# Evaluation of the Common Agricultural Policy's Impact upon Inflation Rate in Central, Eastern and Southern Europe Countries

#### **Ovidiu Stoica**

Department of Finance, Money and Public Administration, Faculty of Economics and Business Administration, "Alexandru Ioan Cuza" University of Iasi, Romania. Email: ostoica@uaic.ro

#### **Monica Damian**

Department of Finance, Money and Public Administration, Faculty of Economics and Business Administration, "Alexandru Ioan Cuza" University of Iasi, Romania. Email: <u>m0nicadamian@yahoo.com</u>

**ABSTRACT:** The goal of this paper is to estimate the inflationary effect of adoption of the Common Agricultural Policy in countries which joined the European Union in 2004, using two approaches. The first one supposes the comparison of consumer food prices before (May-December 2001-2003 and January – April 2002-2004) and after joining the European Union (May – December 2004 and January – April 2005), in all ten states. The second approach consist in the application of a multifactorial regression model for the period 2003-2010 in six countries: the Czech Republic, Hungary, Latvia, Lithuania, Slovakia and Slovenia. The results of the study shows that, contrary to the usual perception, the influence of the agricultural products prices on the food price and, implicitly, on the consumer prices have been relatively low in all the analysed countries, in some countries being counterbalanced by the appreciation of the national currency and the elimination of import custom duties.

**Keywords**: EU Accession; Inflation Rate; Common Agricultural Policy; Food Prices **JEL Classifications:** C35; E3; F36

#### 1. Introduction

On 1<sup>st</sup> of May 2004, ten states from Central, Eastern and Southern Europe joined the European Union: Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia.

The European Union (EU) accession has brought both benefits and costs for the new Member States, but there is a widespread consensus that the benefits of the accession will exceed the costs, especially in the long run (Tang, 2000).

Concerning the consumer prices, the effects of the EU accession differ from country to country, depending on the specific characteristics of each economy and on the norms of the European Union in the moment of the accession.

The years prior the European Union accession were marked by a significant disinflationary process in most of the evaluated countries, seeing as price stability was among the national priorities. The registered progress in the accession countries starting with 2001 were due to the favourable shocks in supplying (the decrease of oil prices) and the deceleration of foods prices in some countries, but also due to the policies used to fight against inflation. This signifies the importance of price stability as statutory objective of the central banks in each accession country. Even if the inflation was tempered, it continued to be a major preoccupation for the national monetary authorities, the level of inflation being an indicator in the evaluation of convergence with the euro area.

The statistical data (Table 1) shows that the negative effect of EU accession refers to the accentuated increase of the inflation rate in the first year (2004) (excepting Cyprus and Slovakia), the

highest inflation rates being registered in Latvia (from 2.9% to 6.2%), Poland (from 0.7% to 3.6%), the Czech Republic (from -0.1% to 2.6%), Lithuania (from -1.1% to 1.2%) and Hungary (from 4.7% to 6.8%). The alignment of some prices (consumer goods and services) and certain taxes to the level of the old EU countries, imposed in the context of accession, created objective inflationary pressures in the new member states.

Country/Year	2000	2001	2002	2003	2004	2005
Cyprus	4.9	2.0	2.8	4.0	1.9	2.0
Czech Republic	3.9	4,5	1,4	-0.1	2.6	1.6
Estonia	3.9	5.6	3.6	1.4	3.0	4.1
Hungary	10.0	9.1	5.2	4.7	6.8	3.5
Latvia	2.6	2.5	2.0	2.9	6.2	6.9
Lithuania	1.1	1.6	0.3	-1.1	1.2	2.7
Malta	3.0	2.5	2.6	1.9	2.7	2.5
Poland	10.1	5.3	1.9	0.7	3.6	2.2
Slovakia	12.2	7.2	3.5	8.4	7.5	2.8
Slovenia	8.9	8.6	7.5	5.7	3.7	2.5

 Table 1. The average inflation rate (HICP) in EU Member States (%, 2000-2005)

Source: Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes

We remark that in 2005 only 4 of the 10 states have registered inflation rate increases, which means that the effect of accession has been absorbed.

The most important factors which affected the consumer prices level after the accession to the European Union are: the harmonization of the structure and rates of indirect taxes; the adoption of the Common Agricultural Policy (CAP); the introduction of the Common Customs Policy. This paper focuses on the evaluation of the impact of adoption of the Common Agricultural Policy upon the overall inflation rate in states which acceded to the EU in 2004.

