Pricing Benchmark in Market Definition: Theoretical Background and Practical Application

Siniša Milošević, Jelena Popović Markopoulos, Jelena Grahovac, and Aleksandra Ravić

1 Introduction

The aim of this paper is to demonstrate the practical application of quantitative tests in the process of delineating relevant markets. The paper provides an application and comparison for four mutually complementary tests that are based on product price movements over time. Following the example of three products, the paper seeks to examine the empirical verification of the initial hypothesis that two out of the three selected products belong to the same relevant market.

The manner in which the relevant market is defined sets the estimated market shares and market power of business entities, hence precisely setting relevant market boundaries represents a precondition for further investigation of competition conditions in the given market.

The concept of the *relevant* market, as used in competition law, differs from the concept of the market as an economic category, and is predominantly narrower when compared. For example, business entities predominantly define the market as geographical territory where they sell their products, or even the whole industry sector to which they belong (European Commission 1997). On the other side, positive legal regulations governing the protection of competition perceive the relevant market vis-à-vis two, mutually complementary dimensions—the product dimension and the geographic dimension. This means that in each process of determining the relevant market, its scope is set by the assortment of products, on the one hand, and the geographical area where such assortment is sold, on the other.

The Law on Protection of Competition of the Republic of Serbia adopted the definition of the relevant market as applied in the European Union. The relevant

S. Milošević (✉) · J. P. Markopoulos · J. Grahovac · A. Ravić
Serbian Commission for Protection of Competition, Belgrade, Serbia
e-mail: sinisa.milosevic@kzk.gov.rs; jelena.popovic@kzk.gov.rs; jelena.grahovac@kzk.gov.rs; aleksandra.ravic@kzk.gov.rs

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product market represents a set of goods or services that consumers and other users consider interchangeable in terms of their characteristics, common purpose and price, while the relevant geographic market is defined as the area in which business entities are involved in the supply or demand, and in which the same or similar conditions of competition apply, appreciably different from the conditions of competition in neighbouring areas.

The paper consists of seven sections. The introduction defines the concept of the relevant market and presents the structure of the paper. The overview of different methodological approaches to defining the relevant market is given in the second part, while the third part presents the theoretical foundations of price-based tests. The following fourth part of the paper provides an overview of European Commission practice in the application of price tests. The fifth, and at the same time, the main part of the paper is dedicated to the practical application of price tests. The conclusion gives the summary of the paper's findings.

2 The Methodological Approach to Defining the Relevant Market

The key concept, on which the definition of relevant market is based, is the concept of interchangeability, i.e. demand-side substitution. In addition to demand substitution, the process of defining the relevant market may also require investigation of the possibility of supply substitution, which is beyond the scope of this paper. Different methodologies are used for investigating the possibility of demand substitution and, by extension, of defining the relevant market, while application of a specific one will depend on factors such as the nature of products for which the relevant market is determined and data availability. The actual procedure for defining the relevant market is case-specific, hence it may occur (although it is not common) that in some cases two products belong to the same relevant market, while in others they constitute two separate relevant markets.

Assessment of the relevant market primarily implies carrying out a qualitative assessment, followed by a quantitative one. The qualitative assessment of the relevant market represents the first step in the process of determining the relevant market. It refers to the logical assumption of the relevant market definition or other potential definitions, later tested by applying quantitative methods.

It is intuitive that chocolate prices will not be sensitive to changes in motor vehicle prices, because they are products that significantly differ in terms of characteristics, as well as in terms of usual purpose, thus under no circumstance can these two products constitute a single relevant market. Without qualitative analysis, significantly more time would be required to determine a relevant market. Therefore in practical terms, the pool of possible relevant market definitions is narrowed by carrying out the qualitative analysis.

