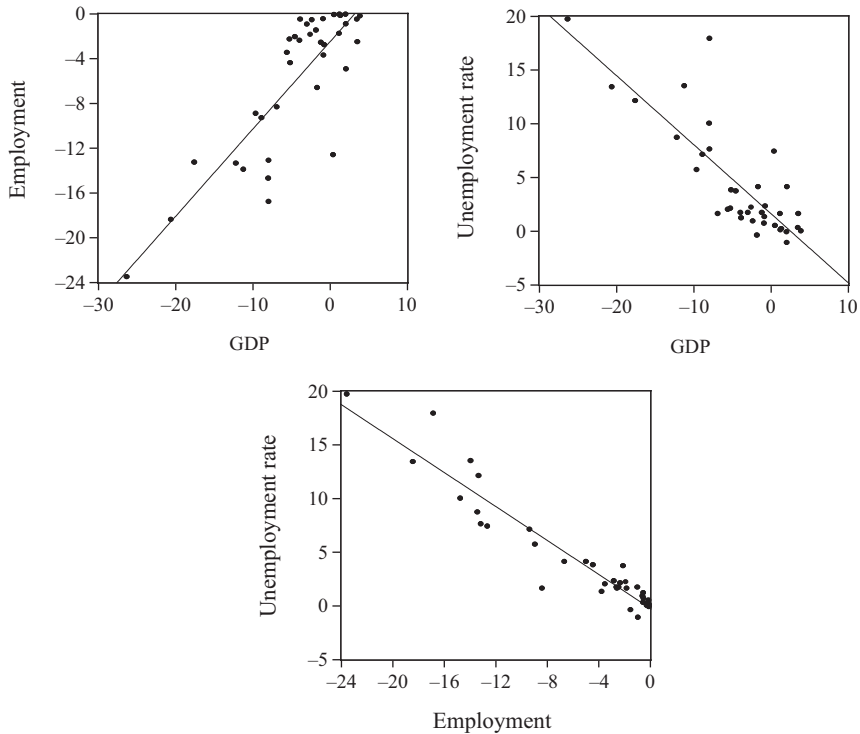
**Fig. 1** Evolution of real GDP (per cent), employment (per cent) and unemployment rates (percentage points) in the EU countries in the episodes of employment decline between 2008 and 2015 (Source: Own calculations based on Eurostat, National Accounts (ESA 2010), and Eurostat, Employment and Unemployment (Labour Force Survey))

nomic activity), there are significant differences in the evolution of the GDP (total employment). Thus, for instance, between 2009 and 2013, Bulgaria registered a fall in total employment amounting to 12.6; a similar decline to that of Estonia between 2008 and 2010, when employment fell by 13.3 per cent. However, in these periods, GDP in Estonia declined by 17.5 per cent, whilst in Bulgaria it rose by 0.5 per cent. Similarly, France in 2011 and Slovakia between 2009 and 2011 registered the same growth of GDP, namely, 2.1 per cent. However, in those dates, employment in France fell only by 0.1 per cent, but in Slovakia this fall amounted to 5 per cent.
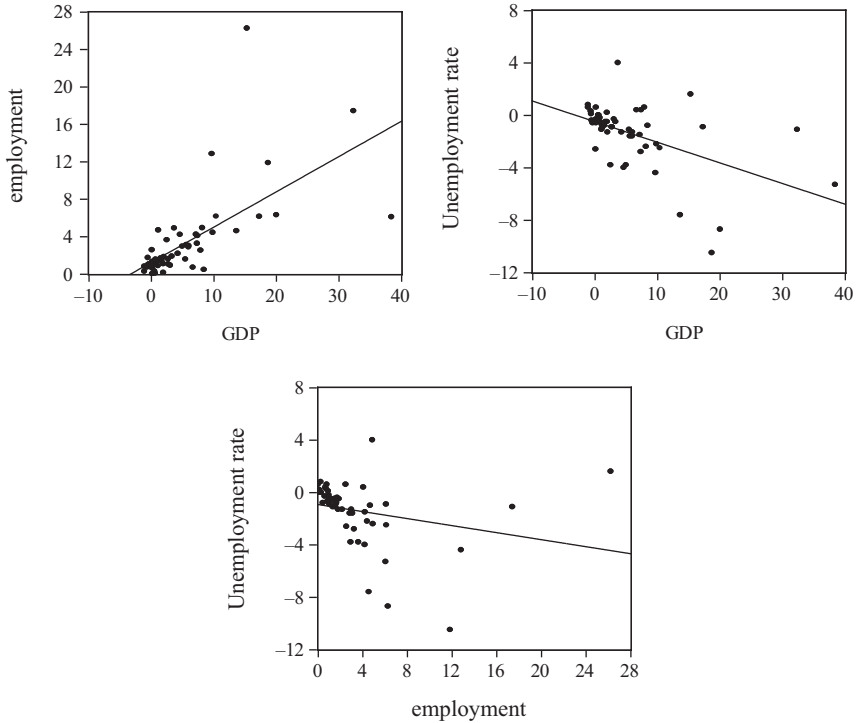
**Fig. 2** Evolution of real GDP (per cent), employment (per cent) and unemployment rates (percentage points) in the EU countries in the episodes of creation of employment between 2008 and 2015 (Source: Our calculations based on Eurostat, National Accounts (ESA 2010), and Eurostat, Employment and Unemployment (Labour Force Survey))

Figure 2 also shows the relationship between the GDP growth and the changes in the unemployment rates during the episodes of employment destruction since 2008. As expected, an inverse relationship between the change in the economic activity and the unemployment rate is detected.

It is important to notice that in three cases the fall in employment has come in parallel to a decline in unemployment rates: Germany 2009–2010, France in 2011 and Latvia in 2014. Out of these three episodes, only in two of them (France and Latvia) was there an increase in the GDP. However, in Germany the decline of employment and the simultaneous fall in unemployment rates came with a decline of the economic activity (amounting to −1.8 per cent).

In eight episodes, the rising unemployment rates have come with an increase in economic activity: Bulgaria 2009–2013, France 2013 and 2015, Netherlands 2013–2014, Poland 2010, Romania 2013 and 2015, and Slovakia 2009–2011. We must highlight the cases of Romania 2013 and 2015 and Poland 2010, in which despite registering high GDP rates of growth (3.5 per cent, 3.9 per cent and 3.6 per cent, respectively), the unemployment rates increased (0.3, 0.0 and 1.6 percentage points, respectively). Another case of interest is that of Slovakia between 2009 and 2011, where the unemployment rate rose by 4.1 percentage points despite a growth of the GDP amounting to 2.1 per cent.

Again, although there is a clear relation between the changes in economic activity and unemployment rates, it is also clear that there are particular elements in each European country that explain the impact of the evolution of economic activity on the labour market performance. Thus, for instance, in Romania in the period 2009–2011 and in Poland in 2016, unemployment rates increased by 1.6 percentage points; however, in these dates, the real GDP in Romania fell by 6.8 per cent, whilst in Poland it rose by 3.6 per cent. Another relevant comparison is that of Romania in the period 2009–2011 and Spain in the years 2008–2013. In both episodes, there was a fall in the GDP: 6.8 per cent in Romania and 7.9 per cent in Spain. However, while in Romania the unemployment rate rose by 1.6 percentage points, in Spain the increase was 11 times higher: 17.9 percentage points.

Finally, Fig. 1 shows the relationship during the episodes of employment destruction between the evolution of total employment and the unemployment rate. Despite the existence of the aforementioned three cases where the employment destruction came with declining unemployment rates, we can observe a negative relationship between the performances of employment and unemployment.

The above results are confirmed by simple OLS regressions (see columns 3–5 of Table 2). GDP growth is a significant determinant of the employment and the unemployment rate, in both cases with the expected sign: That is, a fall in real GDP leads to a rise in unemployment rate and a decline in employment. Moreover, the evolution of the employment is also a key significant determinant of the evolution of the unemployment rate, with a decline in employment leading to higher unemployment rates.

Figure 2 shows the evolution of total employment and the GDP during the episodes of creation of employment registered in the EU between 2008 and 2015. In 6 out of the 54 episodes of employment creation, the latter has come with a decline in the economic activity. However, five out of these six episodes took place in the year 2008 (Denmark, Greece, Italy, Sweden and the UK). The only exception is the Netherlands, where in 2012 employment rose by 0.3 per cent despite a fall in the GDP amounting to −1.1 per cent. Given that the economic crisis began in most European countries in 2008, in many cases in the second semester, it is therefore clear that employment creation is associated with a rising economic activity.

Like in the episodes of employment decline, a direct relation between the evolution of economic activity and employment is detected. Nonetheless, we can observe the existence of episodes in which despite a similar evolution of employment (or economic activity), there are significant differences in the evolution of GDP (total employment), which implies that the evolution of the employment is explained not only by the increase in economic activity but also by other particular structural and institutional elements, among them those related to the respective national labour markets.

Thus, for instance, between 2010 and 2015, Sweden registered an increase of the economic activity amounting to 17.3 per cent. This result was similar to that of Luxembourg between 2009 and 2015, where the GDP rose by 15.3 per cent. This similarity in the performance of economic activity was not reproduced in the case of employment: Whilst employment in Sweden increased by 6.1 per cent, in Luxembourg the creation of employment was four times higher: 26.2 per cent. In the same vein, the UK between 2011 and 2015 and Ireland between 2013 and 2015 recorded the same increase in employment (6.1 per cent). However, this employment creation took place in the UK with an increase in economic activity that was nearly four times lower than that of Ireland (10.4 per cent versus 38.5 per cent).

Figure 2 also shows the relationship between the evolution of the GDP and unemployment rates. It is important to note that not in all the cases has there been a combination of higher employment, higher economic activity and lower unemployment rates. In two cases, higher employment has come with lower economic activity and lower unemployment rates

(Denmark in 2008 and Greece in 2008). In four cases, higher employment has come with a declining economic activity and higher unemployment rate (Italy in 2008, the Netherlands in 2012, Sweden in 2008 and the UK in 2008). Finally, in nine cases, the creation of employment has taken place in a context characterized by higher GDP but higher unemployment rates (Belgium in 2010–2015, France in 2010, 2012 and 2014, Italy in 2011, Cyprus in 2008–2011, Luxembourg in 2009–2015, Austria in 2010–2015 and Poland in 2011–2012).

Again, we can detect significant differences between individual episodes regarding the relations between GDP and unemployment rates. For instance, Estonia in the years 2011–2015 and Sweden between 2010 and 2015 recorded similar increases in their GDP: 18.7 per cent and 17.3 percent, respectively. However, the decline in the unemployment rates was 11 times higher in Estonia than in Sweden: 10.5 percentage points versus 0.9 percentage points. Similarly, the fall in unemployment rates was the same in Malta between 2008 and 2015 and in Germany in 2008: 1.1 percentage points. However, in Malta the GDP recorded an increase by 32.4 per cent versus the increase by 1.1 recorded in Germany.

Finally, we have studied the relationship between the creation of employment and the evolution of the unemployment rates. It is clear that there is no significant relationship between these two variables, a result that is in deep contrast with that reached in the analysis of what happened in the episodes of decline in employment.

Columns 6–8 of Table 2 show the results of three OLS regressions, which show the impact of changes in the GDP and employment on total employment and unemployment rates during the episodes of employment creation. As during the episodes of employment decline, during the episodes of employment creation the GDP growth is a significant determinant of the changes in total employment and unemployment, with the growth in real GDP leading to a rise in employment and a decline in unemployment rates. However, the change in total employment is not a significant determinant of unemployment rate. This result implies that the relationship between employment and unemployment has been affected by structural changes in economic activity as a direct result of the GFC and by demographic changes and changes in the active population of the EU countries.

This conclusion is reinforced by the fact than coefficients of correlation of the three regressions corresponding to the periods of employment creation are much lower than those obtained for the analysis of the periods of employment decline, implying a larger relevance of other elements not included in the regression. But, moreover, the size of the coefficients of the GDP growth during the episodes of employment creation is much lower than those obtained during the periods of employment decline. This result implies that, in order to recover the figures of employment and unemployment rates existing before the crisis, the return to the levels of economic activity existing before the onset of the crisis will not be enough, and, consequently, additional increases in economic activity are required.

It is important to notice that, in most cases, the employment decline is concentrated in the first years of the GFC. This fact leads to the argument that, either as a direct consequence of the crisis or for some other elements generated at this time, for instance, measures of macroeconomic or structural policies, the link between the economic activity and the labour market performance has changed, thus leading to a slow recovery of employment and unemployment rates during the more recent phases of economic recovery. Of course, an alternative explanation could also be valid: It could be argued that as a direct consequence of the different nature of the GR, triggered by a financial crisis, the GFC has had a significant deeper impact on labour markets, hence the huge impact of the crisis on employment and unemployment, and the slow return to the figures of these variables registered before the onset of the crisis.

## 3    Labour Market Performances and Labour Rigidities in the European Union

Previous analyses show that the performances of the labour markets in the EU countries, proxied by the evolution in the figures of total employment and unemployment rates, are not exclusively determined by the economic impact of the GFC (European Commission Directorate-General for Employment, Social Affairs and Inclusion 2014). To be more precise, what we mean is that although it is evident that the economic

growth rates affect and determine the changes recorded in employment and unemployment, there still exist among the European economies significant differences in the behaviour of the labour market outcomes that do not correspond with the evolution of the economic activity, thus making those countries with similar rates of growth of the GDP to have significantly different results in terms of the evolution of the employment and/or the unemployment rates. This outcome implies that the institutional design of the labour market in each country exerts a significant influence on the way and the intensity with which its labour market is adjusted when facing changes in its economic activity.

Based on this evidence, a number of studies argue that the worst national outcomes in the labour markets are the result of an excessive rigidity in these markets. Consequently, for these studies, the considerable increase in unemployment observed during the crisis would have been observed in those countries characterized by labour market institutions and rigidities where the necessary and abrupt adjustment of imbalances resulted in strong falls in output and employment rather than in wage adjustment (Anderton et al. 2015).

Under these circumstances, many European economies have in the last decades promoted labour market reforms aimed at reducing EPL, reducing legal protection for employees and encouraging the use of atypical employment contracts (i.e., fixed-term employment contracts, part-time employment contracts and temporary agency workers) (Lang et al. 2013; Lissowska 2017; Rubery and Piasna 2016).

The enormous rise in the figures of fixed-term workers had led, before the crisis, to an excessive segmentation in the labour markets between permanent and temporary workers, thus leading to the existence of a dual labour market. In this sense, it is often argued that the existence of this dual labour market has contributed to amplify the impact of the crisis on the employment, making the burden of the employment adjustment to fall on temporary workers (Anderton et al. 2015).