A large body of literature was dedicated to the analysis of the consequences of EU accession on prices, especially because of the expectations of price increases. Some empirical studies concentrated upon the overall prices, meanwhile other studies focused on the agrifood prices, including the implications of adopting the CAP.

In Greece, the food prices recorded an 8.5% increase, as an effect of the accession to the European Union in the eighties, causing a boost of the inflation rate by 3.5%. The impact of Greece's accession upon food prices has been estimated using the residuals method. For this purpose, a price model was estimated on the basis of annual data covering the pre-integration period and was then used to predict prices in the no-CAP situation. The deviations of actual from predicted values was considered impact of accession. These price increases affected the consumption of food goods, both on an overall level, as well as its structure. Consequently, the impact of the adoption of the CAP upon the food consumption has been negative, recording a 1% decrease (Georgakopoulos, 1990).

In order to quantify the impact of the accession to the European Union upon the inflation in Austria, Breuss (2000) has compared the inflation rates from Austria with the one from Germany (as an EU Member State) and Switzerland (as a non-EU Member State). According to this method, the EU accession has not had significant effects upon the prices, but the preparations for the euro adoption has led to a significant slowdown of the inflation. In the case of food, beverages and manufactured goods, a larger price diminishment was registered, comparing with the case of other goods and services, as a result of the integration into the single market. Comparing the price evolution from Austria and Germany, Pollan (1996) has established that the effect of the accession to the European Union upon the prices of food, services and manufactured goods has been -1/2 percentage points in the years 1995 and 1996 (Breuss, 2000).

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Fluch and Rumler (2005) used an inflation forecasting model that simulates inflation developments of the past decade (1995-2004) for two scenarios (Austria did or did not joined the EU), in order to estimate the effect of EU integration upon overall inflation. The results of these simulations revealed a dampening effect on inflation of EU integration, reducing the inflation rate by some 0.2 percentage point a year on average, over the past ten years.

Analysing the effects of the Common Agricultural Policy reform and enlargement on the EU-15, the New Member States (NMS), and world agricultural markets, Fabiosa *et. al.* (2005) emphasize that "accession leads to a moderate decrease in the EU-15 prices, whereas for the 10 New Member States, domestic prices of many commodities increase substantially".

Csaki and Jambor (2009) analysed the development of cereals, meat and milk prices in the NMS in a 2000-2007 period. After accession, the cereals' prices came closer to the EU-15 level, with the exception of Romania and Lithuania, the intervention system of the CAP contributing to the adjustment of domestic prices, since the intervention price was higher in most cases than the actual market prices would be. Also, the accession brought the adjustment of prices of meat and milk, leading to significant price increases in those particular cases.

In Poland, the rise in price of consumer goods and services was triggered by the psychological effect that caused a steep domestic demand growth. This effect was related to society's expectations concerning the abrupt price rise after 1<sup>st</sup> of May 2004. Also, another direct effect of accession was the change in the rates of indirect taxes and change in duties. The adoption of the Common Agricultural Policy has generated significant price increases of production inputs and of agricultural land. At the end of 2007, the agricultural land prices were more than two times higher than the average land price in private trade in the years 2000-2003, the authors highlighting that in all ten states which acceded to EU in 2004 was registered a gradual increase of agricultural land prices. In a longer period, the impact of accession on the level of prices was related to the inflow of the EU funds and, indirectly, to faster economic growth rate. Both factors have led to the growth in domestic demand, influencing the price level; this process is reflected in the inflation growth recorded in Poland since 2007 (Office of the Committee for European Integration Department of Analyses and Strategies, 2008).

Fuller *et.al.* (2002) forecasted the effect of European Union accession of the Czech Republic, Hungary and Poland upon agricultural markets, assuming different policy restrictions on grain and dairy production in the acceding countries. The results of such scenarios revealed the significant domestic prices increase, the decrease of final consumption of agricultural products and the production growth.

Piesarskas (2007) has established that the integration of Lithuania into EU had not a direct significant effect upon the inflationary process. During the 2004-2006 period, approximately 0.6 percentage points of the inflation rate has been related to the GDP increase. This rise was not a specific effect of integration, but just a natural result of the faster economic growth.