The presence of similarity between the characteristics and the intended use of products indicates the existence of so-called functional substitution between them (Davis and Garces 2010). However, from the standpoint of competition, functional substitution is not sufficient, but it is significantly important to merit a look at the product prices, in addition to their characteristics and purpose. Therefore, for the mutual substitution of products, all three factors—product characteristics, intended use and price—are of equal importance. This is precisely the reason why in competition cases it is often necessary to carry out certain quantitative tests, in order to define relevant market, as precisely as possible. Quantitative assessment implies the use of different tests, based on time-series of observed product prices, in order to confirm or refute assumptions made during the qualitative assessment of the relevant market.

The hypothetical monopolist test, also called the "small but significant and non-transitory increase in prices" (SSNIP) test, is the best known and most common method for determining the relevant market. The methodological approach in defining the relevant market in the form of a hypothetical monopolist test was first introduced by the US Department of Justice in the Merger Guidelines, in 1982, while in 1992 became part of the joint Horizontal Merger Guidelines of the US Department of Justice and the Federal Trade Commission. In the EU, the hypothetical monopolist test was used for the first time in the Nestlé/Perrier case (No. IV/M. 190, 1992), and has been officially recognised in the Notice on the definition of the relevant market for the purposes of Community competition law, published by the European Commission in 1997. Modelled after the European Commission, the Office of Fair Trading of the United Kingdom included the hypothetical monopolist test for the first time in the market definition procedure in 1999.

The purpose of the SSNIP test is to identify the narrowest group of products (or geographic area) where the hypothetical monopolist could profitably implement the small (5–10%) but significant and more permanent (up to 1 year) price increase of its own product. The relevant product market question asks to what degree customers will substitute away from the product in response to the price increase (Pittman 2017). The procedure is basically iterative in nature and starts by identifying the closest substitutes for the observed product, progressively adding new products—potential substitutes, up to the point when shown that a price increase would be profitable for the hypothetical monopolist producing all products in a market defined in such manner. The test formulated in such way has a quantitative character, but its primary role is to offer a conceptual framework for analysing the nature of competition between products and services, and for assessing the competitive pressure on the potential relevant market (NERA 2001).

Despite the general consensus that the hypothetical monopolist test provides an appropriate analytical framework for defining the relevant market, its implementation is not always straightforward (Froeb and Werden 1991). In a situation in which there is no data on price elasticities, in order to see if and when the hypothetical monopolist would be able to profitably increase prices of its own products, it is necessary to assess the profit at different levels of product prices. This requires an

assessment of cost function, or a rather heroic assumption that all average costs are the same. Because of limited data availability for the estimate of the hypothetical monopolist's cost function and difficulties in determining "competitive" price level subject to the assumed 5–10% increase, the test in effect is often reduced to a qualitative experiment and a not too formal econometric test that is rigorously implemented in all cases.

Reviewing the significance of the relevant market definition's concept and accepting new approaches in order to overcome information-related limitations, is based on the premises that the market definition is not an objective *per se* and does not necessarily have to be the first step in analysing competition conditions in all cases. Although there is still no universally accepted test for determining the boundaries of the relevant market (Kaplow 2013), the practice in recent years has increasingly turned towards information-wise less demanding tests, which exclusive rely on analysing (most often of available) data on prices. These tests are based on the logical premise that if two products belong to the same (relevant) market, their prices will move in similar manner over time.

3 Theoretical Foundations of Price-Based Tests

Horowitz (1981) and Stigler and Sherwin (1985) were among first to define the relevant market based on identifying similarities in product price movement over time. The authors depart from the idea that price-led arbitrage will disable diverse price dynamics in different price areas, if such areas belong to same relevant market. Four mutually complementary tests stand out among most utilised tests that are based on prices of goods and services, whose practical application will be the subject of this paper: the correlation test, the Granger causality test, the stationarity test (unit root test), and the cointegration test.

3.1 Price Correlation Analysis

Price correlation analysis is based on the assumption that prices of products that are close substitutes move together, i.e. that exists a strong mutual correlation. It can be considered that products i and j belong to the same relevant market if there is a correlation between movements in their prices (Stigler and Sherwin 1985). For example, if the price increase of product i occurs, instead of product i consumers will purchase a substitute, product j, whose price remained unchanged. The increase in demand for product j will lead to that product's price increase, hence causing the existence of a positive correlation in price movement of product i and product j. As demonstrated, the price correlation analysis includes comparison of two price series that can be performed over time, in the case of time-series, or spatial comparison, in the case of structural series.