However, such a relationship between the total employment adjustment and the (presumed) higher adjustment in the group of temporary workers is far away from being a common pattern in the European countries. Table 3 shows the evolution of the total employment and the temporary workers during the periods of total employment adjustment in

**Table 3** Growth of total employment and temporary employment during the periods of employment adjustment in the EU countries (percentage of employment existing the previous year)

| Country (years of employment adjustment) | Total employment | Temporary contracts |
|---|---|---|
| Belgium (2009) | −0.6 | −1.6 |
| Bulgaria (2009–2012) | −12.4 | −20.8 |
| Czech Republic (2009–2011) | −2.8 | 4.7 |
| Denmark (2009–2012) | −6.6 | −5.1 |
| Germany (2009–2010) | −1.5 | −2.6 |
| Estonia (2009–2010) | −13.3 | 35.7 |
| Ireland (2008–2012) | −14.7 | 3.4 |
| Greece (2009–2013) | −23.5 | −35.7 |
| Spain (2008–2013) | −16.8 | −39.3 |
| France (2009–2013) | −1.0 | 0.3 |
| Croatia (2009–2013) | −13.4 | 4.7 |
| Italy (2009–2013) | −4.2 | −3.8 |
| Cyprus (2012–2015) | −9.3 | 21.7 |
| Latvia (2008–2011) | −17.2 | 31.6 |
| Lithuania (2008–2010) | −13.9 | −41.3 |
| Luxembourg (2008) | −0.5 | −7.7 |
| Hungary (2007–2010) | −5.2 | 35.6 |
| Netherlands (2009–2014) | −5.2 | 7.8 |
| Austria (2009) | −0.5 | 1.0 |
| Poland (2010–2011) | −2.0 | −0.6 |
| Portugal (2009–2013) | −13.1 | −16.2 |
| Romania (2009–2011) | −8.4 | 2.5 |
| Slovenia (2009–2013) | −8.9 | −17.6 |
| Slovakia (2009–2011) | −5.0 | 34.0 |
| Finland (2009–2015) | −5.2 | −5.2 |
| Sweden (2008–2009) | −1.4 | −14.5 |
| UK (2009–2010) | −1.9 | 10.0 |

Source: Our calculations based on Eurostat, Employment and Unemployment (Labour Force Survey)

the EU countries. (Malta is not included because employment has been rising all the years since 2007.) For each country, the period of employment adjustment is represented by the years that pass from the year with the highest figure of total employment and the year that register the lowest figure of total employment since after the onset of the GFC. The years of these periods of employment destruction are shown in the first column of Table 3. Column 2 shows the variation of total employment (as a percentage of the employment registered in each country in the year

before the period of employment adjustment), and column 3 shows the variation during these years of the number of temporary workers.

From the data in Table 3, it is easy to conclude that there is no relation between both variables.[5] Indeed, we can observe that there is a more intense destruction of temporary employment only in 10 countries: Belgium, Bulgaria, Germany, Greece, Spain, Lithuania, Luxembourg, Portugal, Slovenia and Sweden. But the most remarkable outcome is that during the period of employment adjustment, temporary workers have increased in 13 EU countries, namely, Czech Republic, Estonia, Ireland, France, Croatia, Cyprus, Latvia, Hungary, the Netherlands, Austria, Romania, Slovakia and the UK.

To a large extent, this paradox is explained by the fact that many European countries during the crisis have made more flexible the use of temporary employment contracts as a tool to palliate the employment destruction.[6] Thus, until 2016, countries like Croatia, Czech Republic, Estonia, Finland, France, Greece, Italy, Lithuania, Poland, Portugal, Romania, Spain, Slovakia and Slovenia have adopted measures with the aim to promote the use of fixed-term employment contracts,[7] among others, expanding the objective reasons justifying the renewal of these contracts, extending the maximum total duration of successive fixed-term contracts or increasing the number of renewals allowed for this kind of

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[5] An OLS regression between the change in the growth of temporary contracts and the growth of total employment shows that the growth of the former is not a significant determinant of the change in total employment. The results are not reported to save space, but can be obtained from the authors upon request.

[6] Several countries have adopted new types of employment contracts (both temporary and permanent contracts) for certain categories of workers deeply affected by the GR and the employment destruction (young workers, women, long-duration unemployed workers, etc.). These new contracts frequently offer lower employment protection than the standard contracts (that is, full-time permanent employment contracts), downgrading the rights to unemployment or social benefits, incorporating lower severance payments or offering reducing wages (Lang et al. 2013). These types of contracts have been approved in countries like Belgium, Bulgaria, Croatia, Czech Republic, Romania, France, Greece, Hungary, Ireland, Italy, Luxembourg, Poland, Slovakia, Slovenia, Spain, Sweden and the UK (see Clauwaert and Schömann 2012, and the successive updates of the information included in that work, which are available at the European Trade Union Institute website: https://www.etui.org/Publications2/Working-Papers/The-crisis-and-national-labour-law-reforms-a-mapping-exercise).

[7] See Clauwaert and Schömann (2012) and the successive updates of the information included in that work, which are available at the European Trade Union Institute website: https://www.etui.org/Publications2/Working-Papers/The-crisis-and-national-labour-law-reforms-a-mapping-exercise

contracts (Clauwaert and Schömann 2012; Lang et al. 2013). Moreover, since the onset of the GR, some countries like Belgium, Bulgaria, France, Italy, Lithuania, Malta, Romania and the UK[8] have also adopted measures that favour the use of temporary agency workers, which in most cases are hired by these agencies on a temporary basis.

Despite these measures that favour the use of temporary employment contracts, nevertheless it is increasingly accepted the view that the weight of atypical or non-standard employment contracts is excessive. Thus, in 2015, according to the figures provided by Eurostat (see the Eurostat's website    http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsa_qoe_4ax1r2&lang=en), precarious employment[9] in the EU amounted to 22 per cent of total employment, with 12 countries exceeding this figure[10]: Sweden (26.7 per cent), Slovakia (27.2 per cent), Finland (28 per cent), Slovenia (28.3 per cent), France (29 per cent), Hungary (31.3 per cent), Croatia (33.1 per cent), Estonia (34.4 per cent), Belgium (36 per cent), Latvia (45.3 per cent), Lithuania (45.8 per cent) and Spain (56.8 per cent).

In this sense, it is argued that a high figure of temporary workers has a number of negative social and economic consequences. Thus, temporary employment increases the risk of unemployment or repeated spells of temporary employment, and therefore, does not work as a stepping stone to regular (that is permanent) contract; increases social inequality (leading to negative effects in terms of wage penalties and career mobility and to higher exposure to bad jobs, that is, jobs with low wages and with no or lower access to health insurance and pension benefits); reduces investment in training, thus affecting productivity in the long term; reduces the access to social protection to temporary workers; and generates a

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[8] See footnote 6.

[9] According to the definition of the International Labour Organisation (ILO), used by Eurostat, workers in precarious employment can either (a) be workers whose contract of employment leads to the classification of the incumbent as belonging to the groups of 'casual workers', 'short-term workers' or 'seasonal workers'; or (b) be workers whose contract of employment will allow the employing enterprise or person to terminate the contract at short notice and/or at will, the specific circumstances to be determined by national legislation and custom.

[10] On the contrary, in six countries the share of precarious employment in the year 2015 was below 10 per cent of total employment: Germany (3.7 per cent), Cyprus (4.3 per cent) Czech Republic (4.7 per cent), the Netherlands (5.9 per cent), the UK (6.6 per cent) and Ireland (8.4 per cent).

higher risk of in-work poverty (mainly in the case of part-time fixed-term employment contracts) (European Commission Directorate-General for Employment, Social Affairs and Inclusion 2012, 2014, 2015; Rubery and Piasna 2016).

On the contrary, employment protection would imply significant micro- and macroeconomic benefits, among others, the stabilization of the business cycle, mainly during recessions, because employment protection reduces the incentives of employers to fire workers. Moreover, employment protection would also contribute to increase the productivity in the long term. Finally, it would provide workers with higher income security, not only to the employed workers but also to workers that cannot work, allowing them the access to social protection (Cuadro-Sáez et al. 2012; European Commission Directorate-General for Employment, Social Affairs and Inclusion 2015; Rubery and Piasna 2016).

To these negative consequences, other negative effects of micro- and macroeconomic nature could be added. Thus, in the case of Spain,[11] several studies show that the high share of temporary workers has generated not only negative macroeconomic consequences, in the form of more intense employment adjustments (mainly in temporary workers) during declines of the economic activity, higher precautionary savings in downswings and, therefore, less private consumption, excessive household indebtedness, low growth of real wages, higher income inequality, higher public expenditure in social protection, mainly in unemployment benefits, and so on, but also negative microeconomic consequences, discouraging investments in R&D activities or promoting strategies of firms' competitiveness based on low wages because of the wage penalty suffered by temporary employees (Ferreiro and Gómez 2006, 2015; Ferreiro and Serrano 2001, 2013).

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[11] In 2015, according to the data of Eurostat, temporary employees amounted to 25.2 per cent of total employees. This figure is, nonetheless, much lower than that recorded before the onset of the crisis (34 per cent in 2006). The declining share of the Spanish temporary workers is explained by the huge adjustment in the figures of the temporary workers. However, the current employment creation process is being fuelled by a new rise in temporary workers, and, thus, according to the data of the Labour Force Survey of the Spanish National Institute of Statistics, the share of temporary employees (as a percentage of total employees) has risen from 21.9 per cent at the first quarter of 2013 to 26.5 at the last quarter of 2016.

As a consequence, since the onset of the crisis, and mainly since the year 2010, many European countries have tried to reduce the segmentation in the labour market, with the final objective to reduce the excessive weight of fixed-term workers, trying to reduce the abusive use of temporary employment contracts and of temporary agency workers (Clasen et al. 2012; Lang et al. 2013; Rubery and Piasna 2016). These types of measures have been adopted in countries like Austria, Germany, Greece, Malta, Poland, Slovakia, Spain and Sweden.[12]

In most cases, the strategy to reduce the segmentation between temporary and permanent workers has not been based on measures to increase the protection of temporary workers, levelling up to that enjoyed by permanent workers. On the contrary, it has been mostly based on measures that reduce the protection for regular and standard (that is, permanent) workers, levelling down to that of non-standard (temporary) workers (European Commission Directorate-General for Employment, Social Affairs and Inclusion 2015; Rubery and Piasna 2016).

To get a proper idea of the measures adopted in the European countries to make the labour markets more flexible, refer to Table 4, which shows the data of the EPL strictness indices elaborated by the OECD. The countries that appear in this table are the 21 EU countries for which this index is elaborated by the OECD: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Poland, Portugal Slovakia, Slovenia, Spain, Sweden and the UK.

The EPL would be formed by the set of rules that in each country govern the hiring and firing of employees. The hiring rules are the conditions for the different uses of standard (i.e., full-time permanent contracts) and non-standard (i.e., part-time, fixed-term, temporary agency workers, etc.) employment contracts, while the firing rules are the rules of individual and collective dismissals of workers with standard permanent contracts. This legislation has the aim of providing workers with certain levels of protection and security in their jobs by specifying the requirements that employers must observe and respect to dismiss (permanent) workers (European Commission Directorate-General for Employment, Social Affairs and Inclusion 2015).

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[12] See footnote 6.

**Table 4** OECD EPL indicators (version 3)

| | Individual and collective dismissals (regular contracts) | | | Individual dismissals (regular contracts) | | | Collective dismissals (additional restrictions) | | | Temporary contracts | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2008 | 2013 | Change | 2008 | 2013 | Change | 2008 | 2013 | Change | 2008 | 2013 | Change |
| Austria | 2.44 | 2.44 | 0.00 | 2.12 | 2.12 | 0.00 | 3.25 | 3.25 | 0.00 | 2.17 | 2.17 | 0.00 |
| Belgium | 2.99 | 2.99 | 0.00 | 2.14 | 2.14 | 0.00 | 5.13 | 5.13 | 0.00 | 2.42 | 2.42 | 0.00 |
| Czech Republic | 2.75 | 2.66 | −0.09 | 3.00 | 2.87 | −0.13 | 2.13 | 2.13 | 0.00 | 1.88 | 2.13 | 0.25 |
| Denmark | 2.27 | 2.32 | 0.05 | 2.03 | 2.10 | 0.06 | 2.88 | 2.88 | 0.00 | 1.79 | 1.79 | 0.00 |
| Estonia | 2.33 | 2.07 | −0.26 | 2.56 | 1.74 | −0.82 | 1.75 | 2.88 | 1.13 | 2.29 | 3.04 | 0.75 |
| Finland | 2.17 | 2.17 | 0.00 | 2.38 | 2.38 | 0.00 | 1.63 | 1.63 | 0.00 | 1.88 | 1.88 | 0.00 |
| France | 2.87 | 2.82 | −0.05 | 2.67 | 2.60 | −0.07 | 3.38 | 3.38 | 0.00 | 3.75 | 3.75 | 0.00 |
| Germany | 2.84 | 2.84 | 0.00 | 2.53 | 2.53 | 0.00 | 3.63 | 3.63 | 0.00 | 1.54 | 1.75 | 0.21 |
| Greece | 2.85 | 2.41 | −0.44 | 2.69 | 2.07 | −0.62 | 3.25 | 3.25 | 0.00 | 3.17 | 2.92 | −0.25 |
| Hungary | 2.26 | 2.07 | −0.19 | 1.82 | 1.45 | −0.37 | 3.38 | 3.63 | 0.25 | 1.92 | 2.00 | 0.08 |
| Ireland | 1.98 | 2.07 | 0.09 | 1.37 | 1.50 | 0.13 | 3.50 | 3.50 | 0.00 | 0.71 | 1.21 | 0.50 |
| Italy | 3.03 | 2.89 | −0.14 | 2.60 | 2.55 | −0.05 | 4.13 | 3.75 | −0.38 | 2.71 | 2.71 | 0.00 |
| Luxembourg | 2.74 | 2.74 | 0.00 | 2.28 | 2.28 | 0.00 | 3.88 | 3.88 | 0.00 | 3.83 | 3.83 | 0.00 |
| Netherlands | 2.93 | 2.94 | 0.01 | 2.90 | 2.84 | −0.06 | 3.00 | 3.19 | 0.19 | 1.17 | 1.17 | 0.00 |
| Poland | 2.39 | 2.39 | 0.00 | 2.20 | 2.20 | 0.00 | 2.88 | 2.88 | 0.00 | 2.33 | 2.33 | 0.00 |
| Portugal | 3.51 | 2.69 | −0.83 | 4.17 | 3.01 | −1.16 | 1.88 | 1.88 | 0.00 | 2.29 | 2.33 | 0.04 |
| Slovak Republic | 2.63 | 2.26 | −0.38 | 2.19 | 1.81 | −0.38 | 3.75 | 3.38 | −0.38 | 2.17 | 2.42 | 0.25 |
| Slovenia | 2.70 | 2.67 | −0.03 | 2.43 | 2.39 | −0.05 | 3.38 | 3.38 | 0.00 | 2.50 | 2.50 | 0.00 |
| Spain | 2.66 | 2.36 | −0.30 | 2.22 | 1.95 | −0.28 | 3.75 | 3.38 | −0.38 | 3.50 | 3.17 | −0.33 |
| Sweden | 2.52 | 2.52 | 0.00 | 2.52 | 2.52 | 0.00 | 2.50 | 2.50 | 0.00 | 0.79 | 1.17 | 0.38 |
| UK | 1.76 | 1.66 | −0.10 | 1.31 | 1.18 | −0.13 | 2.88 | 2.88 | 0.00 | 0.42 | 0.54 | 0.12 |

Source: Our calculations based on the OECD Employment Protection Database

The OECD EPL indices try to measure the strictness of employment protection for permanent and temporary contracts, constructing a synthetic indicator on the basis of the values attached to 21 different items. The EPL indices are classified into three main areas: (i) protection of regular workers against individual dismissals; (ii) regulation of temporary forms of employment (fixed-term and temporary agency workers); and (iii) additional, specific requirements for collective dismissals. A fouth index is ellaborated measuring employment protection of regular workers against individual and collective dismissals. Each indicator is measured on a 0–6 score, where the maximum value, that is, 6, represents the stricter regulation, with higher values representing a stricter regulation.