However, Zemeckis and Drozdz (2009) showed that in the Baltic States the inflation rate has been higher than the European average, as effect of the foods and agricultural products price convergence towards the higher levels in the European Union. Ehrlich (2004) demonstrates that the impact has been stronger in Latvia and Lithuania because of the higher weight of food in the consumer basket. Also, the rise of the price of goods and services in the Baltic States has been determined by the fiscal changes which entered into force starting with the accession to the European Union. This refers to the harmonization of the national legislation with the EU legislation in terms of the value added tax (VAT), excises and the common tax rates afferent to the customs duties.

In order to estimate the impact of the adoption of the Common Agricultural Policy upon the inflation rate in Slovakia in the first four months after the accession (May-August 2004), Doliak (2004) has compared the current price level of the food goods and the price level prior the accession to the EU and the CAP's adoption. The results obtained highlighted the inflationary effect of the adoption of the CAP upon the food goods and, subsequently, upon the overall inflation as being of about 0.3%, a bit higher than the expectations of the National Bank of Slovakia. Consequently, following the market competition, the prices of the goods which have increased under the influence of the CAP begun to diminish.

Our contribution to literature consist in the analysis of the inflationary impact of the adoption of the Common Agricultural Policy in the member states which have acceded in 2004, using two approaches.

The paper is organised as follows: Section 2 presents the used data and methodology; Section 3 discusses the empirical results, while Section 4 presents concluding remark.

#### 2. Data and Methodology

In order to analyse the impact of price increase of agricultural products upon the food prices, we have used two approaches. Following the methodology proposed by Doliak (2004), the first of them is the comparison of price increases in May – December 2004 and January – April 2005 with the prices increase in the same months of the years 2001 – 2003, respectively 2002-2004. The prices increase in these months from previous years is thought to be a normal increase and therefore, the difference between post-accession values and pre-accession values is considered to be an effect of EU accession. Using the weight of food in the consumer basket, we have estimated the contribution of these to overall inflation rate (Table 2 and 3). In his paper, Doliak (2004) has evaluated the impact of adopting the Common Agricultural Policy upon food prices in Slovakia in the four months after accession to the EU. *Our contribution to literature consist in the analysis of the accession impact in May-December 2004 and January-April 2005 in all ten member states which have acceded in 2004.* 

In the second approach, we have used a multifactorial regression model, as it follows (Seman and Doliak, 2003):

CPI food = a + b \* CPI process. + c \* CPI agri. + d \* CPI food (-1) +  $\epsilon$ , (1)

where:

CPI food - the annual inflation rate of food;

CPI process.- the annual inflation rate of processed food;

CPI agri. – the annual inflation rate of agricultural products;

CPI food (-1) – the annual inflation rate of food from the previous period;

 $\epsilon$  – error term;

a, b, c, d – regression parameters.

The authors have quantified the possible impact of changes in the agricultural products prices caused by the adoption of CAP upon the food prices in Slovakia.

Another contribution of this paper to the literature is the application of the econometric model above in the Czech Republic, Hungary, Latvia, Lithuania, Slovakia and Slovenia in the 2003-2010 period. Not taking into analysis the other four acceding countries from 2004 is justified by the unavailability of data for the annual inflation rate of agricultural products.

In establishing the regression model we have used monthly data for the 2003-2010 period regarding the annual inflation rate of food and processed food and quarterly data regarding the annual inflation rate of agricultural products. The source of data was the official statistics of the Central European Bank and Eurostat. The monthly data have been adjusted quarterly, by calculating the averages.

The econometric modelling involves the following four steps: a) Checking the stationarity of the series; b) Testing the classical hypothesis; c) Testing the significance of estimated coefficients; d) Testing the model estimated.

- a) Checking the stationarity of the data series was performed using Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests.
- b) The first hypothesis the average value of the error term is 0 is fulfilled. The probability of the t-statistic is higher than 0.05 (Prob= 1), which means that the null hypothesis is accepted (M ( $\epsilon$ i) =0). In order to check of the second hypothesis homoskedasticity we have used the White test. The results of test indicate us that the null hypothesis is accepted (V( $\epsilon$ <sub>i</sub>) =  $\sigma^2$ ). The third hypothesis autocorrelation of the errors has been checked using Breusch-Godfrey test, indicating a higher probability of 0.05, which means that the null hypothesis (cov( $\epsilon$ i,  $\epsilon$ j) = 0) is accepted. The fourth hypothesis normality of distribution errors ( $\epsilon$ i~N(0, $\sigma$ 2)) has been checked using Jarque-Bera test, which indicates a normal distribution of errors. The last hypothesis multicollinearity has been checked using the correlation coefficient. The values of correlation coefficients between the independent variables are less than 0.7, indicating the absence of multicollinearity.