In other words, there are limits to which product prices may diverge within the same relevant market, because the demand-side substitution or supply-side substitution always bring them back to the equilibrium level. Therefore, we should expect that movements in prices of all products in a particular relevant market are correlated over time. The price correlation analysis demonstrates the strength of these links, i.e. the degree to which two price series are related. If a price of one product limits the price of another product, which is characteristic of affiliation to the same relevant market, both price movements must demonstrate similar patterns.

The correlation coefficient ranges from $+1$ (when two price series move together perfectly) to -1 (when two price series move in perfectly opposite directions). A high and significant correlation coefficient close to unity may indicate that the two candidate products belong to the same relevant market. A low or insignificant correlation coefficient may indicate that two candidate products do not belong to the same relevant market.

Price correlation analysis is subject to a number of limitations. A high correlation coefficient may suggest that markets should be widely defined when in fact the correlation is spurious. Spurious correlation occurs when two series seem to be correlated but actually are not. On the other hand, a low correlation coefficient may lead to a narrow market definition when in fact the two price series are related but subject to significant random disturbance that breaks up such correlation. Also, no unique criterion exists to determine whether a correlation is large enough. Despite these limitations, price correlation analysis can provide useful information for relevant market definition, if it is applied and interpreted appropriately.

3.2 Stationarity Test

If two products belong to the same relevant market, then limitations exist in terms of corridors within which their price movement may diverge. In that sense the unit root test, i.e. stationarity test, is used for investigating whether two products belong to the same relevant market (Forni 2004). If two products belong to the same relevant market, shocks that increase single product price against the other product will have a temporary effect. Substitution will occur, demand for the more expensive product will decrease, while demand for more affordable product will increase. The decline in demand for the more expensive product will cause its price to drop, while on the other side, the more affordable product's price increase will occur due to the increased demand for that product. In those conditions product prices always return to the long-term equilibrium level. For that reason the time-series of relative prices, i.e. the quotient or difference between prices of the first and the second product is always stationary, if such products belong to the same relevant market.

3.3 Cointegration Test

Using similar logic to when implementing the unit root test, investigating whether two products belong to the same relevant market may also be performed by applying the cointegration test. Two non-stationary time-series are said to be cointegrated if their linear combination is stationary. If the cointegration test demonstrates that price movement series for two products are cointegrated, then those products belong to a single relevant market, and vice versa (Coe and Krause 2008).

3.4 Granger Causality Test

Correlation in some cases may be spurious: the result of coincidence and not of a causative link between the observed occurrences, meaning that two products may belong to different relevant markets, yet have a high level of interconnectivity in terms of their price movement over time. For example, due to the strong correlation of prices of the two with the third product, indisputably out of the market. On the other side it may occur that no significant correlation between the observed products' price movements exists, but that they nevertheless belong to the single relevant market. This occurs when price alignment happens with a certain time-lag. This means that it takes a certain time following one product's price increase for the prices of its substitutes to increase as well. In this case, the correlation between price movements will be approximately equal to zero even though the products are a very close substitutes.

For those reasons the need arose for the Granger causality test, aimed at determining the existence of causality between prices of two products (Slade 1986). This test was named after Clive Granger, winner of the Nobel Prize in Economics (Engle and Granger 2003). The use of the concept of the Granger causality in competition law inquiries can be illustrated with reference to market definition. The intuition behind the test is obvious and based on a very simple idea: would it be possible to advance prediction of a single product price movement if we don't only look at the time-series of that product price movement, but also include in the analysis the time series of other product prices (Bishop and Walker 2010)? The first step is to fit a regression curve, by using the least squares method, to the time-series of the first product prices based on several shifts, i.e. lags. The second step is to add the time-series of the second product, also with several lags. Then we ask is the explanation for the first product price movement better if, in addition to those prices, we also include other product prices. The common statistical tests are used for enacting a ruling of "better" or "not better" explanation. Comparison between the mean squared errors is performed most frequently. If the explanation is "better", it improves the ability of predicting the first product price movement. In such a situation, the second product price is the cause of the first product price.

