

Inflation after the Introduction of the Euro: the Case of Slovenia

Mejra FESTIĆ* – Sebastijan REPINA** – France KRIŽANIČ***

Abstract

The article contributes to the existing empirical evidence on the impact of the macroeconomic environment on retail prices dynamics by using panel estimates to explain inflation in Slovenia after the introduction of the euro. We evaluated the impact of diesel fuel prices, food prices on the world market, GDP, the bank loans to the private sector, import prices, the earnings of major merchants and the production prices for retail prices of alimentary products.

The earnings of major merchants, import prices and GDP growth contributed significantly to the incline of the retail prices in the first period observed. While, the results of the empirical analysis state that the cause of increased incline of the retail prices of alimentary products after May 2007 can be attributed, mostly to the earnings of major merchants, volume of credit, world food prices, the price of diesel fuel and import prices. The impact of producers' prices was insignificant in both periods observed.

Keywords: *inflation, demand, prosperity, mark-up pricing*

JEL Classification: E31, C13, C2

1. Introduction

After the introduction of the euro, the EU-15 Member States were also confronted with rising prices (Lünnemann and Mathä, 2004). There are factors that spoke for some upward price pressure in connection with the introduction of euro currency (like menu costs). In view of menu costs and depending on the

* Mejra FESTIĆ, University of Maribor, EPF – Faculty of Economics and Business, and EIPF – Economic Institute, Ljubljana, Slovenia; e-mail: mejra.festic@uni-mb.si; mejra.festic@eipf.si

** Sebastijan REPINA, EIPF – Economic Institute, Ljubljana, Slovenia; e-mail: sebastijan.repina@eipf.si

*** France KRIŽANIČ, the Minister of Finance, Republic of Slovenia, Ljubljana, Slovenia Zupančičeva 3, previously employed at EIPF – Economic Institute till November 2008, Ljubljana

competitive situation in a particular market, there was a risk that in setting new psychological numbers, firms used the opportunity to raise prices. Those who took the opportunity of raising prices (and thereby avoiding additional menu costs) contributed to some impact on recorded inflation. Consumers are usually aware of what purchases ought to cost and base their decisions on how the asked price relates to this reference price. Meanwhile, an inflationary impulse might be generated in that consumers' faulty assessments lead to euro prices being seen as more attractive (Aucremanne, 2007).

Despite the occurrence of some identifiable inflationary shocks, which were orthogonal to the changeover, such as increases in crude oil prices, increases in food prices, increases in indirect taxes and administered prices and the lagged transmission of the depreciation of the euro in the period 1999 – 2000 (Aucremanne, 2007), the inflation pressure was of transitory importance for inflation in the euro area (Deutsche Bundesbank, 2004). Probably the most convincing argument for claiming that the inflationary impact was mild after the initial period of the euro common currency (in EU-15) could be found in the fact that aggregate inflation in the euro area continued to be relatively close to 2 percent after the first period of euro introduction.

Following stable price developments, Slovenia adopted the euro in January 2007. The government and the Bank of Slovenia took measures to ensure a smooth transition to the euro, notably the dual pricing that was introduced nine months prior to the euro changeover, and an information campaign aimed at informing the broad public about the possible risk in the process of the currency changeover. A higher rate of economic growth in the New EU Member States and the process of restructuring were the cause of both inflationary differentials and the Balassa-Samuelson effect (Chmielewski, 2003; Breuss, 2003), respectively. The latter ceased with the years in the New EU Member States. We must also add that admission into ERM II, with the final goal of adopting the euro as a common currency, required a gradual cutting of interest rates in Slovenia and the achievement of nominal convergence, which was followed by volume credit growth and growth in demand. Loans granted to the private sector (the population mostly) at lower interest rates and favourable credit terms contributed to price increases through the mechanism of inflation of demand (for the NMSs see, Horváth and Koprnická, 2008; Stavrev, 2009). In Slovenia, a weak jump in prices was already felt at the end of 2006 and after April 2007 a more noticeable rise followed. The inflation of demand was also influenced by monetary policy and credit volume growth. It should be noted that any one-off shift in the price level as the result of changeover acted as an inflationary impulse over just a limited period (for the EMU see, Honohan and Lane, 2003). The conversion to euro

notes and coins increased the risk of inflation because price-setters used the opportunity of rounding the “new” euro prices upwards.

In recent years, we have encountered a considerable rise in energy product and food prices; partly on account of the growth of the Chinese and Indian economy. In Canada and the United States, cultivable areas intended for growing corn were cut down in favour of bio-diesel fuel production and consequently the supply of corn on the world market diminished. On the world market, this was followed by a rise in food prices based on both *marked-up pricing* and on the principle of extra payments, respectively. The dynamics of energy product price movements depend on the demand for industrial products and their movements are procyclical (Kilian, 2007). The depreciation of the US dollar was followed by ECB measures to cut down interest rates, which acted as an incentive for consumption. The above-stated facts reveal that *extra payment* inflation (mark-up pricing) was followed by inflation of *demand* (for the euro area see, Angeloni and Ehrmann, 2007; for the CEE see, Stavrev, 2006).

This paper analyzes the factors behind rising prices in Slovenia after the introduction of the euro. In the next chapter, we shortly review the literature overview on inflation after the introduction of euro in the EU-15 and inflation differentials in the NMSs. In the third chapter, an outline of rising inflation in Slovenia is displayed, while the results of the econometric analysis on the law of price transfers in the food chain are published in the fourth chapter. The hypothesis is that price increases were mainly observed in low-priced and therefore frequently bought items after the introduction of common currency (Ehrmann, 2006; Del Giovane and Sabbatini, 2005). A conclusion and commentary on the empiric results are provided for in the last chapter.