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- c) t-statistic has been used to check the significance of the estimated regression coefficients.
- d) Model testing has been performed using F-statistic test.

### 3. Empirical Results

A study realised by the European Commission has indicated the convergence of average farm prices in Central and Eastern European Countries towards Community levels, sometimes exceeding them, from their marked inferiority in the beginning of the 1990s. This price development was conditioned by a trend towards alignment between the Community and world prices (Pouliquen, 2001).

Implementing the *Common Agricultural Policy* represents one of the factors that affected consumer prices after accession. The changes of agricultural prices influence the food prices, whose weight in the consumer basket was approximately 16-20% in the analysed countries, excepting Lithuania and Latvia (where these had approximately 26% in the consumer basket). Also, the increase of food prices affects the perceived price, influencing the purchase decision and, implicitly, the demand for goods and services.

We must notice that prices of the agricultural products in analysed countries were lower than the EU level. Prediction showed that in the Czech Republic, Hungary, Poland, Slovakia, Slovenia the levels of compared agricultural prices were between half and three quarters of the EU average (Backé *et.al.*, 2002). The authors highlight that "the adjustment of food prices as a consequence of EU accession and CAP integration holds the risk of second-round inflation effects and a weakening of external competitiveness, if it spills over to wage developments". Therefore, we consider that is important to quantify the impact of adoption of the CAP upon food inflation and, finally, upon overall inflation.

### The first approach

The differences (mathematical) of food inflation, in the year 2004, have been negative in Malta, the Czech Republic, Hungary, Slovakia and Slovenia and in the year 2005 the majority of states registered negative differences (mathematical). In these countries, with the exception of Malta, in the period May – December 2004, the food prices decreased, even if the prices of agricultural products increased. This evolution can be justified, on the one hand, by eliminating customs duties applied to import of goods from the EU (applying the Common Customs Policy) and, on the other hand, the national currency appreciation (in May-December 2004 the national currency has appreciated in the Czech Republic – 5.79%, Hungary – 1.84%, Slovakia – 3.02%). One can notice a decrease of prices in the countries with a fix exchange rate (except Poland) and significant increases in the countries with a fix exchange rate. The national currency appreciation is justified by the capital account liberalization in the presence of the interest rate differential.

(May-December 2004)						
Country	Increasing food prices May- December 2001- 2003 (%)	Increasing food prices May- December 2004 (%)	Difference (%)	The weight of food in consumer basket (%)	Contribution to inflation rate in 2004 (%)	
Cyprus	5.02	6.23	1.21	17.18	0.208	
Czech Rep.	-0.20	-0.22	-0.02	17.22	-0.003	
Estonia	-0.74	4.40	5.14	20.62	1.060	
Hungary	0.03	-1.03	-1.06	18.23	-0.194	
Latvia	1.13	4.02	2.89	26.41	0.762	
Lithuania	-0.90	4.24	5.14	26.92	1.384	
Malta	2.27	0.48	-1.79	15.69	-0.281	
Poland	-1.85	3.79	5.64	18.87	1.064	
Slovakia	-0.11	-0.90	-0.79	18.98	-0.150	
Slovenia	1.11	-2.99	-4.10	16.79	-0.689	

Table 2. The impact of food prices variation upon inflation rate in EU Member States
(Mav-December 2004)

Source: Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes, authors' calculations

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A significant negative impact upon the inflation rate in 2004 has registered in Estonia, Lithuania, Poland (over 1%), in 2005 the effect being less than 0.5% in all states. In contrast, a positive impact upon inflation rate was registered in Slovenia (-0.689%). The negative difference (mathematical) of 4.10 is explained by increasing the share of imports of food from the EU, from 70.9% (2001-2003) to 79.4% (2004). Although the Polish zloty has appreciated against the euro (13.12% in May-December 2004) and the share of imports of food from the EU was 72.8%, Poland has registered the highest difference (mathematical) (Table 2). This is explained on the basis of the rising demand for Polish meat and milk products in the European Union and of the lower supply of many agricultural products (National Bank of Poland, 2005, p.35).