The main advantages from the use of these indices are, first, that they allow making a comparison among countries of the strictness in the EPL. In this sense, it could be interpreted that the countries with the highest scores (the stricter provision on individual and collective dismissals) would be the countries with the highest rigidities in the labour market, and vice versa. The second advantage is that the changes in the labour law would imply a change in the value of the indices. Thus, a labour law reform relaxing the regulatory provisions on individual and collective dismissals, that is, a measure making the labour market more flexible, would imply a fall in the score, and vice versa. The deeper the relaxation in these provisions, the higher the fall in the score, and vice versa.

Table 4 shows the indicators of the strictness of employment protection for the four categories for which the OECD calculates the corresponding indicators, namely, individual and collective dismissals for workers with regular contracts, individual dismissals for workers with regular contracts, the additional provisions for collective dismissals for workers with regular contracts and, finally, the strictness of employment protection for temporary contracts (which comprise both fixed-term contracts and temporary work agency employment). For each indicator, Table 4 shows the scores corresponding to the years 2008 and 2013 (the latter being the last available year). It must be noticed that these scores are calculated based on the regulation in force on the 1st of January of each year. Therefore, the change calculated as the difference between the scores in 2013 and in 2008 reflects the changes in the EPL approved between the 1st of January 2008 and the 31st of December 2012.

Table 4, besides showing the remarkable differences in the employment protection, among the EU countries, also shows the changes in the labour legislation that have been approved between 2008 and 2012. In the case of the legal provisions regarding the individual and collective dismissals of regular contracts, those have been relaxed in 11 countries: Czech Republic, Estonia, France, Greece, Hungary, Italy, Portugal, Slovakia, Slovenia, Spain and the UK. On the contrary, these provisions have become more severe in Denmark, Ireland and the Netherlands. Regarding the strictness of individual dismissals of regular contracts, 12 countries have relaxed these legal provisions: Czech Republic, Estonia, France, Greece, Hungary, Italy, the Netherlands, Portugal, Slovakia, Slovenia, Spain and the UK; on the contrary, these provisions are stricter in Denmark and Ireland. In the case of the additional provisions for collective dismissals of regular contracts, these have been relaxed in three countries: Italy, Slovakia and Spain, and have become stricter in Estonia, Hungary and the Netherlands.

In contrast to the former indicator, the one regarding the employment protection for temporary contracts has been relaxed only in two countries, Greece and Spain, but has increased in nine countries: Czech Republic, Estonia, Germany, Hungary, Ireland, Portugal, Slovakia, Sweden and the UK.

These changes show some interesting results. The first conclusion from these results is that since the year 2008, a high number of countries have not modified any of the elements that form the EPL, both for regular (permanent) contracts and for temporary workers. The second conclusion is that the measures to relax the strictness of employment protection have focused on the elements determining the protection against individual dismissals of regular contracts. Thirdly, opposite to what happened to the regular (permanent) contract, a significant number of countries have approved measures to increase the employment protection for temporary workers. The last two conclusions are in accordance with the policies adopted in some EU countries aiming at reducing the labour segmentation in labour markets, which was mainly focused on reducing the employment protection for permanent employment contracts.

If we focus our attention on individual countries, there are some relevant cases that deserve closer attention. There is a group formed by five

countries (Austria, Belgium, Finland, Luxembourg and Poland) whose strictness of employment protection has remained unchanged since 2008. Opposite to this group, we find Spain, a country that has relaxed the employment protection in all the four indicators included in the analysis.

A third group of countries is formed by Denmark, Germany, Ireland and Sweden. What characterizes this group is that the strictness of employment protection increases in some indicators, while it remains constant in the other(s). Consequently, we can state that since 2008 the employment protection has risen in these four countries.

The fourth group is formed by four countries (France, Greece, Italy and Slovenia) where the score in one, or more than one, indicator has fallen, whilst it remains unchanged in the other(s). Therefore, we can state that there has been a relaxation in the strictness of the employment protection in this group. The final group is formed by the remaining seven countries: Czech Republic, Estonia, Hungary, the Netherlands, Portugal, Slovakia and the UK. In these countries, there has been a relaxation in the strictness of the employment protection in some categories, in parallel with an increase of strictness of employment protection in other categories.

As mentioned earlier, for mainstream economists and international organizations, the worst performances in terms of employment and unemployment since the onset of the economic and financial crisis were associated with excessive rigidities in the labour markets. To test the validity of this hypothesis, we have analysed the relationship between the strictness of EPL existing before the crisis and the destruction of employment and the rise in unemployment rates registered since 2008. According to this view, a higher score in the EPL indicator should be associated with a more intense employment adjustment and with a higher increase in the unemployment rates.

Figure 3 shows the relationship between the scores of the four categories of strictness of EPL registered in 2008, the decline in total employment, the increase in unemployment rates registered in the 21 countries, and the EPL strictness indices for which the EPL indices are available between 2008 and 2013. The decline in total employment has been calculated as the difference between the lowest figure of
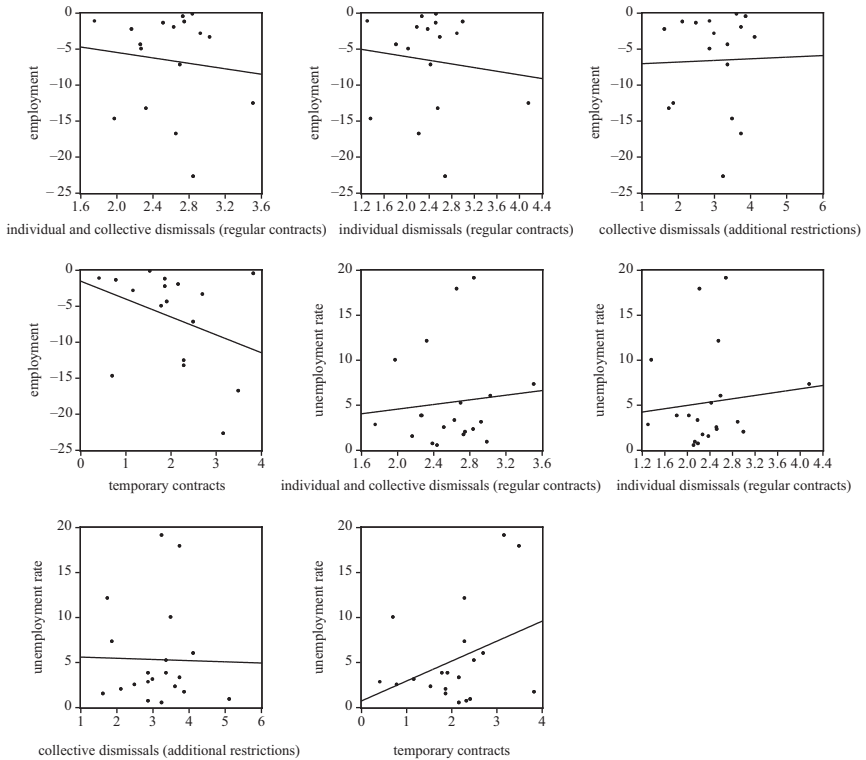
**Fig. 3** Employment destruction (percentage), rise in unemployment rates (percentage points) and EPL index in 2008 (Source: Our calculations based on Eurostat, Employment and Unemployment (Labour Force Survey) and OECD Employment Protection Database)

employment registered in the years 2008–2013 and the employment registered in 2007, according to the figures provided by Eurostat. The rise in unemployment rate has been calculated as the difference between the highest unemployment registered in the years 2008–2013 and the unemployment rate registered in the year 2007, again according to the figures provided by Eurostat.[13]

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[13] Germany is not included because between 2008 and 2013, the unemployment rate was lower than that recorded in the year 2007.

Seemingly, there is a direct relation between the strictness in employment protection and the employment adjustment in EU countries.[14] Therefore, a more strict employment protection would be associated with a more intense employment adjustment. Nonetheless, this outcome does not happen in the case of the additional restriction for collective dismissals of permanent workers. In this case, a higher employment protection is associated with a lower employment adjustment.

Now even more evident than in the case of the employment adjustment is that there is no relation between the strictness in employment protection existing in 2008 and the increase recorded in the unemployment rates. Table 5 confirms this conclusion. Columns 1–4 show the results of four OLS regressions where the dependent is the decline in employment registered since the year 2008 and the explanatory variables are the values of the EPL indicators in the year 2008. Columns 5–8 show the results of four similar OLS regressions where the dependent is the decline in unemployment rates registered since the year 2008 and the explanatory variables are the values of the EPL indicators in the year 2008. As Table 5 shows, the values of the EPL indicators in 2008 are not a significant determinant of the declines in employment and the increases in unemployment rates registered during the GFC. In other words, the national impacts of the GFC in the labour markets cannot be attributed to the rigidities in the labour markets.

These conclusions are based on the hypothesis that the evolution of employment and unemployment rates is influenced by the level of the strictness of the employment protection existing before the onset of the GFC. However, it could happen that what matters in the analysis of the determinants of the labour market performance during the GFC is not the level of the EPL indicators before the crisis, but the changes registered in these indicators during the crisis, that is, since the year 2008 forward.

As explained above, the EPL indicators for a year are based on the regulations in force from the 1st of January in each year. Thus, the year

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[14] It must be noticed that Austria, Belgium, France and Poland are not included in this analysis, because since the year 2008 the employment in these countries has been higher than that recorded in 2007.

**Table 5** OLS estimation results[a]

| | Declines in employment | | | | Increases in unemployment rate | | | | Change in total employment | | | | Change in unemployment rate | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
| Constant | −1.689 (10.799) | −3.513 (6.736) | −7.253 (6.968) | −1.526 (4.251) | 2.072 (8.233) | 3.293 (5.165) | 5.570 (4.805) | 1.992 (2.832) | −0.296 (1.030) | −0.077 (0.896) | −0.975 (1.125) | −1.317 (1.098) | 0.811 (0.644) | 0.822 (0.666) | 1.588** (0.820) | 1.965* (0.575) |
| EPL individual and collective dismissals 2008 | −1.889 (4.126) | | | | | | | | | | | | | | | |
| EPL individual dismissals 2008 | | −1.268 (2.701) | | | | 0.853 (2.106) | | | | | | | | | | |
| EPL collective dismissals (additional restrictions) 2008 | | | 0.225 (2.240) | | | | −0.079 (1.491) | | | | | | | | | |
| EPL temporary contracts 2008 | | | | −2.483 (2.258) | | | | 1.526 (1.545) | | | | | | | | |
| Change in EPL individual and collective dismissals | | | | | | | | | 15.898* (4.044) | | | | −15.489* (5.791) | | | |

(continued)

**Table 5** (continued)

| | Declines in employment | | | | Increases in unemployment rate | | | | Change in total employment | | | | Change in unemployment rate | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
| Change in EPL individual dismissals | | | | | | | | | | 12.805* (2.873) | | | | −10.413* (3.206) | | |
| Change in EPL collective dismissals (additional restrictions) | | | | | | | | | | | −3.615 (6.633) | | | | 2.050 (6.619) | |
| Change in EPL temporary contracts | | | | | | | | | | | | 8.611 (6.952) | | | | −9.342* (3.658) |
| $R^2$ | 0.013 | 0.014 | 0.000 | 0.120 | 0.008 | 0.009 | 0.000 | 0.070 | 0.364 | 0.270 | 0.014 | 0.054 | 0.307 | 0.305 | 0.008 | 0.115 |

Standard errors in parentheses

Standard errors robust to heteroscedasticity and serial correlation

*$p$-value < 0.01; **$p$-value < 0.05; ***$p$-value < 0.1

[a]Dependent variables: declines in total employment (per cent) and increases in unemployment rates (percentage points), and changes in total employment (per cent) and changes in unemployment rates between 2008 and 2012. Independent variables: EPL indices in 2008 and changes in EPL indices between 2008 and 2013

2013 collects the changes approved in these regulations along the year 2012. Therefore, our study of the relationship between the evolution of employment and unemployment rates and the changes of the EPL indicators comprises the years 2008–2012.

We have analysed the evolution of the EPL indicators, first, during the periods of employment adjustment and creation and, second, during the periods of rise and decline of the unemployment rates in the five-year period 2008–2012 for the 21 EU countries for which indicators of EPL strictness are available.

These periods of evolution of total employment and unemployment rates have been determined on the basis of the changes registered in these two variables. These periods can comprise just one year or several successive years where the evolution of the variable has been the same (rise or fall). For each of these periods, we have calculated the change registered in the four indicators of the EPL strictness. This implies that a country can have more than one period of employment creation or destruction or more than one period of rise and decline in the unemployment rates.

As mentioned, mainstream economists and international organizations argue that worst labour market performances are explained by the rigidities in the labour market, hence the need to implement reforms that make labour markets more flexible. As far as we use as proxies of the labour rigidities the score estimated in the EPL indicators, if that hypothesis were correct, a decline in these scores should come with a better performance of the labour market. In this sense, a decline in the EPL indicators should come with a larger increase in total employment and/or with a smaller decline in total employment, and vice versa; similarly, a decline in the EPL indicators should come with a larger decline in unemployment rates and/or a smaller rise in unemployment rates.

Figure 4 shows the relationship between the changes in the total employment registered during the episodes of employment creation adjustment and the changes registered in the EPL indicators in the EU countries (55 episodes in total).