There are three kinds of relations in reference to the Granger causality. If we test the existence of causality between the prices of products X and Y, it is plausible that:

- the price movement of product X causes the price movement of product Y (unidirectional causality);
- the price movement of product Y causes the price movement of product X (unidirectional causality); and
- the price movement of product X causes the price movement of product Y, while simultaneously price movement of product Y causes the price movement of product X (bidirectional causality).

If two products X and Y belong to the same relevant market, it can be expected that the prices of product X cause the prices of product Y, and vice versa.

4 Summary of Case Studies

In its practice up to present, the European Commission has used price-based tests mainly for the purpose of defining the relevant market when examining proposed mergers. In the case of Nestlé/Perrier (1992), the price correlation analysis was used for the first time to define the relevant product market. In its merger notification, Nestlé defined the relevant product market as non-alcoholic beverages market, including bottled source water and soft drinks. The European Commission departed from the assumption that bottled source waters represent a distinct relevant market from soft drinks. Additionally, the assessment of the proposed merger considered whether there is a separate market for sparkling and flavoured waters within the wider, bottled water market. Based on the results of the correlation analysis, which demonstrated the high correlation between the prices for two types of bottled water and low correlation coefficients between bottled waters and other non-alcoholic beverages, the relevant market was defined as the bottled source waters market.

In the case of Gencor/Lonrho (1997), following the determining of a high correlation coefficient between the prices of gold and platinum, and due to indications of related "false correlation", the European Commission applied the cointegration test. This test demonstrated that long-term correlation between the prices of the selected product categories was nonexistent, i.e. the that prices of platinum, rhodium, palladium, silver and gold, have a tendency to move irrespectively of other(s), so that it can be reasonably assumed that this represents the case of separate relevant product markets.

In the case of UPM-Kymmene/Haindl (2001), based on the price correlation coefficient, the European Commission determined that two type of magazine printing papers, so-called wood-free coated paper (WFC) and wood coated paper,[1] make

[1]Such are Super Calendered (SC) and Coated Mechanical Reels (CMR), including Light Weight Coated (LWC), Medium Weight Coated (MWC) and Heavy Weight Coated (HWC) paper.

two separate relevant markets. Namely, the determined correlation coefficient was below 0.55, which constituted an insufficient argument for classifying all types of printing papers in the same relevant market. On the other hand, price correlation between certain types of wood coated papers was also tested, thus validating the determined correlation coefficient between the Light Weight Coated (LWC) paper and Super Calendered (SC) paper at 0.85, which indicates that both types of wood coated papers belong to the same relevant market.

In the case of CVC/Lenzing (2001), by applying the correlation analysis, the European Commission determined that it was not only viscose and lyocell fibres that constituted separate relevant markets, but that viscose fibres and fibres made of other materials, such are cotton, polyester and polypropylene, also did not belong to a single relevant market. Namely, the correlation coefficients between prices of viscose fibres and other fibres ranged from 0.04 for natural fibres, i.e. cotton-made fibres, to above 0.06 for polypropylene fibres from the lower price category, 0.24 for polypropylene fibres from the higher price category, 0.39 for polyester fibres from the lower price category, all the way up to 0.44 for polyester fibres from the higher price category. This European Commission opinion was completely contrary to the view of the parties to the concentration that all textile fibres, artificial (cellulose and synthetic) and natural, constitute the same relevant market.