2. The Literature Overview on Inflation in the EU New Member States and After the Introduction of Euro in the EU-15

According to Stavrev (2006) inflation in the Central and Eastern European countries have been largely driven by common factors related to the country-specific financial conditions and the structure of the consumption basket (over the short term);¹ pass-through from foreign prices, business cycle fluctuations,

¹ The New Member States (NMSs) are more energy intensive and have a significantly higher share of food prices in their consumer baskets than the old EU members (Stavrev, 2009); and therefore, commodity price shocks have a much more biased effect on core inflation in the NMS relative to the old EU countries (the past several years food and energy inflation contributed slightly less than 40 percent to headline inflation in the euro area, while it contributed close to 60 percent in the NMS). Altissimo et al. (2005) suggest that most of the dispersion in European inflation occurs in the services category of the EU's harmonized consumer price index.

demand-supply relation, administered price adjustments and increases of indirect taxes associated with EU accession (over the medium-term); and factors such as convergence of price levels across countries (over the longer term). Égert (2007) has provided an overview of inflation differentials in Europe by stating that the Balassa-Samuelson effect is unlikely to explain the observed inflation differentials; and he concludes that the effect of the exchange rate on inflation is weakening over time in Central and Eastern European countries.

According to Horváth and Koprnická (2008) real convergence factors are important for inflation developments in the NMSs as compared to the euro area. Honohan and Lane (2003) examine the relative influence of the country's external exposure, cyclical position, fiscal policy and price level convergence as vital determinants of inflation differentials in the euro area. According to Hofmann and Remsperger (2005) the inflation differentials are mainly influenced by differences in cyclical positions, fluctuations of the effective exchange rate and a level of inflation persistence (which depends on the past monetary policy regime and expectations).²

Mody and Ohnsorge (2007), using a sample of EU-25 countries, find evidence that a lower initial price level is associated with higher subsequent inflation, showing that country-specific inflation in the NMS is higher than that in the old EU members. Choueiri et al. (2008) in a panel of EU-25 countries find that cross-country differences in common inflation within the EU depend on gaps in the initial price level, changes in the nominal effective exchange rate, the quality of institutions, and the flexibility of the economies.

Rogoff (2003) argues that as a result of globalization the level of inflation has declined, partly through increased competition, reducing the real effects of monetary policy surprises. Thus, central banks have less incentives to inflate, which enhances their anti-inflationary credibility. Angeloni and Ehrmann (2007) point out that the main sources of inflation differentials – in the early years of the euro area – have been aggregate demand or potential output shocks,³ followed by domestic cost-push disturbances.

The introduction of the euro notes and coins in the first two months of 2002 was followed by a lively debate on the alleged inflationary effects of the new currency. In the euro area, survey-based measures signaled a much sharper rise in inflation than that measured by the official price indices (Angelini and Lippi, 2007). Several arguments explained a gap between measured and perceived inflation

² The countries with a history of low and stable inflation rates exhibit zero persistence (ibidem, 2005).

³ According to Fidrmuc and Korhonen (2006) the business cycle correlation of most EU NMSs is sufficiently high as not to hinder membership in the monetary union. Indeed, several current members of the euro area appear to have lower business cycle correlations than the EU NMSs.

that might have occurred in the aftermath of the changeover (Brachinger, 2006). An introduction of common currency might have had an impact on inflation and the discrepancy between inflation perceptions and the official statistics, emphasizing the role of psychological factors, and especially the role of *a priori* expectations (Traut-Mattausch et al., 2004). According to this theory, a gap between perceived and measured inflation could indeed arise at the time of the changeover just because of the timing of specific (temporarily) price shocks (Aucremanne, 2007). Cornille (2003) and Hoffmann et al. (2006) showed that the changeover led to a substantial and persistent increase in price diversity, which further complicated information-processing in the new regime. One of the findings of Dziuda and Mastrobuoni (2006) is that consumers who still convert prices to their old currency have higher inflation perceptions. Mastrobuoni (2004) emphasized the difficulties that consumers experience when adapting to the euro and they find that inflation perceptions are higher for consumers experiencing more such difficulties, in particular older and less educated people. Given the complexity of the conversion rates, the introduction of the euro was fundamentally different from most other historical examples of changes in the unit of account, as in many cases they merely implied that a number of zeros was dropped from inflated currencies.

Angeloni, Aucremanne and Ciccarelli (2006) found for a broad set of consumer goods and services in the euro area, where a very large clearly pronounced spike in the number of price increases was seen at the time of the changeover and showed an asymmetric pattern in the less competitive services sector. Hobbijn, Ravenna and Tambalotti (2006) analyzed the dynamics of restaurant prices and find evidence consistent with a price hike. Dziuda and Mastrobuoni (2006) found evidence of changeover-induced price increases for lower priced items and in sectors, where price transparency is low and market concentration high. Ehrmann (2006) found that price increases were mainly observed in low-priced and therefore frequently bought items or in outlets, where consumers tend to buy a single good or service. Del Giovane and Sabbatini (2005) argue that inflation perceptions were mainly affected by the prices of goods that are cheaper and more frequently purchased.

Slovakia joined the euro area on January 1, 2009 and relied before the introduction of euro on an inflation targeting strategy with wider variability in the exchange rate (tolerating fluctuations within a $\pm 15\%$ fluctuation band around the central exchange rate with the euro). Due to the fact that Slovakia is a small open economy, highly integrated in foreign trade and finance to the euro area, the introduction of euro contributed to favorable conditions for long term business decisions (Šuster, 2009).

Given this fact, the price level was expected to rise in tandem with convergence in the economic level before the introduction of common currency, and Slovakia probably stayed sharp to ease the excessive upward pressures on prices, by maintaining labor market flexibility and a competitive market environment (Gašparíková et al., 2004).

In Slovakia they introduced consumer protection system (dual display of prices, control of consumer protection associations, monitoring of selected prices, consumer awareness activities, ethical code declaration etc.). Thanks to detailed preparatory work, the technical aspects of the transition went well. According to a European Commission Eurobarometer survey conducted in January 2009, 90% of Slovaks felt well-informed about the euro. As a result, perceptions of change-over-related inflationary pressures were limited and it did not lead to significant price increases after the introduction of euro (EC, 2009).