Contrary to the above-mentioned hypothesis, a decline in the strictness of the employment protection is not associated with a better performance
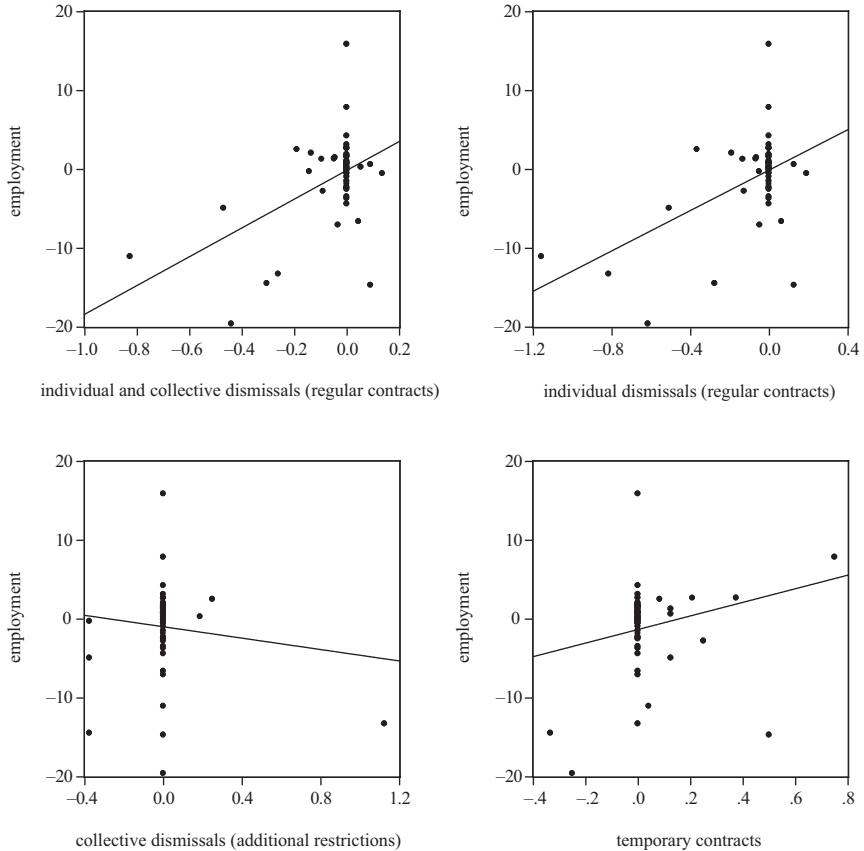
**Fig. 4** Changes in total employment (percentage) and changes in EPL indicators in the period 2008–2012 (Source: Our calculations based on Eurostat, Employment and Unemployment (Labour Force Survey) and OECD Employment Protection Database)

of employment, but to a larger decline in employment. The only case in which a relaxation in the EPL strictness is associated with better performances in employment is in the case of the additional restrictions in the collective dismissals.[15]

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[15] We have separately analysed the periods of employment creation and the periods of employment adjustment. In both cases, a decline in EPL indicators is associated with a worse result in employment. Results can be obtained from the authors upon request.

The results of Table 5 reinforce these conclusions. Columns 9–12 show the results of an OLS regression where the dependent variable is the percentage change of total employment during the episodes of employment adjustment and creation, and the independent variable is the change registered in the EPL indicators during these episodes. Both the EPL indicators corresponding to the additional restrictions in collective dismissals and the strictness in employment protection for temporary contracts are not significant. On the contrary, the indicators for individual and collective dismissals for regular contracts and for individual dismissals for regular contracts are significant, but with a positive sign, proving that a stricter protection for regular workers has implied a better performance of total employment since 2008 and, therefore, that measure to make the labour market more flexible have led to worse data of employment.

We have also analysed the relationship between the changes in the unemployment rates registered during the episodes of rise and decline (using the same methodology as in the case of employment) of the unemployment rates (52 episodes in total) and the changes registered in these episodes in the four EPL indicators.

Figure 5 shows the relation between the change in the unemployment rates and the EPL indicators. Again, it is detected that a relaxation in the strictness of the employment protection legislation is associated with larger increases in the unemployment rates. Like in the case of employment, the only exception is the case of the additional restrictions for collective dismissals of permanent workers, where a decline in the score of this index is associated with smaller increases (larger declines) of unemployment rates.

Columns 13–16 of Table 5 show the results of an OLS regression where the dependent variable is the change in percentage points of unemployment rates during the episodes of rise and fall of unemployment rates, and the independent variable is the change registered in the EPL indicators during these episodes. The EPL indicators for individual and collective dismissals for regular contracts, for individual dismissals for regular contracts and for temporary contracts are all significant, and with a negative sign, implying that a relaxation in the employment protection for permanent and temporary workers has led to an increase in the unemployment rates. In other words, measures adopted to make the labour market more flexible have implied a higher unemployment rate.
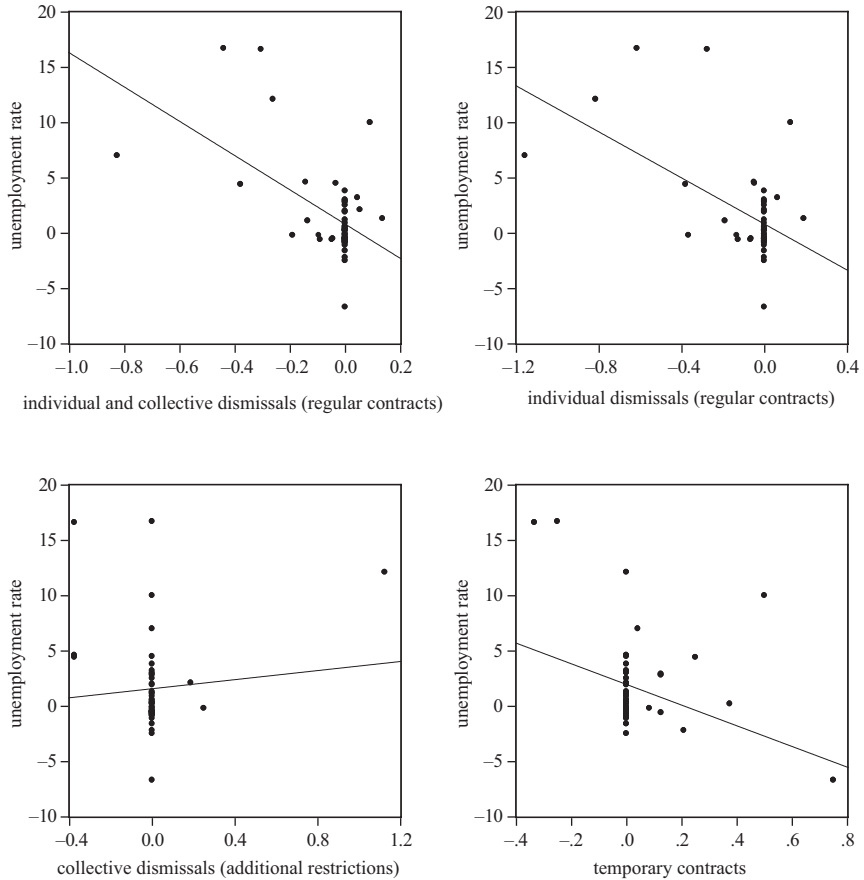
**Fig. 5** Changes in unemployment rates (percentage points) and changes in EPL indicators in the period 2008–2012 (Source: Our calculations based on Eurostat, Employment and Unemployment (Labour Force Survey) and the OECD Employment Protection Database)

# 4     Summary and Conclusions

The GFC has had a deep negative impact on the labour markets of the EU economies. Nonetheless, there exist significant differences among EU countries regarding the evolution of the employment and the unemployment rates since the onset of the financial and economic crisis.

Our analysis shows that the behaviour of national labour markets before the crisis does not explain the results in terms of employment and unemployment during the crisis, since many of the bad (or worst) performers during the crisis had recorded before the crisis high rates of employment creation and low (to be more precisely, lower than the EU averages) unemployment rates. It could be argued that those countries that have suffered the deepest employment adjustments and increases in the unemployment rates since the year 2008 have been those with the worst results in terms of the economic activity; however, we have shown that, though relevant, the national differences in terms of the evolution of the economic activity do not alone explain the national differences in the labour market performances. Thus, and as we have demonstrated, there are a high number of cases where similar labour markets results are obtained in countries that present significant differences in the evolution of their GDPs, and that countries with similar impacts of the financial and economic crisis on the economic activity also present deep differences in the evolution of employment and unemployment. Indeed, the OLS regressions have shown that the changes in the GDP explain a small percentage of the changes registered in the figures of employment and unemployment, and that, consequently, there have been other elements that explain the large differences of the labour market performances in the EU countries.

To explain this conundrum, many authors argue that differences in the institutional design of the European labour markets are a key determinant of the differences in the impact of the crisis on these markets. Mainstream economics and international organizations have argued in the last decades that rigidities in the labour markets have a negative impact, contributing to generate and maintain high unemployment rates, hence the recommendations to approve reforms in the labour market legislations that contribute to a more flexible labour market, and, consequently, to better outcomes in terms of economic activity and employment and unemployment rates.

However, our regression analyses show that the impact of the GFC on the European labour markets, in terms of employment declines and increases in unemployment rates, is not explained by the rigidities in these labour markets existing before the onset of the crisis, where these

rigidities, and their variations, have been proxied by the EPL strictness indicators elaborated by the OECD. In other words, it cannot be argued that the worst outcomes in employment and unemployment rates have occurred in the countries with the more rigid labour markets. Moreover, when the analysis has focused on the impact of changes in the EPL, the results obtained show that in some cases the reforms in the EPL approved since the year 2008 have not had any impact at all on the evolution of employment and unemployment. Even more, when a significant impact has been detected, the direction of this effect is in contrast to the expected one, with declines in the strictness of employment protection leading to worse results both in employment and in unemployment rates.

Not only do these results imply that labour market reforms that reduce the employment protection do not have a positive impact on labour market performances, but also that improvements on employment protection are associated with better results in terms of employment and unemployment, thereby reinforcing those opinions that defend the positive consequences, both social and economic ones, of employment protection. This result helps to understand the poor creation of employment and decline of unemployment rates registered during the recovery phase that is taking place in the recent years in most EU countries.

In sum, our results allow us to argue that the economic growth is a key determinant of the labour market outcomes, and that the labour rigidities existing prior to the onset of the crisis do not explain the impact of the GFC on the labour markets. Moreover, the reforms approved during the GCF to make the labour market more flexible have contributed to a worse performance of the labour markets.

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# The Tightening Links Between Financial Systems and the Low-Carbon Transition

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**Abstract**  This chapter investigates the implications of the policy changes triggered by the Global Financial Crisis on the transition to a low-carbon society. The immediate effects have mostly been negative: national governments have retracted from public spending and fiscal support to clean technologies; new macroprudential regulation has discouraged banks from lending to low-carbon projects; monetary policies have perpetuated the high-carbon lock-in of the economic system. However, the

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transformed macroeconomic and institutional setting, together with the increased awareness of the links between financial dynamics and natural resources, has also created new space of opportunity for low-carbon investment and financing. New concepts and policy proposals have emerged, including the 'green growth' narrative, the idea of aligning macroprudential policy to climate objectives and the suggestion to use unconventional 'Quantitative Easing' monetary policies to support low-carbon investment.

**Keywords** Low-carbon transition • Climate-related risks • Environmental policy • Macroprudential regulation • Quantitative easing • Green growth

**JEL Classification** E44 • E58 • E62 • G20 • Q43 • Q58

# 1    Introduction[1]

Two main channels exist connecting financial systems to the transition to a sustainable economy.[2] First, the transition needs large-scale investment, and investment needs to be financed. At present, several obstacles are preventing financial resources to flow towards low-carbon sectors. Second, the low-carbon transition and the policies aimed at supporting it are likely to have strong economic and financial implications. Moving away from fossil fuels would lead to a drop in the valuation of fossil-dependent companies, which would in turn affect the investors holding their financial assets, with potential cascade effects throughout the financial system. Both issues are complex, dynamic and linked by non-linear feedbacks.

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[1] Minor portions of this chapter are based on previous work by the authors, in particular: Campiglio (2016), Campiglio et al. (2017) and Godin et al. (2017).

[2] We will use the terms 'green', 'sustainable', 'low-carbon' and 'climate-friendly' in their broad sense and employ them as synonyms to refer to investment in all sectors involved in producing goods and services with a low environmental impact, or technologies that help to reduce the environmental impact of other sectors. A non-exhaustive list includes generation of electricity from renewable sources, energy efficiency in buildings, electric vehicles and low-carbon transportation, and waste and water management. While keeping a broad perspective, we will mainly focus on climate change, climate mitigation policies and renewable energy production.

Managing the complexity of the low-carbon transition is further complicated by the current macroeconomic context. The Global Financial Crisis (GFC) has thrown the international economic system in a state of enduring turmoil characterized by low investment levels, sluggish growth and poor confidence, thus worsening the outlook for low-carbon investment. The crisis also drastically changed the global policy and institutional setting, especially in high-income countries: while a large number of national governments have retracted from counter-cyclical policies in an attempt to maintain balanced budgets, central banks have pursued new and unconventional policy instruments, effectively becoming the main institutions to promote macroeconomic and financial stability.

This contribution will argue that the fallout of the GFC in terms of policy implementation has, on average, had a negative impact on the prospect of a low-carbon transition: governments have reduced spending and fiscal measures in support of renewable energy sectors; the new financial regulations have pushed investors away from low-carbon investment; the quantitative easing (QE) programmes launched by many central banks have perpetuated the existing high-carbon financial lock-in.

However, the new macroeconomic setting and the renovated roles of public institutions have also created new space of opportunity for low-carbon investment and financing, as well as raised the collective awareness on climate-related financial risks and the wider links between financial dynamics, the 'real' economy and natural resources. Several new crisis-shaped narratives and proposals have been put forward. In particular, we will critically discuss the concepts of green growth, climate-aligned macroprudential regulation and green QE.

The remainder of the chapter is structured as follows. Section 2 will present in more detail the two main finance–environment links mentioned above: the need for low-carbon finance and climate-related financial risks. Section 3 will study the environmental impact of GFC-induced policies, focusing in particular on fiscal policies, financial regulation and monetary policy. Section 4 will then discuss the new opportunities for environment-friendly policies that the current context offers. Finally, Sect. 5 discusses further research directions and concludes.

## 2    Finance and the Low-Carbon Transition

This section will present and discuss the main systemic links connecting financial systems to the low-carbon transition. Section 2.1 will study the channels through which financial resources could flow to low-carbon sectors and the obstacles that are currently blocking them. Section 2.2 will look at the potential financial repercussions of the transition and the policies put in place to support it.