In the case of Ryanair/Aer Lingus (2003), a price-correlation analysis was used to complement other evidence in determining the relevant geographic market. The takeaway from this example is that there is no agreed level or threshold that defines whether series move sufficiently together for two products to belong to the same relevant market. A partial, but generally accepted, response to this critique is the use of benchmarking techniques. As a benchmark against which to compare other correlations, one can use the correlation coefficient between the prices of two series that one is willing to state on a priori grounds are in the same relevant market. In this case the average correlation on six routes operated both by Aer Lingus and Ryanair was used as a general benchmark. According to this approach, the correlation coefficients of individual routes that were above the average correlation of 0.69 were used as a first indication that the merging parties are close competitors on these routes.

In the case of Arsenal/DSP (2009), the European Commission applied the price correlation and stationarity tests in order to define the relevant geographic market. Contrary to the view of the parties to the concentration that the relevant market in geographic terms was the global market, the European Commission concluded, based on the low correlation coefficients between continents and absence of stationarity of relative prices, that Europe, Asia, and North America represent separate geographic markets.

5 Practical Application of Price-Based Tests

We will demonstrate the practical application of price-based tests on the example of analysis of monthly time-series data relating to prices of three products, two different brands of edible sunflower oil and diesel fuel, in the Serbian market, during a 4-year

period (2012–2015). For further ease of use, the products will be marked as A, B, and C, with C being diesel fuel. Each data-series had 48 observations. The prices of all three products were deflated using appropriate indexes.

Departing from the basic legal requirements in determining the relevant market (characteristics, common purpose, and price), already in the first step taken, it was noted that based on the criteria of characteristics and purpose, products A and B belonged to the same market, while product C represents the second, considerably different and separate market. Further empirical analysis dealt with the price movement of these three products with the aim of verifying whether products A, B, and C, whose retail prices move at approximately identical level, belong to the same relevant market. In addition to that, the purpose of the empirical work was to obtain an answer as t the existence of causality of the price of product A against products B and C, and if any, whether the causalities were unidirectional- or bidirectional in nature.

First, we will examine the graph presentation of time-series data of prices related to products A, B, and C. Already at first glance, such visual representation suggests that the prices of products A and B demonstrate similar dynamics, while the price of product C has a considerably different trend (Fig. 1).

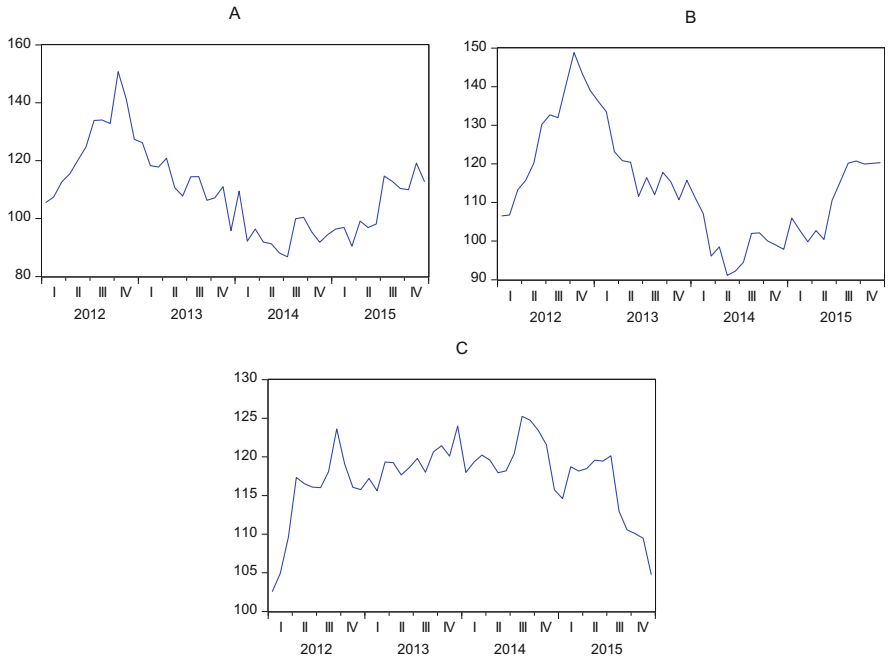

Fig. 1 Movement of observed prices

5.1 Price Correlation Test

Further investigation analysed the correlation between those three data-series. The values of correlation coefficients and associated probabilities are presented in the form of Table 1.