3. Inflation after the Introduction of Euro in Slovenia

In the euro adoption period, Slovenia met the Maastricht criterion regarding inflation. Before the introduction of the euro, inflationary expectations diminished; competition had a favourable influence on prices when new suppliers entered the Slovenian market, with the same influence also felt among metal, oil, and oil derivative prices (Bole et al., 2006).

After the introduction of the euro, prices did not rise significantly because a silent agreement on slow-paced price growth was in force. By the end of 2007, the rising-price trend exceeded anticipation and hit 9.3% in December 2007, and then 9.9% in January 2008. Price increases slowed down by the end of the first quarter of 2008 and reached 6.3% in May 2008. According to the data of UMAR (2008), the prices of consumer goods increased by 5.56% between June 2007 and May 2008. This rise was at least partly of a seasonal nature and the five-month inflation rate (from January 2008 to May 2008, in comparison with the same period of the previous year) remained at 6.37%.

There are several (external and internal) reasons for an increase in prices at the end of 2007 and in the beginning of 2008. The most important external factors that influence inflation are definitely the conditions of the world markets (Bole et al., 2008). Some originate from the increase in food and energy product prices on the world market and from relative high GDP growth in Slovenia. (i) A major contribution to inflation is also an accelerated increase in food prices. An index of food prices published in *The Economist* displays significant growth starting in 2005 (Bole et al., 2006). On world commodity exchanges, the index of food prices growth in the year 2006 was 37% higher than in the year 2005,

reaching the level of 157 in 2007, and 257 in 2008. The prices of some essential agricultural raw materials on the world market went up because of the ever increasing needs of underdeveloped states for food and energy (UMAR, 2008). Poorer harvests, as a result of natural catastrophes such as drought, must not be ignored. Unfavourable price trends on the world markets manifest asymmetrically in Slovenia, where the prices of consumer goods have increased considerably more than on world markets. (ii) In the trade boom period – together with the favourable effects of liberalization in foreign trade – the necessary completion of the long-term motorway construction project and the start of an intensive development policy dictated by the use of EU cohesion and structural funds, economic growth is additionally increasing through the accelerator effect by stimulating new investments intended to increase final demand (Bole et al., 2008). (iii) The internal factors that contributed to inflation were weak competition in certain sectors and an increase in demand. The trade boom thus increased the income of the population and made possible *marked-up pricing*, based on the principle of extra payments to the suppliers of certain goods (alimentary products in particular). The response of all economic subjects that in any way affect inflation was of crucial importance for the inflation rate. Various authors have written that the global reason for price increase in Slovenia is underdeveloped competition and the market behaviour of all participants (UMAR, 2008). In addition to this, the effect of upwards price adjustment can be added. Some additional reasons for inflation can be found in an underdeveloped and innovatory oriented economy. In recent years, Slovenian enterprises started to fall behind in development as the share of labour costs in gross domestic product strongly exceeded the average of all EU Member States as well as of the United States and Japan (SURS, 2008). The lag is also noticeable in inefficient investments into research, development, and innovations.

The increase of primary consumer goods results in the decline of the average purchasing power and in the diminished welfare of the population. Slovenian inflation in 2008 exceeded eurozone inflation by 2.58 percentage points (May 2008), with the largest increases being noted in food, housing costs and tourist services (Table 1). If we take into consideration the cumulative relative inflation in Slovenia and the eurozone as a standard (2.58%) and use it as a standard for price growth in particular sectors, we can see that the pressure of rising prices in Slovenia was above average or bigger – since it corresponds to a cumulative difference in inflation between Slovenia and the eurozone in food prices (2.85%), prices of clothing and footwear (0.62%), housing costs (4.05%), housing equipment (0.85%), recreation and culture (1.17%), tourism (3.2%) and services (0.30%). Slovenia had lower price growth than the Eurozone only with transportation – which lagged behind by 3.7% (Table 1). If we standardize the

price growth of consumer goods by particular sectors with relative economic growth in Slovenia, and compare this to the eurozone, we can see Slovenia “leading” in all products; an above-average increase of Slovenian prices was noted in housing costs, tourism, food, recreation and culture, housing equipment, clothing and footwear (Table 1). The heavyweights in the consumer goods index have been food (15.9%). Rising food prices triggered a chain reaction among prices in other sectors and strengthened inflationary inertia.

Table 1

Year-on-year inflation in Slovenia, the Eurozone and Germany – May 2008 (in %) (increases in May 2008 in comparison with May 2007)			
	Slovenia	Eurozone	Germany
Food	11.79	6.36	6.43
Alcohol – tobacco	4.90	3.34	1.69
Clothing – footwear	3.96	0.76	–0.20
Housing	12.28	5.65	5.01
Housing equipment	5.43	2.00	1.19
Healthcare	2.14	1.58	1.57
Transport	2.22	5.92	4.69
Communications	0.52	–1.73	–2.16
Recreation and culture	3.84	0.09	0.90
Education	4.44	3.76	4.13
Tourism	9.10	3.32	1.26
Other	4.79	2.41	1.84
Goods	6.73	4.52	4.30
Services	5.34	2.46	1.55
TOTAL	6.25	3.67	3.08
Economic growth in Slovenia, the Eurozone and Germany (from the first quarter of 2007 to the first quarter of 2008)			
	Slovenia	Eurozone	Germany
Real increase of GDP	10.66	3.90	3.15
Relative inflation in Slovenia in comparison with Eurozone inflation (from May 2007 to May 2008)			
	Relative inflation	Groups of goods with regard to the joint relative inflation	With regard to relative economic growth
Food	5.43	2.85	14.52
Alcohol – tobacco	1.56	–1.02	10.65
Clothing – footwear	3.20	0.62	12.29
Housing	6.63	4.05	15.72
Housing equipment	3.43	0.85	12.52
Healthcare	0.56	–2.02	9.65
Transport	–3.70	–6.28	5.39
Communications	2.25	–0.33	11.34
Recreation and culture	3.75	1.17	12.84
Education	0.68	–1.90	9.77
Tourism	5.78	3.20	14.87
Other	2.38	–0.20	11.47
Goods	2.21	–0.37	11.30
Services	2.88	0.30	11.97
TOTAL	2.58	–	11.67

Source: EIPF (2008); Eurostat (2008); SURS (2007; 2008) and own calculations (2008).