### 2.1    The Need for Low-Carbon Finance

Before developing the discussion, it is useful to clarify the concept of 'low-carbon'—or 'climate'—finance, as the definition is often not consistent across the related literature. Figure 1 presents the distinct stages of the investment process. At the end of the chain, there is the physical realization of the investment. This can take a number of different forms, such as large renewable energy projects, climate adaptation
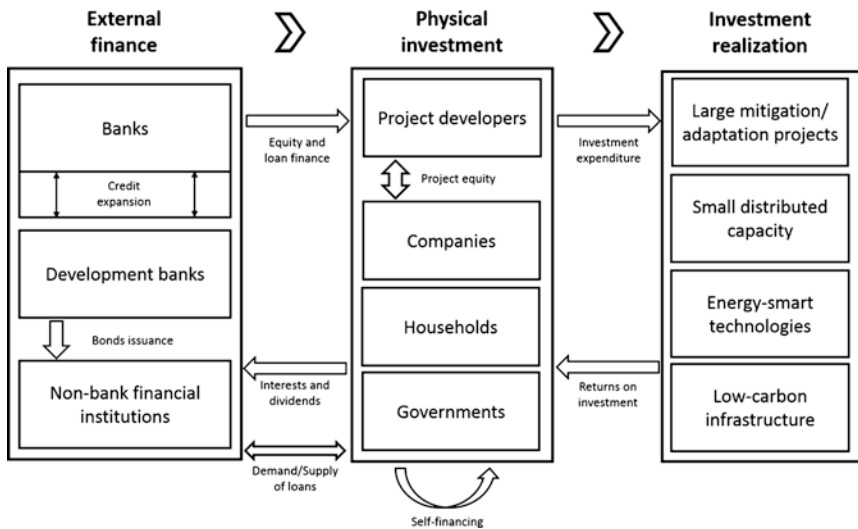


Fig. 1    A stylized representation of low-carbon investment financing

infrastructure, small renewable energy installations, new low-carbon technology, and others. Physical investment expenditure is usually carried out by private actors, such as households (in the case of small projects), project developers, utilities and other types of companies. However, these entities—as private firms more generally—usually require external finance in order to carry out the investment. For instance, in the case of renewable energy, a common funding structure is non-recourse project finance, through which a parent company—e.g. a utility company—creates a project company with the only purpose of executing and managing the project. A large proportion of funding will then actually come from a group of external investors—banks, most often—in the form of debt.

External finance (left column of Fig. 1) can come from a variety of sources: commercial banks, non-bank financial institutions (e.g. pension funds and other institutional investors), companies, public development banks or a combination thereof. Within the financial network, in turn, one can find internal chains of financing, which are however difficult to identify and categorize. For instance, the role of institutional investors in directly financing green investment is still marginal, but they might also be indirectly involved via the purchase of debt securities issued by development banks to finance lending to low-carbon companies. It is also important to recognize the special role of the private banking system in endogenously creating and allocating credit. To the contrary of what the standard view assumes—see for instance the climate investment financing chain represented in CCST (2015) —commercial banks do not have to wait for savers to make a deposit in order to be able to lend, but rather create new credit in the act of lending. They do so by expanding both sides of their balance sheet—new deposits as liability and new debt as asset—together with the balance sheet of the borrower—new deposits as assets and new debt as liability (Ryan-Collins et al. 2011; McLeay et al. 2014). Consequently, the amount of available external finance for low-carbon investment is also a function of the demand for credit by low-carbon companies.

It is useful to keep in mind this distinction when analysing the available data on current climate finance, as different data sources position

themselves at different stages of the chain. For instance, one of the most widely cited sources of data—the Bloomberg New Energy Finance (BNEF) database—aggregates 'asset finance' and 'small distributed capacity',[3] which refer to direct investment expenditure (right column of Fig. 1), together with public equity, which instead positions itself closer to the origins of external finance (a financial investor purchasing new equity of a listed low-carbon company). The 'Global Landscape of Climate Finance' report series published by the Climate Policy Initiative (CPI 2015) offers a more detailed disaggregation of financial flows, but there is a limit to how much one can disentangle the interactions among actors of the financial system.

Once the limitations of current climate finance data have been clarified, what is the available evidence on the current state of climate-friendly investment? FS-UNEP and BNEF (2016) show that the overall amount of investment in renewable energy capacity[4] has been strongly expanding in recent years, moving from 46.6 billion USD in 2004 to 285.9 billion in 2015. As can be observed in Fig. 2, however, this trend has not been free from impediments. There has been a brief stall in 2008–2009, mainly the result of the financial crisis, from which the sector recovered relatively easily. There has then been a more serious crisis in the 2011–2013 period, during which new investment dropped from 278.5 to 234.1 billion USD. This has mainly been the result of a change in the strategy of many governments concerning the support to the industry, itself a consequence of the Eurozone crisis and the austerity programmes implemented. Finally, despite 2014 and 2015 having been good years, preliminary data from BNEF (2017) seems to indicate that 2016 has seen another decline in investment.

This has been due to both the sharp decline in the cost of renewable capital, especially in solar technology, and the slowing down of the Asian markets, that still have to properly put to use the large new capacity built in past years. A similar picture is offered by CPI (2015), which, looking

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[3] Asset finance refers to 'all money invested in renewable energy generation projects'; solar project with less than 1 MW are estimated separately and referred to as small distributed capacity (FS-UNEP and BNEF 2016, p. 10).

[4] FS-UNEP and BNEF (2016) data include investments in solar, wind, biomass and waste-to-energy, hydropower projects of less than 50 MW, biofuels, geothermal, wave and tidal energies.
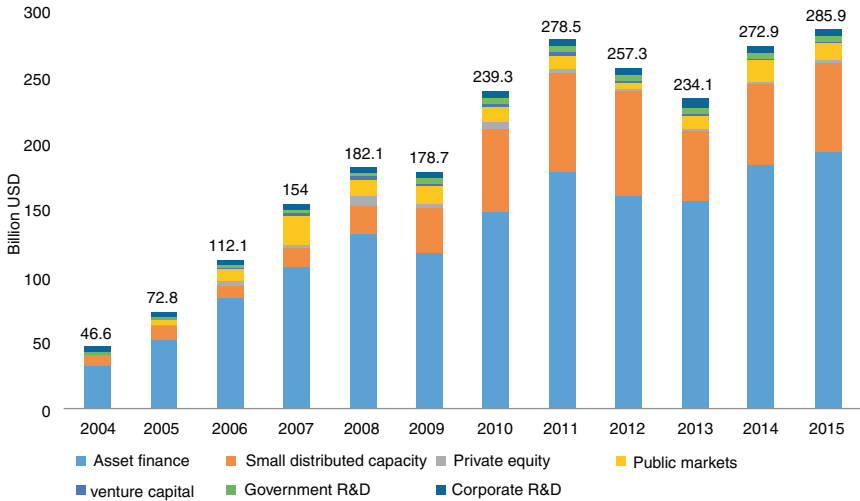
**Fig. 2** New global investment in renewable energy (FS-UNEP and BNEF 2016)

at a wider universe of climate-friendly investments,[5] reports a decline in the 2011–2013 period, followed by a strong increase in 2014 to 392 billion USD.

Despite the upward trend, several estimates concur in considering current values of climate investment insufficient to steer the global economic system onto a path compatible with the 2°C degrees commitment on temperature increase agreed in Paris in 2015 (UNFCCC 2016). IEA (2015a), for instance, calculates that decarbonizing the global economic system would entail annual additional investment in the power, transportation, industry and building sectors of around 1.2 trillion USD, moving from a 2016–50 total of 318.4 trillion USD in their 6 Degrees Scenario to a total of 358.8 in their 2 Degrees Scenario. UNEP (2011) estimates the annual additional investment needed to achieve a green economy in the range of 1–2.6 trillion USD over the 2010–50 period. IPPC (2014c) reviews a number of available studies to find a median value of additional annual investment in renewable energy just below

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[5] These include renewable energy, energy efficiency, sustainable transport, water and waste management, climate adaptation projects and others (CPI 2015).

100 billion USD in the 2010–29 period, and closer to 200 billion over 2030–49. Concurrently, annual investment in end-use energy efficiency in transport, building and industry would have to increase by more than 300 (2010–29) and 700 billion USD (2030–49). Investments of similar scale would also be needed in nuclear energy and fossil plants with carbon capture and storage (CCS) technology. A portion of these required additional investments could originate from the lower projected investment in fossil fuel extraction and fossil power plants without CCS. Other calculations reported by Campiglio (2016) and Olbrisch et al. (2011) provide estimates in the same range.

As argued in Bowen et al. (2014), large surges in investment levels are far from unprecedented, especially in low- and middle-income countries. At the moment, however, there does not seem to be a strong driving force that could naturally fill the green investment gap. So, where will the financial resources come from, and how will they be mobilized? A first broad dichotomy one can identify is between money coming from public institutions—such as the government, public development banks and the central bank—and financial resources coming from private actors—project developers, institutional and other types of investors, commercial banks.

Private sources represent by far the largest proportion of finance flowing to green sectors. According to CPI (2015) private finance amounted to 243 billion USD in 2014, more than 60% of total climate finance. However, if one considers that most of the remaining part (130 billion USD) comes from development banks, which raise a large proportion of their finance by issuing and selling bonds on private capital markets, the percentage of private finance on the total is probably much higher. Private actors are also the source from which the large majority of finance will have to come from in the future if the low-carbon transition is to become a large-scale process. Even in the event of abundant low-carbon government spending—not the case at the moment—it needs to be in the interest of households and firms to invest in low-carbon technologies for the transition to be system-wide.

There are different instruments and channels to match companies or project developers in search of external finance and private financial

investors looking for investment opportunities. These can be aggregated in two main categories: debt and equity. Most project-level debt comes from commercial banks, with bonds only representing a minor proportion of overall private debt finance, as well as a small portion of the wider universe of 'green bonds'. The amount of debt finance coming from public development banks is also relevant. The other option for a project or a company to be financed is through equity money. This could be the case of a utility company financing a project via own resources, or an institutional investor purchasing the new equity of a project or a company—publicly listed or not—or a venture capitalist financing the very early stages of the technology development. In order to attract the interest of larger investors, a number of yieldcos have emerged in recent years, publicly traded companies that own parts of renewable energy projects already in their operational stage. These are expected to generate stable cash flows in the long run, which are then mostly distributed to investors in the form of dividends (FS-UNEP and BNEF 2016).

However, despite the plenitude of options, most banks and financial investors are still strongly reluctant to finance the low-carbon sector. One of the main reasons for this is the high degree of perceived risk associated with renewable energy and other low-carbon activities (Frisari et al. 2013). Clean technologies are still relatively new and they have not proved themselves reliable and profitable yet. Most of them are perceived as heavily dependent on public support, as confirmed by the drop of investment experienced in 2012–13 after many national governments cut their fiscal support. Policy uncertainty is probably the single most relevant factor negatively affecting the development of the sector. The market is still relatively illiquid, thus raising exit strategy risks. There are risks related to financing and refinancing. In emerging economies, these risks are exacerbated and some additional ones are present, related to the political and social situation, the reliability of domestic financial markets, the legal framework and the characteristics of the labour market. Renewable energy projects are also usually characterized by other unattractive features such as very high initial capital costs, which also makes them more dependent on external financing and vulnerable to financing costs (Schmidt 2014).

In light of these risks, returns on green investments should be very high in order to attract investors. However, this does not seem to be the case at the moment. Ceres (2014) compares target and actual returns for a range of different asset classes. While project bonds seem to offer a return broadly in line with the ones offered in other sectors, low-carbon equity—both private and public—has performed worse than general benchmark indices. FS-UNEP and BNEF (2016) report values of all-in cost of project debt between 2.5% and 4.5% in high-income economies, which appear to be higher than the current average return on debt but possibly not high enough to attract large amounts of finance to the sector. Volatility of returns is another issue: the yieldco model mentioned above seemed to offer relatively high and stable dividend flows to investors for a while, but during 2015, their share prices plummeted and it is not clear what the future development of this asset class might be. Therefore, despite a significant expansion of 'ethical', 'sustainable and responsible' and 'impact' investment in recent years (Eurosif 2016; GIIN 2016), the large bulk of profit-driven financial investors is still to be attracted to low-carbon sectors.

The main proposed policy instrument to achieve this is the modification of the system of prices. Since most environmental goods and services do not have a price, they are usually excluded from the computation of private costs and benefits. This creates a market failure, in that the market price system is unable to take into account the 'social' costs deriving from pollution and natural resource degradation. This market failure calls for the government to intervene by modifying prices. For instance, the implementation a 'carbon price' has been repeatedly proposed (World Bank 2016). Two main ways exist to do this. The first is to introduce a tax on the carbon content of goods and services. The second is to create a cap-and-trade system of emissions allowances, such as the European Union Emissions Trading Scheme (EU ETS). In this case, policy-makers fix the quantity of allowable emissions while the price is freely determined by the market. Other price-modifying options include phasing out subsidies to fossil fuels and introducing feed-in tariffs in support of renewable energy. A comprehensive price system, capable of internalizing environmental externalities in economic decisions, should put households, firms

and financial institutions in the position of wanting to participate to low-carbon sectors.

However, two categories of complications affect this policy strategy. First, a carbon price may never be implemented. Proposals of carbon taxes or carbon markets are likely to encounter strong political and social resistance on the grounds that they will harm business and increase energy bills. Even if these policies are introduced, they may not last, or incur in major execution problems as in the case of the EU ETS. The uncertainty around the long-term policy commitment is a major obstacle for green investment as, even in the presence of the 'right' prices, firms may decide to wait to internalize them. Second, as argued in Campiglio (2016), even a stable and credible carbon price may not be sufficient to steer the required amount of economic resources to green investment. This is due to the existence of an additional market failure, related to the process of creation and allocation of credit that, under circumstances of deep macroeconomic stress, may lead investors not to react as expected to price signals and banks not to lend even in the presence of potential profitable investments.

## 2.2 Climate-Related Financial Risks

After having discussed the financial requirements of the transition to a low-carbon economy, we now turn to investigating the possible financial implications of climate change and mitigation policies.

Two main types of climate-related financial risks can be identified. The first is represented by the possible damages and undesired modifications to the production and consumption process brought by man-induced environmental changes. Examples of disruptive phenomena produced by climatic change include extreme weather events, coastal flooding, heavy precipitations and droughts (IPCC 2014a). These can have large impacts on the assets of households and businesses as well as on the balance sheets of their insurance companies and the commercial banks they have borrowed from (Batten et al. 2016). Dietz et al. (2016) estimate the average global value at risk due to climate damages between 2015 and 2100 in a

business-as-usual scenario to be 1.77%, but reaching 16.86% at the 99th percentile, which is equivalent to approximately 24.2 trillion USD of lost financial assets.