Correlation analysis demonstrated a high and statistically significant correlation coefficient between products A and B (0.94), while the correlation coefficients of product C against products A and B have a negative sign, demonstrating low values (−0.17 and −0.14, respectively), and are not statistically significant.

The obtained results suggest that products A and B belong to the same relevant market, while product C belongs to another relevant product market, therefore confirming the preliminary conclusion reached based on the qualitative assessment of the relevant market, by analysing the characteristics and purpose of these products. The correlation analysis results should be interpreted with caution, particularly in situations when not all observed time series are stationary. Consequently, it is recommended to combine correlation analysis with other price movement tests.

5.2 Stationarity Test (Unit Root Test)

Next we implemented another price-based test, by investigating the stationarity of the time-series of relative prices, related to products A, B and C, whereas the relative prices are expressed as a difference in price between two products (Fig. 2).

Based on the graph presentation, already *prima facie it* can be concluded that the time-series of relative prices of products A–B is stationary, while the time-series of relative prices of products A–C, and B–C are non-stationary, which we will verify by applying the unit root test.

Firstly, we will test the stationarity of time-series by using the Augmented Dickey-Fuller (ADF) test, followed by the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test. Although in principle they lead to the same conclusions, the tests differ in the null hypothesis. Namely, the ADF test departs from the hypothesis on the presence of a unit root (lack of stationarity), while the KPSS test tests the null hypothesis that the time-series is stationary.

Table 1 Results of the price correlation test

Correlation coefficient associated probability		PR_A	PR_B	PR_C
A	Correlation coefficient	1.0000		
B	Correlation coefficient	0.9367***	1.0000	
C	Correlation coefficient	−0.1695	−0.1379	1.0000

*Significant at $p \leq 10\%$
**Significant at $p \leq 5\%$
***Significant at $p \leq 1\%$

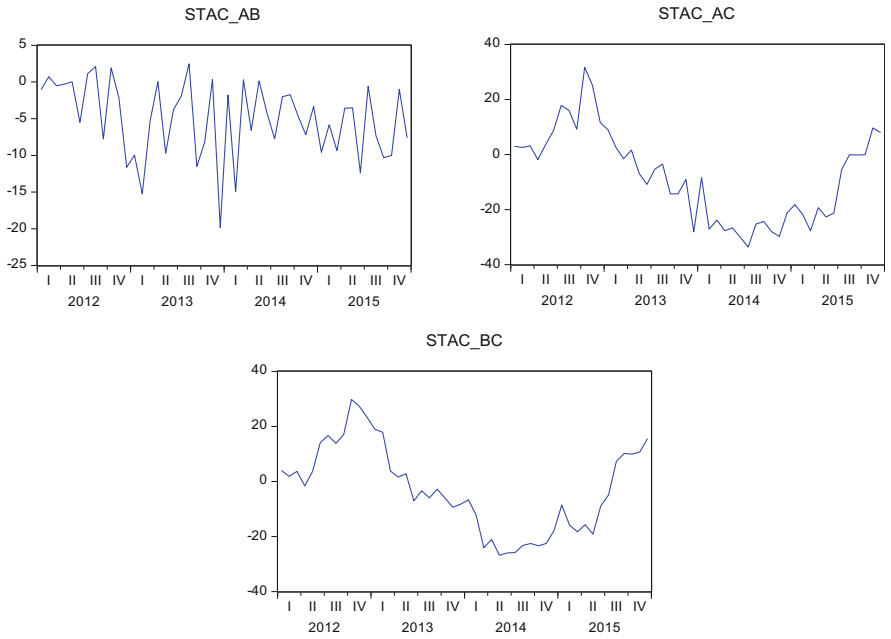

Fig. 2 Movement of product price differences

Table 2 Results of the ADF stationarity test for products A and B

	t-statistic
ADF t-statistic	−7.5724***

*Significant at $p \leq 10\%$
**Significant at $p \leq 5\%$
***Significant at $p \leq 1\%$

By applying the ADF test to the time-series of relative prices of products A and B, we get the result as indicated in Table 2.