4. Empirical Evidence: Determinants of Inflation in Slovenia after the Introduction of Euro

4.1. Data

Time series of the following products were used as factors for inflation: spad (= carbonated and uncarbonated) beverages; coffee, tea and cocoa; bread and other corn products; meat; milk, milk products and eggs; oils and fats; beer; fruit – fresh and processed; sweets and confectionary products; wine; vegetables – fresh and processed; spirits. The above listed provisions were used as retail prices and as production prices. In order to evaluate the impact of singular explanatory variables (the production prices of twelve singular alimentary products, import prices, food prices according to the Economist, diesel fuel prices, food-vendor earnings before interest and tax (EBIT), loans granted to the private sector and real GDP) on retail price changes of alimentary products, a panel regression was used (*cross section weights*).

We evaluated the impact of diesel fuel prices, food prices on the world market, GDP, the (real) value of bank loans to the private sector, import prices, the earnings and EBIT of major merchants⁴ and the production prices for retail prices of alimentary products. A *dummy* variable was included in order to explain the inclination change of the retail price average (after May 2007). Variables were de-seasoned by applying the X-12-ARIMA method, monthly data from January 2006 to May 2008 was taken from EIPF (2008) and SURS (2008) database.

4.2. Methodology

The methods used in different estimations that look for empirical evidence of a relationship between macro-economic variables are primarily: co-integration analysis, correlations, cross-sectional regressions and panel regressions (Beck and Katz, 1995). Panel data analysis endows regression analysis with both a spatial and temporal dimension. The spatial dimension pertains to a set of cross-sectional units of observation (commodities in our case). The temporal dimension pertains to periodic observations of a set of variables characterizing these cross-sectional units over a particular time span. Due to the fact that panel data often refers to a data set where the observations are dominated by large numbers of units relative to time periods (Baltagi, 2001), we decided to use the panel data in our analysis. Panel data sets generally include sequential blocks or cross-sections of data, within each of which resides a time series. According to the relatively

⁴ Earnings before interest and tax. Only the earnings of merchants and their production units in Slovenia were taken into account.

short time span and similarities between the alimentary products, we decided to use panel regression (*cross section weights*) (Hsiao, 2003), and subsequently obtain more information on the analyzed parameters (Wooldridge, 2002).

The method allows one to control for omitted variables that are persistent over time and, by including lags of regressors, one may alleviate measurement errors and endogeneity bias (see also Maddala and Wanhong, 1996; Baltagi, 2001). The advantage of the applied method is that it lowers co-linearity between explanatory variables (Davidson and MacKinnon, 1993) as well as dismisses heterogeneous effects (Western, 1998). We contributed to the existing empirical evidence on the impact of the macroeconomic environment on NPL ratio dynamics by analyzing the model with fixed effects (which controls for the impact of neglected and changing variables among observed units that are constant within a time period) (Arellano and Bond, 1991).

Moffatt and Salies (2003) demonstrated that logarithmic approximation is accurate only if the rates of change in variables are reasonably small. Since the dynamics of inflation are sometimes considerable – this approximation would produce a significant downward bias in the simulation – all the time series were transformed into percentage changes in the original time series. After deriving the transformed time series, the stationarity of all the selected time series was obtained at a 1% significance level and then proven by the ADF – Fischer Test (Esaka, 2003). Basic statistical properties of the time series proved to be adequate by Jarque-Bera test and probabilities.⁵ The lag length selection in the specified model was based on the Schwarz information criterion. According to Asghar and Abid (2007), the Schwarz criterion performs good information criteria in the presence of a structural break (see: Table 2 and 3, Picture 1).

Q-Statistics were employed to check for autocorrelation in the residuals. We accepted the hypothesis of no autocorrelation of residuals – with high probabilities and low Q-statistics (Iwaisako, 2004). Using fixed effects within the estimation, we assumed a slope common to each of the products (b_i), while intercepts varied across each of the product (c_i) (Beck and Katz, 2004). Fixed effects were included to account for possible unobserved heterogeneity across products. According to the results of the Cross-section F-test (Table 2), the system responded well within the fixed effects estimations in our model.⁶ All the calculations were performed by Eviews 6.0 and SPSS 15.0. In order to explain the common impact on retail prices, a panel as a whole was analyzed by means of regression and was

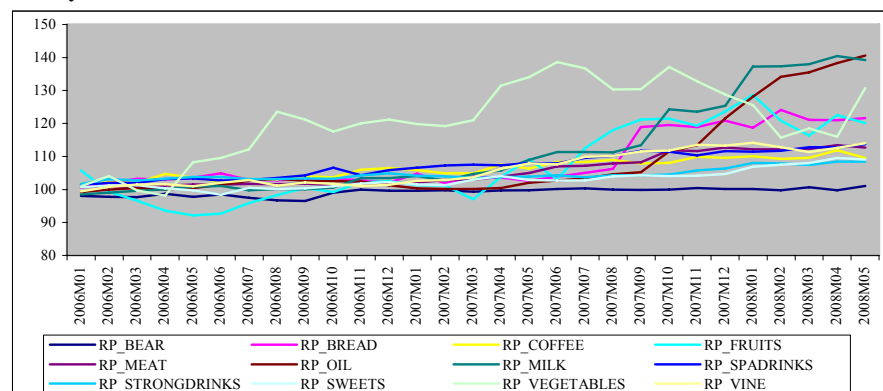
⁵ The results are available upon request.