The second broad area of climate-related risks is represented by the potential disruption brought by the low-carbon transition itself and the implementation of policies aimed at supporting it. There are several layers of complexity here. First, the commitment of the international community to keep the increase of global temperatures below 2°C (UNFCCC 2016) will require a large portion of existing reserves of oil, gas and coal to remain in the ground, thus becoming 'stranded'. Meinshausen et al. (2009) calculate that less than half of all economically recoverable fossil reserves should be used up to 2050 to achieve at least a 50% probability of not exceeding 2°C. Carbon Tracker Initiative (2013) estimate in 762 gigatonnes the amount of $CO_2$ embodied in the reserves of 200 listed companies and calculate that, in order to remain below the 2°C threshold with an 80% probability, only about a fourth of these can be burnt. McGlade and Ekins (2015) estimate that around 80% of coal reserves, half of gas reserves and a third of oil reserves will have to remain unexploited. Writing off these assets from balance sheets will deeply impact fossil companies, which are among the largest businesses of the world. The FT Global 500 list of listed companies by market capitalization sees two of them (Exxon Mobil and PetroChina) in its top ten (FT 2015). In 2011, before the recent large drop in oil prices, the oil and gas producers in the top ten were five (Exxon Mobil, PetroChina, Petrobras, Royal Dutch Shell and Chevron). If one takes into account the numerous large unlisted oil companies—among which there is what is considered to be the largest company in the world, Saudi Aramco—it appears clear how stranded physical assets might produce wide systemic implications.

Second, a very large part of the economic system is at present inextricably linked to the use of fossil fuels and other polluting materials. For instance, the production of electric power, which in turn is a crucial input factor in most production processes, is still predominantly based on fossil fuels. IEA (2016) reports that in 2014 around two thirds of global electricity generation has been coming from coal (40.8%), natural gas (21.6%) and oil (4.3%). The transportation sector, which accounts

for approximately 23% of global energy-related $CO_2$ emissions (IPCC 2014b), is mainly centred around the combustion of oil-based products in automobiles, heavy-duty vehicles, airplanes and ships. Heating of buildings and industrial processes also usually requires substantial amounts of fossil fuel inputs. All these productive sectors could be negatively affected by a low-carbon transition, as they would have to overhaul their production technology and process, while possibly having to write off a relevant portion of their high-carbon physical capital assets.

Third, and possibly more importantly, the stranding of physical assets—both natural resources and productive capital—is likely to lead to a sharp reduction in the valuation of the companies owning them and the market price of the financial assets they have issued. This, in turn, will adversely affect the wealth of all the investors holding the devalued financial assets in their portfolios, and all the investors holding the financial assets of the latter investors and so on, with potential systemic ramifications and cascade effects throughout the whole financial network. Battiston et al. (2017) run a network-based climate stress test on the EU and US financial system to find that direct and indirect exposures to climate-relevant sectors represent a large portion of investors' equity holdings portfolios—in particular for pension funds.

The financial risks attached to the low-carbon transition have increasingly attracted the attention of central banks and other institutions responsible for financial stability—e.g. Bank of England (Carney 2015), Netherlands Central Bank (Schotten et al. 2016), Bank of Italy (Signorini 2017), Bank of France (Villeroy de Galhau 2015), Bank of Canada (Lane 2017), the Swedish Financial Supervisory Authority (Bowen and Dietz 2016), the European Systemic Risk Board (ESRB 2016) and the G20 group (GFSG 2016) —some of which have started developing methodologies to stress test their financial systems for climate-related shocks.

It is unclear whether the financial industry has also begun to acknowledge the existence of climate financial risks. The Efficient Market Hypothesis (Fama 1970) would imply that asset prices fully reflect the information available to rational profit-maximizing financial actors. If this were the case, climate-related financial risks may have already been internalized in the current price system and the absence of a decline in

asset values would suggest that financial actors simply do not believe that a firm carbon budget will be implemented.[6]

However, the picture might be more complex than this. There is a large number of concurrent reasons for which individuals operating in the financial industry may overlook and under-price climate transition risks (Silver 2017; Weber 2017). Following widespread convictions and social norms in the financial industry, they may perceive low-carbon investment just as a relatively unprofitable niche market. Their educational background may have given them limited knowledge of climate and energy issues, possibly causing them to overlook or only partially understand related news and empirical evidence, whose validity they may not be able to assess. Perhaps more importantly, the structure of incentives that investment professionals face tends to steer them away from low-carbon assets. The performance of asset managers is evaluated looking at how their short-term risk-adjusted returns compare with those offered by their peers, which drives them to hover around an established index. Deciding to drop stranded-to-be assets—usually very relevant in indices and relatively risk-free in terms of historical volatility—from their portfolios may be interpreted as excessively risky, with possibly lower returns in the short term. Asset managers will thus tend to prefer sticking to the accepted behavioural norms of their social group, externalizing longer-term transition risks to asset owners (Thomä and Chenet 2017).

A large stream of literature has now extensively argued that investment professionals, as all human beings, suffer from limited rationality and behavioural biases (Simon 1959; Kahneman and Tversky 1979; Hirshleifer 2001). Confronted with problems more complex than what they can master, individuals act following simpler 'rules of thumb' that may lead them to systematic errors. Status quo bias may lead individuals to disproportionally prefer the current state of things (Samuelson and Zeckhauser 1988). Additionally, confirmation bias may bring them to disregard new information not in line with their pre-existing system of beliefs or to interpret it in a way to support it.

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[6] Stock prices of a large number of companies operating in fossil fuel sectors have indeed been declining in recent years. However, this trend seems to have been driven mainly by the large drop in fossil fuel prices since 2014, which in turn has been determined by a mix of stagnating demand, abundant supply and geopolitical reasons (Baumeister and Kilian 2016).

In a world of limited information, bounded rationality and radical uncertainty, asset prices may not fully reflect risks. Shiller (2015) argues that an 'irrational exuberance' of the financial system may lead to the over-valuation of financial assets. In the case of climate investment, we may be in the presence of a case of 'irrational apathy' (Critchlow 2015), for which a combination of behavioural biases leads the financial system to disregard climate transition risks and overprice financial assets issued by fossil or fossil-dependent industries. This 'carbon bubble', once markets internalize the perspective of a low-carbon transition (assuming this will actually take place), may have deep macroeconomic and financial implications.

# 3 The Environmental Implications of the GFC

This section will discuss how the new global policy context that emerged from the GFC has affected the prospects of a low-carbon transition. We will focus on public spending and fiscal policies (Sect. 3.1), macroprudential regulation (Sect. 3.2) and monetary policies (Sect. 3.3).

## 3.1 Public Finance and Austerity

The GFC had deep and diversified implications on public spending and policies, which in turn had relevant repercussions on the transition to sustainability. We can broadly distinguish two phases. The immediate reaction of many national governments to the financial crisis has been the design and implementation of counter-cyclical 'stimulus' packages—comprised of a mix of tax reliefs, public spending and loan guarantees—aimed at supporting employment, encouraging private spending and investment, and protecting the most vulnerable segments of the population. Simultaneously, a large international movement of opinion formed around the proposal of using the occasion to address the climatic challenge, by directing the stimulus packages towards the development of sustainable infrastructure and clean technologies. This 'Green New Deal' would have supported the economic recovery by fostering the expansion

of productive activities linked to sustainability, such as renewable energy production, modernization of buildings, the expansion of the railway system and other forms of low-carbon mobility, the development of a 'smart' electric grid and sustainable agriculture (GNDG 2008; UNEP 2009).

Indeed, most of the national stimulus packages did incorporate climate-friendly measures, although to a varying degree. Barbier (2010) calculates the green component of the global post-crisis fiscal stimulus effort at around 463 billion USD, worth approximately 15% of the overall stimulus package and 0.7% of the GDP of the countries involved. China and South Korea stood out in this ranking with a green component of 95% and 33% of the total fiscal stimulus, respectively. For both countries, the green stimulus was equivalent to approximately 3% of their GDP. Values were much lower in the EU and the United States, with green fiscal stimulus representing 0.2% and 0.7% of GDP, respectively. Although the methodology behind these calculations was contested for its crude categorization of 'green' policies (Tienhaara 2014) and some doubts have emerged on the actual effectiveness of these measures (Sonnenschein and Mundaca 2016), during this 'Keynesian moment' the idea of using public fiscal power to simultaneously address the economic and the environmental crises was largely fashionable in high-income countries.

Soon after, however, the economic narrative quickly and drastically changed. The high public deficit and debt levels, combined with low growth and sluggish employment, led a number of countries to a sovereign debt crisis, particularly pronounced in the Eurozone 'periphery' countries—Greece, Italy, Spain, Portugal and Ireland. This shifted the focus of policy-makers and international markets to strategies aimed at balancing the public budget, which led to the Fiscal Stability Treaty of the EU (EU 2012) as well as to the introduction of passages mentioning budget balance in some national constitutions—e.g. Italy and Germany.[7]

Austerity strategies can have a range of different implications on the low-carbon transition, depending on which specific policies are enacted to achieve a balanced budget. A reduction of public spending, especially if directed towards infrastructure investment, is likely to have negative

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[7] The balanced budget principle was introduced in Article 81 of the Italian Constitution by Constitutional Law 2012/1, and in Article 109 of the Basic Law of Germany in 2009.

effects, as investment requirements for low-carbon technologies—e.g. a wide network of battery charging stations for electric vehicles—are much higher than those for high-carbon ones, mostly already in place and only requiring maintenance. A reduction of fiscal support can produce both positive and negative impacts, depending on which activities and sectors are deprived of public assistance: a cut in subsidies for fossil fuel consumption would accelerate the low-carbon transition; a reduction in feed-in tariffs supporting renewable energy production would hinder it. An increase in the tax burden aimed at expanding government revenues may also have diverse effects depending on the details of the policy implemented. Potentially, applying an environmental tax could be a win-win choice, as it would help fiscal consolidation while reorienting choices of households and firms towards low-carbon sectors.

Unfortunately, the actual impact of post-GFC fiscal policies have mostly been negative. The reluctance of governments to embark on large-scale expenditure programmes has negatively impacted the prospect of low-carbon infrastructure development. A wide number of countries reduced the feed-in tariffs previously introduced to support clean power production. This has also been the result of an unexpectedly quick uptake of these technologies in some countries like Italy and Germany, which accelerated the cut of the subsidies. In some cases—e.g. Spain, Romania—the measures have been retroactive (FS-UNEP and BNEF 2016). In the meantime, despite some promising exceptions, there has not been a generalized increase in environmental taxation (Bruvoll et al. 2013). The lack of public support, in combination with a paralysed credit system, led to a consistent decline in renewable energy investment for two consecutive years (see Fig. 2).

Concurrently, as argued by Geels (2013) and Scruggs and Benegal (2012), the public discourse has to some degree shifted away from climate change, sustainability and the low-carbon transition. The financial crisis and economic recession quickly occupied the main stage in the media and the public opinion attention, downgrading climate mitigation to an expensive luxury to be postponed to better times. This was also reflected in the reduced ambition of energy and environmental national strategies in many countries, reinforcing the narrative contraposing environmental action and economic prosperity.

## 3.2    The Environmental Implications of Macroprudential Regulation

The bursting of the subprime mortgage bubble in the United States and the financial and property-related bubbles in a range of European countries, together with the subsequent systemic economic crisis, put the financial system under the spotlight of public opinion, media and regulators. The banking system was blamed for having created massive quantities of new credit in absence of the appropriate underlying conditions. The financial system more widely was accused of having hidden these unsustainable amounts of debt using multiple layers of obscure financial instruments, while generating enormous personal profits. It became clear that gradual financial deregulation over the past decades had played a crucial role in creating the conditions for the crisis to take place.

The main post-crisis regulatory effort at the international level has been the 'Basel III' Accord, a voluntary supervisory framework formulated by the Basel Committee on Banking Supervision (BCBS). Basel III is supposed to have positive effects on both individual banking institutions, who would be more resilient to negative shocks (microprudential regulation), and the banking system as a whole, who would be less prone to systemic shocks and traumatic cascade effects (macroprudential regulation). The latter objective motivates the introduction of additional regulation for 'systemically important banks' (FSB 2016). Basel III intervenes in two main areas: (i) it raises the quality and quantity of banks' capital base and improves the coverage of risk; (ii) it increases the liquidity requirements (BCBS 2010).

Capital requirements mainly consist of a set of ratios comparing the capital base of a bank—e.g. its Tier 1 capital made of equity and retained earning—to a risk-weighted valuation of its assets. All these measures will be gradually introduced until full implementation by 2019. The rationale behind them is to avoid excessive leverage, that is, to put a limit to the ability of commercial banks in expanding their credit.

Liquidity regulation complement capital adequacy requirements by introducing two further fundamental ratios that banks need to respect: the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR). The LCR ensures that banks hold an amount of 'high-quality liquid assets' sufficient to cover their liquidity needs during a prolonged

(30 days) funding stress scenario (BCBS 2013). High-quality liquid assets are central bank reserves, cash or other assets that can be easily converted into cash on capital markets with little or no loss of value, such as sovereign bonds. These are then compared to 'total net cash outflows', that is, the expected net outflows over 30 days of funding stress. The required ratio is scheduled to gradually increase, reaching 100% in 2019. The NSFR requires banks to respect at least a 1:1 proportion between 'available amount of stable funding' and 'required amount of stable funding' (BCBS 2014) with the rationale of avoiding a maturity mismatch between assets and liabilities. The required amount of stable funding is calculated looking at the liquidity profile of the assets of the bank. Long-term (over 1-year maturity) assets are expected to be matched by liabilities of similar maturity and not short-term wholesale funding. The NSFR will become a minimum standard in 2018.

A number of analysts have argued that the new Basel III regulation, and the liquidity requirement ratios in particular, might negatively affect banks' willingness to lend to low-carbon projects (Liebreich and McCrone 2013; Narbel 2013; Spencer and Stevenson 2013; Caldecott and McDaniels 2014). The main channel through which commercial banks lend to large-scale renewable energy projects is non-recourse project finance, which in 2015 represented 52% of total 'asset finance', which in turn represented around 70% of total investment in the sector (FS-UNEP and BNEF 2016). However, holding these types of assets will worsen the capital and liquidity requirements that banks are supposed to respect under Basel III.

First, a higher degree of risk is associated with bank credit for long-maturity project finance, thus expanding the denominator of the risk-weighted capital requirements and worsening the ratio. At the same time, however, S&P Global (2016) estimates that in the 1998–2012 period, the average annual default rate of rated project finance debt was lower than the one for corporate issuers, while the loan recovery ratio was higher, thus indicating an overall creditworthiness of the asset class. Second, project finance debt certainly does not qualify as a 'high-quality liquid asset', as required to satisfy the LCR. Third, loans to renewable energy projects tend to exhibit longer tenors compared to plants fuelled by gas or coal. This is due to the higher capital costs of clean technologies (Lazard 2016) and

their different cost profile, characterized by very high upfront costs followed by much lower variable costs (Nelson and Shrimali 2014). Longer-term assets will require banks to maintain more stable sources of funding for a longer period, which comes at a cost. This may lead banks to reduce the tenor of the loan, thus making a refinancing necessary at some point in the future. This will tend to increase the perceived risk of the project.