Based on the ADF t-statistic, which is below the critical value for all significance levels, we can reject the null hypothesis on the presence of a unit root, hence we concluded that the time-series of relative prices relating to products A and B is stationary.

Now we tested the stationarity of the time-series of relative prices of products A and C (Table 3).

The table demonstrates that the t-statistics is in the area of accepting the null hypothesis for all significance levels, hence we conclude that the time-series is not stationary. The identical result is also achieved when we apply the test to the time-series of relative prices of products B and C (Table 4).

By testing the stationarity of time-series of relative prices relating to products A, B and C, using the ADF unit root test, we concluded that products A and B belong to the same relevant market, while product C constitutes the separate relevant market.

Table 3 Results of the ADF stationarity test for products A and C

	t-statistic
ADF t-statistic	−1.6637

*Significant at p ≤ 10%
**Significant at p ≤ 5%
***Significant at p ≤ 1%

Table 4 Results of the ADF stationarity test for products B and C

	t-statistic
ADF t-statistic	−0.9788

*Significant at p ≤ 10%
**Significant at p ≤ 5%
***Significant at p ≤ 1%

Table 5 Results of the KPSS test for products A and B

	LM-statistic
KPSS t-statistic	0.3516*

*Significant at p ≤ 10%
**Significant at p ≤ 5%
***Significant at p ≤ 1%

By applying the KPSS test we arrive to almost identical conclusions, hence below, for illustration purposes, we will give only the result of testing the stationarity of the time-series of relative prices of products A and B (Table 5).

The critical value (0.352) is located in the area of acceptance of the null hypothesis, for significance levels of 1% and 5%, while the null hypothesis is practically located in the margins of the critical area, for the significance level of 10%. Based on the abovementioned, we conclude that the time-series is stationary.

5.3 Cointegration Test

The test that we have used in order to draw conclusions on the determination of observed products against the same or different relevant markets is the cointegration test. The purpose of this test is to investigate whether the linear combination of two (non-stationary) time-series is stationary, from which it is concluded whether products belong to the same relevant market.

In order to investigate whether the time-series are cointegrated, it is primarily necessary to estimate the regression equations for each pair of products (three equations in total), then to create the residuals and test whether the time-series of the residuals are stationary, by using the unit root test. Therefore, the cointegration test is actually reduced to testing the presence of a unit root in the residuals, obtained by estimating the regression equations, by using the ordinary least squares method.

Table 6 Results of the cointegration test for products A and B

	t-statistic
ADF t-statistic	−7.4955***

*Significant at $p \leq 10\%$
**Significant at $p \leq 5\%$
***Significant at $p \leq 1\%$

Table 7 Results for products A and C

	t-statistic
ADF t-statistic	−1.8884

*Significant at $p \leq 10\%$
**Significant at $p \leq 5\%$
***Significant at $p \leq 1\%$

Table 8 Results for products B and C

	t-statistic
ADF t-statistic	−1.5072

*Significant at $p \leq 10\%$
**Significant at $p \leq 5\%$
***Significant at $p \leq 1\%$

The result of the stationarity testing of the residuals obtained through the assessment of the regression equation of the A-B product time-series is presented in Table 6.

Based on the calculated value of the ADF t-statistics and associated probability, and comparing it against the critical values for different significance levels, we conclude that the null hypothesis on the presence of a unit root is rejected, i.e. that the time-series is stationary, which suggests that products A and B belong to the same relevant market.

For the estimated regression equation of the time-series of products A and C, and the related resulting residuals, we obtain a different result (Table 7).

The calculated value of t-statistic is not statistically significant and it is located in the area of accepting the null hypothesis for all significance levels, thus we cannot reject the null hypothesis on non-stationarity. Accordingly, we conclude that products A and C do not belong to the same relevant market. The identical result is also obtained if we test the stationarity of residuals obtained by estimating the regression equation of the time-series of products B and C, which is demonstrated in Table 8, thus we conclude that those products belong to different relevant markets.