⁶ If the p-values associated with the F-statistic is around 0.0000, there is strong evidence against the null hypothesis (H_0 = the fixed effects are all equal to each other). This suggests that there is unobserved heterogeneity. Our results (see Table 2) reject the H_0 hypothesis and we accepted the fixed effects in our panel regression model.

also divided into two (sub)periods due to a significant function inclination change after May 2007, when the significant growth of the price level after the introduction of euro in Slovenia started (see: Picture 1); and therefore dummies were included in the panel regression (see Table 2).⁷ From the economic point of view, we can state that after the introduction of the euro, prices did not rise significantly because a silent agreement on slow-paced price growth was in force till May 2007. From May to June 2007, the impulse growth trend strengthened from 5.2% to 6.5% (UMAR, 2008) and was intensive till May 2008 (see Chapter 3).

Picture 1

The Dynamics of Retail Prices of Food in Slovenia



RP – Retail Prices.

Source: EIPF (2008).

Using monthly data, we contributed to the existing empirical evidence on the impact of the macroeconomic environment on retail prices dynamics by using panel estimates to explain inflation in Slovenia after the introduction of the euro by estimating the following equation (where $D(x)$ denotes the difference in growth rate of the variable as measured in percentage points, b_x regression coefficient and CD threshold level).

$$D(\text{Retail prices})_t = c + b_1 \cdot D(\text{Production prices})_{t-n} + b_2 \cdot D(\text{Diesel fuel prices})_{t-n} + b_3 \cdot D(\text{Food prices} - \text{The Economist})_{t-n} + b_4 \cdot D(\text{EBIT total})_{t-n} + b_5 \cdot D(\text{GDP})_{t-n} + b_6 \cdot D(\text{Import prices})_{t-n} + b_7 \cdot D(\text{Loans to private sector})_{t-n} + b_8 \cdot D(\text{Production prices}(0))_{t-n} - CD \cdot \text{Production prices}(0)_{t-n} * \text{DUMMY} + b_9 \cdot D(\text{Diesel fuel prices}(-2))_{t-n} - CD \cdot \text{Diesel fuel prices}(-2)_{t-n} * \text{DUMMY} + b_{10} \cdot D(\text{Food prices} - \text{The Economist}(-3))_{t-n} - CD \cdot \text{Food prices} - \text{The Economist}(-3)_{t-n} * \text{DUMMY} + b_{11} \cdot D(\text{GDP}(-3))_{t-n} - CD \cdot \text{GDP}(-3)_{t-n} * \text{DUMMY} + b_{12} \cdot D(\text{Import prices}(-3))_{t-n} - CD \cdot \text{Import prices}(-3)_{t-n} * \text{DUMMY} + b_{13} \cdot D(\text{Loans to private sector}(-3))_{t-n} - CD \cdot \text{Loans to private sector}(-3)_{t-n} * \text{DUMMY} + b_{14} \cdot D(\text{EBIT total}(6))_{t-n} - CD \cdot \text{EBIT total}(6)_{t-n} * \text{DUMMY} + \text{AR}(1)$$

⁷ The Chow forecast test was also performed to check for the existence of the structural break in May 2007.

4.3. Results

The production price impact on retail prices of alimentary products⁸ and the impact of other explanatory variables can be observed in two periods. According to the model, May 2007 was calculated as a breaking point (see Picture 1). The results display a stronger production price impact on retail prices in the first period, where a 1 percentage point increase of production prices contributed to an average 0.03 percentage point increase of retail prices for all products under observation. The impact intensity of the stated relation fell to 0.00 percentage points during the second observation period (Table 3). What we find interesting is a significant EBIT impact on retail prices after May 2007. In the first period, the EBIT⁹ probably depended more on market share expansion, lowering costs, and other sales rationalization measures and less on retail price growth (0.35 percentage points). After May 2007, EBIT becomes an important determinant of retail price growth with a 2.82 coefficient, which – *ceteris paribus* – means a 2.82 percentage-point change (e.g., if working costs, wages & salaries, rents and other operative costs, taxes, etc. remain unchanged). A conclusion can be drawn from the previously stated facts, showing that production prices made no contribution to retail price growth, which therefore had to be generated somewhere else.

A one percentage point diesel fuel price increase contributed to a 0.41 percentage point retail price increase after May 2007, while in the first observation period the diesel-fuel price impact (and transportation costs respectively) on alimentary products retail prices (coefficient 0.04) was nearly imperceptible. The impact of world food prices likewise contributed to retail price growth in the second analyzed period (coefficient 0.42); before this no significant impact was noticed (0.07 percentage points). Loans granted to the private sector added 0.1 percentage points to retail price growth in the first period and a 0.45 percentage point in the second period. Credit volume growth contributed to more consumption in the economy, which as a consequence probably also contributed to the increase of trade margins.

The influence of GDP was stronger in the first observation period (coefficient 0.15), when economic growth was favourable; this corresponds to the Okun law. After May 2007, the dynamics of GDP contributed less to retail price growth (coefficient 0.07). As far as import prices are concerned, we can say that they contributed more to retail price growth, with a coefficient of 0.19 in the first

⁸ The consumption basket includes spud (= carbonated and uncarbonated) drinks; coffee, tea and cocoa; bread and other corn products; meat; milk, milk products and eggs; oils and fats; beer; fruit – fresh and processed; sweets and confectionary products; wine; vegetables – fresh and processed and spirits (strong drinks).

⁹ EBIT can be the cause or consequence of retail price growth.

period and 0.14 in the second (Tables 2 and 3). On this basis, retail prices were still growing, but at a lower rate.