In general, the implementation of Basel III is regarded by some as likely to produce a reallocation of investments towards liquid, shorter-term and less risky assets, while renewable energy projects are on average illiquid, long-term investments characterized by a range of technological, financial and policy uncertainties. Caldecott and McDaniels (2014) report how already European banks appear to have sold at discount prices over 11 billion USD of project finance loans to US and Japanese banks in 2012, and that more similar transactions are expected. In the meantime, tenors on project finance loans have moved from 10–15 to 5–10 years.

At the same time, however, other analyses seem to indicate that, among the criteria that a bank uses to decide whether to approve lending, the associated regulatory capital may play only a marginal role. CISL (2014), for instance, runs qualitative interviews with practitioners from a set of emerging economies and concludes that Basel III's capital and liquidity requirements would be insignificant in affecting banks' decision on whether to lend to low-carbon projects, and on what interest rate to apply. This would be consistent with the evidence that compliance of banking institutions with both capital and liquidity requirements seems to be already quite high (Cohen 2013; Gobat et al. 2014).

## 3.3    Quantitative Easing and High-Carbon Lock-In

The most relevant process of policy change triggered by the GFC has probably been the expansion of the range of action of central banking institutions, especially in high-income countries. After having limited their sphere of competence to the setting of interest rates for decades, the post-crisis economic stagnation and the apparent inability of national governments to implement long-term fiscal recovery programmes have led a large number of central banks to put in place 'unconventional' policy measures.

The first reaction to the crisis has been to cut the reference interest rates to levels close to or lower than zero (BIS 2013). Given the weak effects of such a move in a macroeconomic context that would have probably needed interest rates well below zero to regain confidence, they launched substantial QE programmes of purchase of financial assets. Depending on the country, these may include public sector (sovereign or supranational) bonds, asset-backed securities, covered bonds, corporate bonds, or equities. These purchases are counterbalanced in central banks' balance sheets by the simultaneous creation of a proportional amount of central bank reserves[8] that are put at the disposal of commercial banks. In other words, the central bank autonomously expands its own balance sheet by employing newly created money to purchase financial assets from banks and other financial institutions on the secondary market, with the aim of reducing financing costs, encouraging bank lending, stimulating private spending, achieving a stable rate of inflation around a pre-announced target and reviving economic growth. In the EU, QE has also been aimed at calming the financial turmoil around sovereign debt titles experienced by several Eurozone periphery countries in the 2010–2012 period. The US QE programme also served the purpose of cleaning up financial markets from corporate mortgage-backed assets and other 'toxic' financial assets (Fawley and Neely 2013).

More recently, some central banks have expanded the range of assets eligible for purchase to debt securities issued by private companies. The European Central Bank (ECB), in addition to its ongoing purchases of covered bonds and asset-backed securities, began buying corporate bonds in June 2016 under its Corporate Sector Purchase Programme (CSPP) (ECB 2016a). As of the end of March 2017, the ECB had already accumulated €75 billion worth of corporate bonds. In September 2016 the Bank of England launched its Corporate Bond Purchase Scheme (CBPS), with the aim of purchasing "a portfolio of up to £10bn of sterling bonds representative of issuance by firms making a material contribution to the UK economy, in order to impart broad economic stimulus" (BoE 2017a).

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[8] Central bank reserves are accounts that commercial banks hold at the central bank and use to settle interbank transactions.

In theory, QE is meant to act as a lever operating on the economy as a whole, leading to asset price increases across the board. This would decrease the cost of borrowing and encourage additional debt issuance, thus increasing investment and the rate of inflation, and contributing to overall economic growth. In practice, however, a large amount of research on the topic seems to support the proposition that QE may have unintended sectoral effects due to frictions in the market and a lack of substitutability between assets (Krishnamurthy and Vissing-Jorgensen 2011; IMF 2013; Rogers 2014; Nassr et al. 2016). Thus, despite their 'neutrality' intentions, both the ECB and the Bank of England may create unintended market distortions through their purchase strategies due to imperfections in the transmission channel, with relatively more benefit for the assets being purchased relative to other assets. Even allocating purchases according to the makeup of the market, or the economy, is a decision to maintain the status quo—and so one could argue is not truly 'neutral' in that it reinforces existing market distortions compared to the socially optimal distribution of capital.

It is unclear what the implications of QE on the low-carbon transition might be in the case of purchase of sovereign bonds (the allocation of raised finance depends on government budget strategies), covered bonds and asset-backed securities (too little information on these purchase programmes is disclosed). A more detailed assessment can be performed on the purchase of corporate bonds, for which more information is available. Campiglio et al. (2017), for instance, study whether QE programmes may have had unintended negative consequences for low-carbon sectors, focusing in particular on the CSPP programme of the ECB and the CBPS programme of the Bank of England. The analysis suggests that, as the schemes currently stand, the purchases are allocated to high-carbon sectors in disproportionately large amounts relative to the sector's contribution to the European economy.

# 4    Opportunities from New Policy Settings

In Sect. 3, we have argued that the changes in the global policy setting triggered by the GFC mostly had negative effects on the prospect of a low-carbon transition. Public investment in sustainable infrastructure

and fiscal policies in support of renewable energy investment have been cut as part of the austerity strategy; new financial regulation has penalized low-carbon assets because of their illiquid and higher riskiness features; the recently adopted unconventional policies have perpetuated the high-carbon financial lock-in.

At the same time, however, this same context has generated new concepts and policy proposals to be experimented in the pursuit of a sustainable economy. The increased awareness around the repercussion of financial dynamics on socioeconomic systems has led to a renovated interested in understanding and addressing the links between finance and the environment. We will argue that these new ideas could not have been developed without the financial crisis taking place, or at least not at the same speed. We will in particular focus on three of them: the green growth paradigm (Sect. 4.1), climate-aligned macroprudential regulation (Sect. 4.2) and green QE (Sect. 4.3).

## 4.1 The Green Growth Paradigm

The economic context created by the GFC has been the perfect *milieu* for the quick development of the 'green growth' concept. For a long time the main keyword in international environmental policy-making and research has been 'Sustainable Development' (SD), famously defined in the Brundtland Report as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987). As argued in Jacobs (2012), the discourse around sustainable development, while successful in bringing resources and the environment to the attention of the international public opinion, was putting forward a narrative that focused excessively on the sacrifices to be made in the name of sustainability. The effort towards environmental protection was mainly presented as a necessary drag on economic prosperity, and thus inherently unattractive to policy-makers.

This narrative could not survive intact the trauma of the financial crisis, after which the public discourse quickly shifted away from the environment and towards more pressing economic and financial issues (Geels 2013). This represented the ideal trampoline for the emerging green growth narrative to become mainstream since it delivers a powerful,

attractive message at times of crisis: economic prosperity and environmental sustainability are not only compatible; they are mutually reinforcing. In times of protracted 'secular' stagnation (Teulings and Baldwin 2014), investing resources in low-carbon sectors could be just what is needed to simultaneously achieve a sustainable society and a prosperous economy (Bowen 2014).

The first incarnation of the green growth paradigm has been the push for incorporating green elements in the post-crisis stimulus packages, already discussed in Sect. 3.1. The concept survived the radical turn of many countries to austerity strategies and quickly established its roots in all major international development institutions (OECD 2011; UNEP 2011; World Bank 2012). The core policy tenet of green growth is to correct the market failure related to the absence of environmental goods from the price system, which leads households, firms and financial investors not to value them at their 'true' social cost. This can be achieved in three main ways: (1) the introduction of an additional price on the polluting content of goods and services (e.g. a carbon tax to disincentive the production and consumption of carbon-intensive goods); (2) the implementation of subsidies in support of renewable energy production and other forms of clean technologies (e.g. feed-in tariffs); (3) the elimination of public subsidies currently supporting the consumption of fossil fuels. A carbon price in turn can be introduced either through an additional tax or through the creation of a market of emission permits (World Bank 2016). The combination of these fiscal measures should be able to radically modify the structure of incentives faced by consumers, producers and investors, steering them away from high-carbon technologies and processes (NCE 2014).

Raising a carbon tax is broadly in line with budget consolidation and strategies aimed at limiting public deficit, as it would ensure fiscal revenues for the government, possibly very large ones. In 2014 environmental taxation in OECD countries represented on average 5% of the overall amount of fiscal revenues, equivalent to 1.56% of GDP (OECD 2015). Values ranged from the 0.06% of GDP in Mexico to 4.11% in Denmark. Carbon pricing is expected to sensibly expand environmentally related fiscal revenues. Bowen et al. (2014), for instance, use two Integrated Assessment Models (IAMs) to estimate 2°C-compatible car-

bon tax revenues in the order of 2–6% of global GDP by 2030. Carbon fiscal revenues within each region would be sufficient to finance total investment in energy supply. Similar considerations apply to the auction of emission permits, although these are often distributed for free to firms participating in the schemes, thus providing no benefit to public budgets. Another often-cited measure that could help consolidation objectives, but similarly controversial for its distributional effects, is the phasing out of subsidies to fossil fuel consumption. IEA (2015b) estimates global subsidies to fossil fuels in 2014 at 493 billion USD, while Coady et al. (2015) calculate overall energy subsidy costs—including local air pollution, climate change and other externalities—at around 5.3 trillion USD in 2015, equivalent to 6.5% of global GDP. Saving money from direct fossil fuel subsidies and indirect health and pollution costs produced by fossil consumption would certainly improve public fiscal position, while improving the prospects of a low-carbon transition.

However, higher taxation and reduced public subsidies, while possibly positive for public budget balances, may have negative economic and social implications. For instance, imposing a 2°C-compatible carbon tax could seriously affect business and consumers, increasing the price of energy and forcing them to quickly transition to clean technologies while not prepared to do so. Eliminating fossil fuel subsidies, on the other hand, could have negative repercussions on the lower-income parts of the population, which benefit from the subsidies in terms of improved access to energy. As a consequence, these measures have often been opposed and in certain occasions they had to be retracted due to protests and social unrest (OECD 2013). However, governments could relatively easily solve this issues by implementing complementary fiscal policies aimed at using carbon tax revenues to decrease taxation on labour or investment spending, or to increase public transfers to households negatively affected by the phasing out of fossil fuel subsidies, thus obtaining a *double dividend* (Goulder 1995).

While attractive, the idea has received numerous critiques. Some have criticized it as a mere continuation of business as usual, as it does not propose a reform of those fundamental features of the current economic system that have led to the financial and environmental crises in the first place (Lander 2011). Others have raised doubts on the actual likelihood

of an absolute decoupling between economic growth and environmental degradation (Antal and Van Den Bergh 2016; Ward et al. 2016). What is relevant for the purpose of this work is, however, that the GFC has strongly accelerated the development and diffusion of the Green Growth paradigm, and this in turn has been instrumental to keep sustainability at the centre of policy-making and media attention despite the concurrent economic crisis.

## 4.2    Climate-Aligned Financial Regulation

As discussed in Sect. 3.2, the international financial regulation framework designed after the GFC could be steering bank lending away from low-carbon activities due to their illiquidity, long-term investment perspective and high perceived risk. However, the existence of a possible threat to financial stability coming from climate change has increasingly been recognized and studied (see Sect. 2.2). This has led some commentators to propose including environmental considerations into macroprudential regulation, so to avoid undesired side effects on low-carbon investment while simultaneously protecting the financial system from climate-related risks.

Rozenberg et al. (2013), for instance, argue for the introduction of differentiated reserve ratio requirements directed in favour of green sectors. Reserve ratio requirements relate the amount of reserves that banks possess—either in the form of cash kept in their vaults or as deposits held at the central bank—to the stock of their clients' deposits. The reserve ratio is a form of liquidity requirement and gives an indication of how resilient a bank would be to an unexpected withdrawal of funds from its clients' deposits. Differentiating reserve requirements means to impose different reserve requirements, depending on the destination sector of lending. In the case of *green* differentiated reserve requirements, the reserve ratio that banks have to satisfy would be lower than average for loans directed towards low-carbon sectors. Given that banks obtain their profits from lending, and that a lower reserve ratio expands the potential amount of credit that a bank can create, this policy should give an incentive to banks to direct a larger amount of lending towards green investment.

A similar scheme—called 'National Energy Efficiency and Renewable Energy Action' (NEEREA)—has recently been implemented in Lebanon (Banque du Liban 2010; PWMSP 2011). The scheme aims at providing cheap credit to the private sector for projects related to renewable energy production and energy efficiency in buildings. If the commercial bank decides to accept the loan request, the firm presents a technical study of the project, which is assessed by the Lebanese Center for Energy Conservation (LCEC), an agency affiliated to the Lebanese Ministry of Energy and Water. If the project is approved, the Lebanese Central Bank provides its support by reducing the bank's obligatory reserve requirements by an amount equal to 100–150% of the loan.

Campiglio (2016) analyses this policy proposal in light of central banking operational frameworks. In many high-income countries, reserve ratios are in fact not likely to be effective as a constraint on bank lending behaviour, for at least two reasons. First, availability of reserves is currently far from being a problem for banks since central banks have inundated the interbank market with new liquidity through the QE programmes. Additionally, and most importantly, in most modern banking systems, central bank reserves are not capable of acting as a strong constraint, even in non-extraordinary circumstances. This is due to the fact that most central banks in high-income in recent decades have preferred to use the reference interest rate—that is, the price of reserves—rather than the quantity of reserves as their main policy instrument.

The manipulation of the reference interest rate helps the central bank to have a better control on the interbank lending rate, which is the interest rate at which banks lend to one another. However, this leaves the determination of the quantity of reserves out of the control of central banks: if the objective is to keep the price of money in the interbank market around a certain range then central banks have to satisfy any demand of reserves coming from the banking market. Denying new reserves to banks in moments of liquidity stress would automatically put pressure on the price of reserves on the interbank market, putting the interest rate out of the control of the central bank. Therefore, in high-income economies where central banks give themselves as a priority the stability of the interbank rate, reserve requirements cannot act as a constraint.

Things might work differently in emerging economies, where central banks are willing to let the interbank rate fluctuate more, in exchange of a stronger control on the quantity of reserves. This is supported by the evidence that, while high-income countries have abolished or gradually reduced reserve requirements to very low levels (Gray 2011), many emerging economies have often used reserve requirements and a wide range of other macroprudential tools in recent years (Lim et al. 2011; Cerutti et al. 2017). A non-exhaustive list of policy tools includes liquidity and capital requirements, caps on the loan-to-value ratio, caps on debt-to-income ratio, ceilings on credit growth, restrictions on profit distribution, and many others. The People's Bank of China is also using 'dynamic' differentiated reserve requirements, for which required reserve ratios are different across banking institutions depending on their size, their financial conditions—for instance, their capital adequacy ratio—and the sector they operate in (Ma et al. 2013).