5.4 Granger Causality Test

Bearing in mind that the previous test confirmed that products A and B belong to the same relevant product market, further examination referred to the causality of the price movement of these three products. The Granger causality test is applied to examine whether the time-series of product A prices causes the time-series of

Table 9 Results of the Granger causality test

Null hypothesis	Number of observations	F-statistic
No causality exists between product B and product A in terms of Granger	47	9.5111***
No causality exists between product A and product B in terms of Granger		11.1046***
No causality exists between product C and product A in terms of Granger	47	0.0168
No causality exists between product A and product C in terms of Granger		0.6217
No causality exists between product C and product B in terms of Granger	47	0.4782
No causality exists between product B and product C in terms of Granger		1.1437

*Significant at $p \leq 10\%$
**Significant at $p \leq 5\%$
***Significant at $p \leq 1\%$

product B and C prices, and if causality exists, whether it is unidirectional or bidirectional.

The causality analysis is preceded by a statistical analysis of the model from the aspect of the optimal number of lags. A single lag is included in the model, and the following results are obtained (Table 9):

The determined values of the Granger causality test and associated probability ($p < 0.05$) demonstrate that when testing the causality of products A and B, the null hypothesis on the absence of causality is rejected, thus it is concluded that the price movement of product A is caused by the price movement of product B, and vice versa.

On the other hand, in the case of product sets C-A and C-B, the null hypothesis on the absence of causality in the price movement relating to the observed products cannot be rejected ($p > 0.05$), which additionally increases the previous finding that product C does not belong to the relevant product market to which products A and B belong.

This result is consistent with the conclusions reached in all three previously applied price tests, as well as with the initial assumption based on the qualitative analysis of products' characteristics and intended use. Various brands of edible sunflower oil constitute a relevant market that is different and separate from the market to which diesel fuel belong.

6 Conclusion

The definition of the relevant market is one of the most fundamental concepts upon which all crucial issues of competition policy are based. Defining the relevant market is a widely applicable analytical framework that represents an initial step when analysing competition conditions and investigating potential infringements of

competition. Properly determined boundaries of the relevant market enable identification of the market structure and market participants, as well as assessment of the competitive pressure that they face from one another.

There is a wide range of different methods and techniques that can be applied when assessing the relevant market, starting from the qualitative, which are based on product characteristics and their intended use, to the quantitative, which are based on the hypothetical monopolist test and price-based tests. Which of the methods will be implemented depends on the conditions under which the determination of relevant market is performed and on available data.

Tests that are based on the monitoring of time-series of product price movements are used when it is not possible to collect data for conducting other, more complex and information-demanding tests, such as the SSNIP test. Scientific papers published during last two decades and provide an abundance of examples of practical application of price-based tests, while the European Commission has used them extensively since 1992 in defining the relevant market, when assessing proposed concentrations.

Using an example of three products, we have demonstrated the practical implementation of price-based tests in the procedure of determining the relevant market. The performed tests and the results obtained aimed to empirically verify the initial hypothesis that different brands of edible sunflower oil belong to the same relevant market, while diesel fuel represents the separate relevant market. All four utilised tests confirmed the preliminary position obtained in the qualitative analysis, based on which we concluded that diesel fuel belongs to the separate relevant market, i.e. that it does not belong to the relevant market to which edible sunflower oil belongs.

This paper has addressed the issue of how price correlation and other price-based tests can be applied for a given data set of average monthly retail prices of two brands of edible sunflower oil and that of diesel fuel, over a 4-year period. However, the initial selection of products was done in a way that made the results of a preliminary qualitative analysis rather intuitive, and these were in a later stage confirmed by quantitative testing. It would be interesting to see how well the obtained benchmarks fits into another, similar data set, for example, by applying the same techniques to test the hypothesis that all edible oils (olive oil, palm oil, coconut oil, etc.) constitute the same relevant market.

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