Table 2

The Impact of Inflation from the Producer to the Merchant for a Total of All Alimentary Products

Dependent variable/retail prices for period January 2006 – May 2008 Cross-sections included: 12; Total pool (balanced) observations: 348; Iterate coefficients after one-step weighting matrix.					
Variable	Lag	Coefficient	Std. Error	t-Statistic	Prob.
C	–	0.360093	0.106913	3.368091	0.0008
Production prices	(0)	0.028016	0.006096	4.595430	0.0000
Diesel fuel prices	(–2)	0.044470	0.018722	2.375260	0.0181
Food prices – The Economist	(–3)	0.066877	0.014476	4.619949	0.0000
EBIT total	(–4)	0.346831	0.081996	4.229804	0.0000
GDP	(–3)	0.152267	0.051640	2.948626	0.0034
Import prices	(–3)	0.193518	0.084177	2.298933	0.0221
Loans to private sector	(–3)	0.099141	0.030469	3.253815	0.0013
Production prices *DUMMY	(0)	–0.027836	0.007168	–3.883326	0.0001
Diesel fuel prices *DUMMY	(–2)	0.361009	0.083272	4.335289	0.0000
Food prices – The Economist *DUMMY	(–3)	0.352226	0.095063	3.705174	0.0002
GDP *DUMMY	(–3)	–0.083851	0.012972	–6.463858	0.0000
Import prices *DUMMY	(–3)	–0.055283	0.007885	–7.010421	0.0000
Loans to private sector *DUMMY	(–3)	0.353379	0.145231	2.433212	0.0155
EBIT total *DUMMY	(–4)	2.471976	0.560953	4.406746	0.0000
AR(1)		–0.106876	0.052285	–2.044107	0.0417
Fixed Effects (Cross)					
Spad beverages				–0.089375	
Coffee, tea and cocoa				–0.148768	
Bread and other corn products				0.160108	
Meat				–0.074561	
Milk, milk products and eggs				0.322055	
Oils and fats				–0.045767	
Beer				–0.336794	
Fruit				0.153965	
Sweets				–0.302146	
Wine				–0.011067	
Vegetables				0.284664	
Spirits (=strong drinks)				–0.312313	
Effects Specification; Cross-section fixed (dummy variables)					
Weighted Statistics					
R-squared				0.464051	
Adjusted R-squared				0.422205	
S.E. of regression				1.006594	
F-statistic				11.08951	
Prob(F-statistic)				0.000000	
Mean dependent var				0.474327	
S.D. dependent var				1.372869	
Sum squared resid				337.4059	
Durbin-Watson stat				1.947097	
Redundant Fixed Effects Tests					
Cross-section F (11, 333)				41.907165 (0.0008)	

Source: Own calculations.

Table 3

Common Coefficients**The Impact of Inflation from the Producer to the Merchant for a Total of All Alimentary Products**

Variable	Lag	Coefficient	Coefficient after May 2007
C	–	0.3600	
Production prices	(0)	0.0280	0.0002
Diesel fuel prices	(–2)	0.0444	0.4055
Food prices – The Economist	(–3)	0.0668	0.4191
EBIT total	(–4)	0.3468	2.8188
GDP	(–3)	0.1522	0.0684
Import prices	(–3)	0.1935	0.1382
Loans to private sector	(–3)	0.0991	0.4525
AR(1)		–0.1069	

Source: Own calculations.

On the basis of regression in Table 2 and Table 3, we discovered that the cause for the inclination increase of the evaluated function after 2007 can be attributed to EBIT (and trade margins) respectively; to credit volume growth to the private sector; to food prices on the world market; to diesel fuel prices and to the import prices of products, while the production price impact on retail prices was equal to zero after May 2007. We can confirm the obtained results by other relevant studies: The catching-up process and nominal convergence – combined with the credit growth around the EU accession – have increased demand for leveraging amongst companies and boosted private consumption (Brzoza-Brzezina, 2005). Loans to the private sector have been growing at a rapid pace in Slovenia in the period from 2002 – 2008. Further, the dynamics of energy product price movements depend on the demand for industrial products and their movements are procyclical (Kilian, 2007). A considerable rise in food prices was partly on account of the growth of the Chinese and Indian economy and a smaller volume of corn produce in the world economy. Dziuda and Mastrobuoni (2006) found evidence of changeover-induced price increases due to lower competitiveness between suppliers of frequently bought products.

Conclusion

On the basis of empirical analysis (for the period from January 2006 – May 2008) we have established that the dynamics of food price trends in Slovenia was influenced by the EBIT of merchants, the import prices, the growth of GDP, the price of diesel fuel and world food prices. Based on econometric tests, the period of the whole *pool* under observation was divided into two parts with the breaking point in May 2007. The findings of the analysis state that the cause of the increased incline of the evaluated function after May 2007 can be attributed,

mostly to EBIT, volume of credit, world food prices, the price of diesel fuel and import prices. The impact of producers' prices was insignificant.

The results demonstrate that the impact of production prices on retail prices was stronger in the first period, when a production price increase of one percentage point contributed to an increase of retail prices by 0.03 percentage points (on average) for all products under observation; and the impact intensity of the mentioned relation diminished to 0.00 percentage points in the second period under survey. The increase of diesel fuel prices for 1 percentage point contributed 0.41 percentage points to retail price increases after May 2007, while in the first period under survey, no significant impact of diesel fuel prices was felt on retail prices (with a 0.04 quotient). The influence of world food prices also contributed to the growth of retail prices in the second analyzed period (with a 0.42 quotient); before this period no significant impact was noticed (0.07 percentage points). The growth of credit volume contributed to a larger consumption of the economy. After May 2007, the one percentage point growth of credit volume contributed to the retail price increase of 0.45 percentage points. After May 2007, the dynamics of GDP growth was slowing down the growth of retail prices (with a 0.07 quotient).