Another option could be to focus on capital adequacy ratios and incorporate environmental, social and governance (ESG) criteria into asset risk assessment for risk-weighted capital requirements. In particular, introducing considerations linked to climate and carbon emissions would reflect the increasing concern around climate-related risks to financial stability. As discussed in Sect. 3.2, loans to low-carbon infrastructure projects would now appear as unfavourably risky on banks' balance sheets, thus possibly leading them to drop these assets in favour of more liquid, standardized assets, which are, however, unlikely to provide a comparable protection against climate damages. Differentiating capital requirements depending on the type of lending that banks provide, or attributing lower risk weights to low-carbon assets, could correct this high-carbon bias and fruitfully manage to direct larger flows of new credit creation towards them.

These policies may appear very far from the usual central banking practice in high-income countries. However, the vast majority of advanced economies have implemented some form of macroprudential policy at some point in the past. Elliott et al. (2013) review the long history of macroprudential instruments employed by the United States throughout the last century to promote or curb credit growth, often with specific sectors in mind (housing, for instance). These included underwriting

standards, reserve requirements, deposit rate ceilings, credit growth limits, supervisory pressures and other policies, which have helped public authorities in their attempt of moulding the shape of the American economic system.

The use of macroprudential policy to encourage additional green investment would, however, mean diverting the policy tool from its primary objective of addressing systemic financial risk. While this has been done before, for example with preferential regulatory treatment for loans to small and medium enterprises (SMEs) in the EU, it would be predicated on such assets being provably of lower risk—either due to being 'future-proofed' against transition risk or if backed in some way by government support; for example, the way the European Investment Fund has been supporting financing to small businesses, such as loan guarantees (EBA 2016). Otherwise, there could be the risk of encouraging excessive investment in green projects, which then fail to provide investor returns, and thus creating an undesirable trade-off between financial stability and environmental sustainability (CISL 2014). Caution should be used in implementing these measures and a process of monitoring put in place, so as to promptly correct the strategy in case the formation of a 'green bubble' is detected.

## 4.3    The Role of Central Banks: A Green QE?

As already discussed, the GFC has triggered an unprecedented expansion of central banks' range of action in high-income countries. Far from limiting themselves to setting the reference interest rates, they have embarked on ambitious QE programmes of financial asset purchases. QE programmes involve two main aspects. First, a certain amount of financial assets is purchased. Sovereign bonds represent the large majority of holdings, but as shown in Sect. 3.3, private assets are also being bought. Second, new liquidity—that is, central bank reserves—is created and put at the disposal of commercial banks, in the hope that these will in turn increase lending to the real economy. However, lending conditions took a long time to recover and, despite recent improvements, they are still far from the pre-crisis situation (BoE 2016; ECB 2017). Additionally,

there is no evidence that whatever credit is created by commercial banks is flowing to low-carbon sectors. Therefore, neither of the two aspects of QE seems to be helping societies in facing the urgent and systemic challenge of climate change and the transition to a sustainable economy. To the contrary, the analysis performed in Campiglio et al. (2017) suggests that, if anything, current QE schemes may be perpetuating society's high-carbon lock-in.

This has led some to propose reoriented QE programmes so to support low-carbon sectors more directly through the purchase of 'green' assets linked to climate-friendly investment—a 'Green Quantitative Easing' (Murphy and Hines 2010; Werner 2012; Anderson 2015). As part of their ongoing programmes of financial asset purchases, central banks could buy on the secondary markets assets that are linked to the realization of low-carbon projects. 'Green bonds'—debt securities whose proceeds are earmarked for specific environment-friendly uses—represent one example of such assets in rapid expansion (CBI 2016). Green bonds can be issued by private firms, governments, public development banks and other actors.

Purchasing green bonds issued by development banks would probably be the most effective and least controversial way of implementing a green QE. Public development banks are financial institutions devoted to supporting the process of national or regional economic development, often providing credit to activities that commercial banks are unwilling to finance, or on more favourable terms. Both national and multilateral banks[9] have become one of the most prominent actors in climate finance (CPI 2015; FS-UNEP and BNEF 2016). They also appear to be instrumental in delivering finance to the riskiest renewable energy projects (Mazzucato and Semieniuk 2016). As part of its Public Sector Purchase Programme (PSPP), the ECB is already purchasing debt securities emitted by 'supranational' entities, which include both international/regional institutions located in the euro area—European Investment

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[9] National development banks include, to cite some of the largest, the China Development Bank (CDB), the German Kreditanstalt fur Wiederaufbau (KfW) and the Brazilian Banco Nacional do Desenvolvimento (BNDES). MDBs include the European Investment Bank (EIB), the International Bank for Reconstruction and Development (IBRD), the International Finance Corporation (IFC), the Asian Development Bank (ADB) and others.

Bank, Nordic Investment Bank and others—and national agencies and development banks—KfW in Germany, Caisse des Dépôts in France and many others.[10] As of the end of March 2017, the holdings of supranational assets amounted to 162 billion EUR, out of a 1481 billion total of PSPP holdings.

Therefore, it is possible that the ECB could already be implementing an indirect and unplanned form of Green QE through the purchase of, for instance, EIB's bonds whose proceedings are then used to finance low-carbon projects. This could be made explicit and expanded (Anderson 2015). The President of the ECB, Mario Draghi, confirmed that, while not allowed to buy EIB bonds on the primary market, the ECB could certainly buy green bonds issued by the EIB on the secondary market, provided they comply with the ECB rating standards (EU Parliament 2015).

However, the execution of such a suggestion using bond purchases would be currently constrained. First, EIB loans are limited to 50% of a project's financing, meaning that an increase in lending by the EIB would need to be matched by additional funding from private banks or EU grants. Second, many development banks are constrained in their lending by predetermined leverage ratios. The banks of the World Bank group and other multilateral development banks (MDBs), for instance, usually cannot lend more than 100% of their total subscribed capital (plus reserves and retained earnings). In the case of the EIB, mainly lending to high-income European countries, the value is 250%. However, all of them sit very comfortably below this statutory ceiling. Just considering actual paid-in capital,[11] the equity/loan ratio of MDBs tend to be much higher than their private counterparts (Humphrey 2015). Their traditionally conservative capital management, together with the difficulties experienced in raising further capital from subscribing states, limits the amount of lending available. Third, public development banks lack one

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[10] The complete list of eligible supranational entities can be found at this link: https://www.ecb.europa.eu/mopo/implement/omt/html/pspp.en.html.

[11] There are two types of capital base in MDBs: (i) paid-in capital (plus reserves and retained earnings) and (ii) 'callable' capital, guaranteed by governments in times of crisis. The share of paid-in capital has been gradually shrinking in all MDBs (Humphrey 2015); governments prefer to offer callable capital, as it doesn't involve any actual budgetary disbursement.

of the most crucial characteristics of banks: the ability to autonomously expand their own balance sheets. The power of creating credit through the act of lending is in fact forbidden to development banks, which have to limit their lending to the amount of finance they raise on the secondary markets through the issuance of bonds.

Disregarding the fact that it is in fact already happening, arguing for central banks to purchase public development banks' bonds would still probably be considered by some as an excessive intrusion of central banks into what should be the responsibility of elected governments. However, as unconventional this proposal may appear, it is not unprecedented. At the end of World War II, the Canadian Central Bank created an Industrial Development Bank (IDB) aimed at supporting the small and medium enterprise sector. The IDB—which in its 31 years of operations lent money to approximately 50,000 businesses—was entirely financed by the Central Bank, which purchased the whole amount of bonds issued by the IDB through the creation of new reserves (Ryan-Collins et al. 2013). More recently, far from aiming for neutrality, the Federal Reserve deliberately targeted mortgage-backed securities in order to "provide support to mortgage and housing markets" (New York Fed 2010) and thereby increase bank lending to households. Targeted longer-term refinancing operations (TLTROs) conducted by the ECB have had the aim of increasing lending to the real economy, and it explicitly excluded financial corporation and loans to households for house purchase (ECB 2016b). The Bank of England's Funding for Lending Scheme has targeted household lending (until November 2013) and lending to small and medium enterprises (BoE 2017b). The Central Bank of Bangladesh has set up a refinancing facility expressly targeted to projects in the field of renewable energy (Barkawi and Monnin 2015).

Central banks could also use their collateral framework to support assets issued by low-carbon firms or linked to low-carbon projects. As part of their standard monetary policy frameworks, central banks lend liquidity to banks only against adequate collateral (Nyborg 2017). The rules regarding the type of assets that are eligible as collateral at the central bank have a clear impact on banks' asset preferences, and low-carbon project assets tend not to be eligible. A 'haircut' is then applied to the market value used as collateral, which usually depends on their rating and

maturity. In this context, including ESG consideration could decrease the haircut applied to low-carbon sustainable assets, so that banks would have a relatively higher willingness to hold them and use them as collateral at the central bank.

Different central banking frameworks adopt different strategies. The People's Bank of China (PBC), for instance, exerts a sort of soft pressure—called 'window guidance'—on the banking system, for instance by holding monthly meetings with commercial banks to make sure that the allocation of credit across sectors follows the Central Bank's strategic plans. The Chinese window guidance framework has focused extensively on low-carbon sectors, which are considered one of the most important priorities for the country's development (Xian and Liping 2015). PBC (2013), for instance, states that "financial institutions were guided to intensify support …. to sectors crucial for economic and social development such as …. energy conservation and emissions reduction" and that "credit support to industries with high energy consumption and high emissions and industries with an overcapacity needs to be controlled" (p. 15). The China Banking Regulatory Commission (CBRC) also published a document presenting the 'Green Credit Guidelines', in which it is stated that "banking institutions shall promote green credit from a strategic height, increase the support to green, low-carbon and recycling economy, fend off environmental and social risks, and improve their own environmental and social performance" (CBRC 2012).

# 5    Conclusions and Further Research

Transitioning to a sustainable economic system will have multiple and diverse implications for the financial system. For the transition to ever take place, physical and financial investments must be reallocated towards productive activities that help decarbonizing the economy. The market drivers of the transition—e.g. the rapid decrease in the cost of renewable energy technologies—will play a crucial role in raising the interest of firms and financial investors but they will probably need to be complemented by public policies in order to respect the 2°C threshold

in temperatures increase. Both market and policy drivers, while pushing financial resources in the direction of green investment, may have undesired negative effects on financial stability triggered by the process of writing off carbon-intensive assets. The responsibility of public institutions—governments, central banks, financial regulators—is thus to achieve the fine balance that will deliver a quick but smooth transition.

In this context, this chapter has tried to investigate what have been the implications of the GFC on the prospect of a low-carbon transition, and in particular on the policies aimed at supporting it. We have argued that the immediate effects, while not strong enough to halt neither the expansion of green sectors nor the related policy effort, have mostly been negative. National governments, after an initial fiscal stimulus incorporating green components, have retracted from public spending and fiscal instruments in favour of clean technologies due to the adoption of balanced budget strategies and a stronger focus on growth and employment issues. The international financial regulation framework introduced with the Basel III Accord has worsened the incentives for banks to lend to renewable energy projects. Unconventional monetary policies launched by many central banks as a reaction to the crisis appear to have perpetuated the lock-in of the economic and financial system into high-carbon sectors.

However, the profound change of the global policy and institutional setting has also created space for new concepts and proposals. Sluggish growth and low employment levels have favoured the development of the green growth narrative, which argues for the introduction of carbon pricing and other instruments aimed at decarbonizing the economy while letting it expand. The concept is likely to be more appealing than 'sustainable development' to both policy-makers and market forces, although it still has to prove itself as a realistic strategy. The process of regulation of the financial system, combined with the possible bias against low-carbon investment, has led to the proposal of using macroprudential policy in order to incentivise bank lending to green sectors. Finally, given the unprecedented level of intervention of central banks, it has been suggested that QE programmes could be reoriented so to purchase assets that help supporting the low-carbon sectors, possibly including public development banks in the process.

A comprehensive and coordinated set of policies will have to be designed and implemented in order to address in an integrated manner the issues raised by climate change and the low-carbon transition. However, policy-makers currently lack the appropriate assessment tools. Despite the relevance of the topic, models connecting macroeconomic, financial and climatic issues in an integrated way are still rare.

The standard modelling frameworks in both climate economics and macroeconomic/monetary economics—IAMs and Dynamic Stochastic General Equilibrium (DSGE) models, respectively—do not currently appear up to the task of investigating the complexity around climate–finance interactions. Among other relevant shortcomings (Farmer et al. 2015), IAMs offer an excessively simplistic supply-side treatment of the economic system, usually depicted as an aggregate sector driven by exogenous trends and the intertemporal maximization of consumption by a representative agent, with no representation of financial variables and institutions. DSGE models, on the other hand, usually abstract from the biophysical basis of the economy, and the rare exceptions (Golosov et al. 2014; Annicchiarico and Di Dio 2016) do not provide an explicit representation of the banking and financial sector. They are also incapable of producing endogenous climate-related financial dynamics; that is, they rely on some kind of 'shock' to perturb the system populated by forward-looking optimizing representative agents and then smoothly move from one equilibrium to another. More, in general, DSGE models have come under heavy criticism for their inability to properly represent banking, credit and financial variables—as highlighted by their powerlessness in the wake of the financial crisis—and their links with the wider macro dynamics (Romer 2016).

More promising results can be expected by two non-neoclassical methods: agent-based models (ABMs) and stock-flow consistent (SFC) models. ABMs simulate the economy as complex evolving systems populated by a large number of agents and institutions interacting among each other according to distinct behavioural rules, not necessarily rational or forward-looking. SFC models usually represent the economic system as a set of interacting aggregate sectors, with a particular focus on the real and financial transactions linking them. Compared to ABMs, the degree of disaggregation in SFC models tends to be lower, but the physical and

financial interactions between sectors are better specified and the policy implications of results of easier interpretation. The insights into macro-financial booms and busts offered by these methodological approaches led policy-makers to start developing research around them—see, for instance, the work by the Bank of England (Burgess et al. 2016; Turrell 2016).

While traditionally applied to macroeconomic problems, the two approaches share a set of features that makes them particularly attractive for modelling climate-related risks. They are both able to move away from the simplistic assumptions of both IAMs and DSGE models to provide a more systemic and realistic description of socioeconomic systems, with a particular focus on balance sheet interactions between agents or sectors. They are indicated for studying non-linear behaviours, amplification effects, path dependencies and emerging properties, and they are not forced to rely on equilibriums. Thus, while still young (Balint et al. 2016; Dafermos et al. 2017; Godin et al. 2017), this stream of literature could soon shed more light on the dynamic interactions between financial and environmental systems, the relevance of which was so clearly highlighted by the GFC and its aftermath.

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