The hypothesis that price increases were observed in frequently bought items has been proved on the case of Slovenia. The cumulative (retail) price level growth was also conditioned by internal factors (a weak competition in certain sectors and an increase in domestic demand) and external factors (some originate from the increase in food and energy product prices on the world market and from relative high GDP growth in Slovenia due to export growth) in the observed time period.

References

- ALTISSIMO, F. – BENIGNO, P. – PALENZUELA, D. (2005): Long-run Determinants of Inflation Differentials in a Monetary Union. [CEPR Discussion Papers, No. 5149.] London: CEPR.
- ANGELINI, P. – LIPPI, F. (2007): Did Prices Really Soar after the Euro Cash Changeover? Evidence from ATM Withdrawals. Central Bank of Rome: Research Department, Bank of Italy – University of Sassari – CEPR.
- ANGELONI, I. – EHRMANN, M. (2007): Euro Area Inflation Differentials. *Topics in Macroeconomics*, 7, No. 1, article 24.
- ANGELONI, I. – AUCREMANNE, L. – CICCARELLI, M. (2006): Price Setting and Inflation Persistence: Did EMU Matter? *Economic Policy*, 46, April, pp. 353 – 387.
- ARELLANO, M. – BOND, S. R. (1991): Some Tests of Specification for Panel Sata: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies*, 58, No. 2, pp. 227 – 297.
- ASGHAR, Z. – ABID, I. (2007): Performance of Lag Length Selection Criteria in Three Different Situations. *Interstat*. Available: <interstat.statjournals.net/YEAR/2007/articles/0704001.pdf> (12. 10. 2009).

- AUCREMANNE, L. – COLLIN, M. – STRAGIER, T. (2007): Assessing the Gap between Observed and Perceived Inflation in the Euro Area: Is the Credibility of the HICP at Stake? [Working Paper Research Series, No. 112, April.] Brussels: National Bank of Belgium.
- BALTAGI, B. H. (2001): *Econometric Analysis of Panel Data*. Second Edition. London: John Wiley and Sons.
- BECK, N. – KATZ, J. N. (1995): What to Do (and not to do) with Time-series Cross-section Data. *American Political Science Review*, 89, No. 3, pp. 634 – 647.
- BECK, N. – KATZ, J. N. (2004): Random Coefficient Models for Time-series-cross-section Data. [Working Papers, No. 1205.] Pasadena: California Institute of Technology, Division of the Humanities and Social Sciences.
- BRACHINGER, H. W. (2006): Euro or Teuro?: The Euro-induced Perceived Inflation in Germany. [Department of Quantitative Economics Working Paper Series 5.] Switzerland: University of Fribourg.
- BREUSS, F. (2003): Balassa-Samuelson Effect in CEEC. Are there Obstacles for Joining the EMU? [Working Paper, No. 52.] Vienna: Research Institute for European Affairs.
- BRZOZA-BRZEZINA, M. (2005): Lending Booms in the New Member States, will Euro Adoption Matter? [Working Paper, No. 543, December.] Frankfurt: ECB. Available: <<http://www.ecb.int/pub/pdf/scpwps/ecbwp543.pdf>> (15. 5. 2006).
- BOLE, V. – KRIŽANIČ, F. – ŠTIBLAR, F. – MENCINGER, J. (2006): Nadaljevanje pretežno ugodnih gibanj. [Continuing of Majority Favourable Economic Movements.] *Gospod. Gibanja*, April, No. 380, pp. 14 – 29.
- BOLE, V. – KRIŽANIČ, F. – ŠTIBLAR, F. – MENCINGER, J. (2008): Umirjanje rasti in inflacije ter poglobljanje neravnotežij [The Lowering of Inflation Dynamics and Deepening of Imbalances.] *Gospod. Gibanja*, May, No. 403, pp. 6 – 24.
- CHMIELEWSKI, T. (2003): Is the Balassa-Samuelson Effect a Serious Obstacle for an Accession Country? In: ALPEN, D. and LUCHTMEIER, H. (eds): *The Euro in Eastern Europe: Options for the Monetary and Currency Regime*. Berlin: VWF – Verlag für Wissenschaft und Forschung.
- CHOUËIRI, N. – OHNSORGE, F. – Van ELKAN, R. (2008): Inflation Differentials in the EU: A Common (Factors) Approach with Implications for EU-8 Euro Adoption Prospects. [IMF Working Paper, WP/08/21.] Washington, DC: IMF.
- CORNILLE, D. (2003): L'adaptation des prix au passage à l'euro: une mise en perspective. *NBB Economic Review*, 4th Quarter (December), pp. 247 – 256.
- DAVIDSON, R. – MACKINNON, J. G. (1993): *Estimation and Inference in Econometrics*. Oxford: Oxford University Press.
- Del GIOVANE, P. – SABBATINI, R. (2005): The Introduction of the Euro and the Divergence between Officially Measured and Perceived Inflation: The Case of Italy. [Mimeo.] In: Del GIOVANE, P., LIPPI, F. and SABBATINI, R. (eds): *L'euro e l'inflazione. Percezioni, fatti e analisi*. Bologna: Il Mulino.
- Deutsche Bundesbank (2004): *The Euro and Prices Two Years On*. Monthly Report, 56, No. 1, pp. 15 – 28.
- DZIUDA, W. – MASTROBUONI, G. (2006): *The Euro Changeover and its Effects on Price Transparency and Inflation*. [Mimeo.] New Jersey: Princeton University.
- EC (2009): *The Annual Report*. [Annual Statement of the Euro Area. No. 1313/2, COM(2009) 527.] Available: <http://ec.europa.eu/economy_finance/publications/publication15951_en.pdf> (18. 10. 2009).
- ÉGERT, B. (2007): Real Convergence, Price Level Convergence and Inflation Differentials in Europe. [William Davidson Institute Working Paper, No. 895.] Michigan: William Davidson Institute.
- EHRMANN, M. (2006): Inattentive Consumers, Inflation Developments and Perceptions after the Euro Cash Changeover. [ECB WP Series, No. 588.] Frankfurt: ECB.
- EIPF (2008): *Internal Data Base*. Ljubljana: Economic Institute.
- ESAKA, T. (2003): Panel Unit Root Tests of Purchasing Power Parity between Japanese Cities, 1960 – 1998: Disaggregated Price Data. *Japan and the World Economy*, 15, No. 2, pp. 233 – 244.
- Eurostat (2008): *Data Base*. <<http://epp.eurostat.ec.europa.eu/portal>> (21. 07. 2008).

- FIDRMUC, J. – KORHONEN, I. (2006): Meta-analysis of the Business Cycle Correlation between the Euro Area and the CEECs. *Journal of Comparative Economics*, 34, No. 3, pp. 518 – 537.
- GAŠPARIKOVÁ, J. – BRZICA, D. – NEMCOVÁ, E. (2004): The Impact of Industrial and Regional Differentiation on SMEs in Slovak Republic. *Ekonomický časopis/Journal of Economics*, 52, No. 7, pp. 820 – 834.
- HOBIN, B. – RAVENNA, F. – TAMBALOTTI, A. (2006): Menu Costs at Work: Restaurant Prices and the Introduction of the Euro. *Quarterly Journal of Economics*, 121, No. 3, pp. 1103 – 1131.
- HOFMANN, B. – REMSPERGER, H. (2005): Inflation Differentials among the Euro Area Countries: Potential Causes and Consequences. *Journal of Asian Economics*, 16, No. 3, pp. 403 – 419.
- HOFFMANN, J. – LEIFER, H. A. – LORENZ, A. (2006): Index of Perceived Inflation or EU Consumer Surveys? An Assessment of Professor H. W. Brachinger's Approach. *Intereconomics – Review of European Economic Policy*, 8, No. 41, pp. 145 – 162.
- HONOHAN, P. – LANE, P. (2003): Divergent Inflation Rates in EMU. *Economic Policy*, 37, No. 929, pp. 358 – 394.
- HORVATH, R. – KOPRNICKA, K. (2008): Inflation Differentials in New EU Member States: Empirical Evidence. *Finance a úvěr – Czech Journal of Economics and Finance*, 58, No. 7 – 8, pp. 318 – 328.
- HSIAO, C. (2003): *Analysis of Panel Data*. Kindle Edition. Oxford: Oxford University Press.
- IWAISAKO, T. (2004): Stock Index Autocorrelation and Cross-autocorrelations of Size-sorted Portfolios in the Japanese Market. *Journal of Financial Economics*, 3, No. 448, pp. 281 – 318.
- KILIAN, L. (2007): The Economic Effects of Energy Price Shocks. [CEPR and University of Michigan.] <<http://www-personal.umich.edu/~lkilian/jel052407.pdf>> (7. 7. 2007).
- LÜNNEMANN, P. – MATHÄ, T. Y. (2004): How Persistent is Disaggregate Inflation? An Analysis Across EU-15 Countries and HICP Sub-indices. [Working Paper Series, November, No. 415.] Frankfurt: ECB.
- MADDALA, G. S. – WANHONG, H. (1996): The Pooling Problem. In: MÁTYÁS, L. and SEVESTRE, P. (eds): *The Econometrics of Panel Data*. Dordrecht: Kluwer Academic, pp. 307 – 322.
- MASTROBUONI, G. (2004): The Effects of the Euro-conversion on Prices and Price Perceptions. [CEPS Working Paper, No. 101.] New Jersey: Princeton. Available: <<http://www.princeton.edu/~ceps/workingpapers/101mastrobuoni>> (25. 7. 2009).
- MODY, A. – OHNSORGE, F. (2007): Can Domestic Policies Influence Inflation? [IMF Working Paper, WP/07/257.] Washington, DC: IMF.
- MOFFATT, F. – SALIES, E. (2003): A Note of the Modelling of Hyper-inflation. [City University Discussion Paper, No. 3.] London: City University. Available: <<http://econwpa.wustl.edu/eps/em/papers/0406/0406002.dpf>> (13. 8. 2007).
- ROGOFF, K. (2003): Globalization and Global Disinflation. *Federal Reserve Bank of Kansas City Economic Review*, 88, No. 4, pp. 45 – 78.
- STAVREV, E. (2006): Driving Forces of Inflation in New EU-8 Countries. *Finance a úvěr – Czech Journal of Economics and Finance*, 56, No. 5 – 6, pp. 246 – 257.
- STAVREV, E. (2009): Forces Driving Inflation in the New EU-10 Members. [IMF Working Paper, WP/51/09.] Washington, DC: IMF.
- SURS (2008): Data Base. <<http://www.stat.si/pxweb/Dialog/statfile2.asp>> (21. 07. 2008).
- ŠUSTER, M. (2009): Euro Introduction in Slovakia. Bratislava: NBS. Available: <<http://www.docstoc.com/docs/13285776/Euro-Introduction-in-Slovakia>> (18. 10. 2009).
- TRAUT-MATTAUSCH, E. – SCHULZ-HARDT, S. – GREITEMEYER, T. – FREY, D. (2004): Expectancy Confirmation in Spite of Disconfirming Evidence: The Case of Price Increases Due to the Introduction of the Euro. *European Journal of Social Psychology*, 34, No. 6, pp. 739 – 760.
- UMAR (2008): Bureau for Macroeconomic Analysis and Development. <<http://www.umar.gov.si/drugo/januarskaInflacija.doc>> (21. 07. 2008).
- WESTERN, B. (1998): Causal Heterogeneity in Comparative Research: A Bayesian Hierarchical Modelling Approach. *American Journal of Political Science*, 42, No. 4, pp. 1233 – 1259.
- WOOLDRIDGE, J. (2002): *Econometric Analysis of Cross Section and Panel Data*. Cambridge: The MIT Press.