(January - April 2003)							
Country	Increasing food prices January- April 2002-2004 (%)	Increasing food prices January- April 2005 (%)	Difference (%)	The weight of food in consumer basket (%)	Contribution to inflation rate in 2005 (%)		
Cyprus	0.59	-3.56	-4.15	16.80	-0.697		
Czech Rep.	0.66	0	-0.66	17.17	-0.113		
Estonia	2.49	0.70	-1.79	19.83	-0.354		
Hungary	4.18	2.12	-2.06	18.00	-0.371		
Latvia	3.57	4.97	1.40	25.72	0.360		
Lithuania	-0.28	1.81	2.09	25.48	0.532		
Malta	-0.74	0.54	1.28	15.15	0.194		
Poland	2.69	0.20	-2.49	19.25	-0.480		
Slovakia	3.32	1.40	-1.92	17.15	-0.330		
Slovenia	3.80	1.05	-2.75	16.62	-0.458		

Table 3. The impact of food prices variation upon inflation rate in EU Member States (January - April 2005)

Source: Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes, authors' calculations

In 2005, Cyprus has registered a significant (mathematical) negative difference (-4.15%) due to eliminating of customs duties applied to imports from the EU. If the share of imports of food from the EU was 59.85% in the 2002-2003 period, the imports of food had significantly increased in 2005 (78%).

Although the prices of agricultural products increased after the EU accession, in some states the (mathematical) contribution of the food prices upon inflation rate was negative, according to the figures in the above tables.

## The second approach

Because Prob (F-statistic) is less than 0.10, the regression model can be used to analyse the dependence between variables.

The estimated regression equations between food inflation rate and its factors in the six selected EU member states (2003-2010) are presented in Table 4.

The results show us that the *impact of the agricultural products prices upon the food prices is low;* an annual increase of agricultural products inflation rate by 1 percentage point leads to an annual increase of food inflation rate between 0.05% and 0.16%. Also, we notice the significant influence of the inflation of processed food upon inflation of food. Based on the weight of food in the consumer basket (for 2004), we have calculated *the contribution of agricultural products inflation to overall annual inflation as being between 0.01% and 0.03%*. We mention that the estimations represent the possible maximum impact, because prices increase of agricultural products is the result of the influence of other factors, too.

Therefore, the *impact of adopting CAP* upon food prices and, implicitly, upon *consumer prices was insignificant*, this one being counterbalanced in some countries by the national currency appreciation and by eliminating customs duties applied to imports from the EU.

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Commutant,	Regression parameters						
Country	Intercept	CPI process.	CPI agri.	CPI food (-1)			
	0.517129	0.532135	0.086447	0.076807			
Czech Republic	(0.180752)	(0.080026)	(0.018158)	(0.075240)			
	[2.860982]	[6.649538]	[4.760822]	[1.020820]			
	0.158661	0.649448	0.081766	0.001647			
Hungary	(0.341964)	(0.206829)	(0.029103)	(0.210483)			
	[0.463971]	[3.140018]	[2.809576]	[-0.007825]			
Latvia	-0.814968	0.535522	0.112671	- 0.191737			
	(0.369994)	(0.099578)	(0.036155)	(0.138497)			
	[-2.202650]	[5.377895]	[3.116291]	[-1.384418]			
Lithuania	-0.120276	0.573595	0.057052	0.115791			
	(0.277667)	(0.142342)	(0.032456)	(0.124679)			
	[-0.433167]	[4.029687]	[1.757813]	[0.928714]			
Slovakia	0.781438	0.367365	0.108441	0.267278			
	(0.218462)	(0.063826)	(0.015237)	(0.074878)			
	[3.577005]	[5.755731]	[7.116751]	[3.569519]			
Slovenia	-0.043986	0.485569	0.168444	- 0.238824			
	(0.262557)	(0.172638)	(0.070653)	(0.187032)			
	[-0.167529]	[2.812637]	[2.384110]	[-1.276913]			

Table 4. The estimated regression	equations between	food inflation	rate and its	factors in	selected	
EU Member States						

Note: () - Standard errors, [] - t-statistics

#### 4. Conclusions

Using two approaches, we have estimated the impact of *the adoption of the Common Agricultural Policy upon inflation rate in countries which acceded to EU in 2004.* Comparing the price increase in May – December 2004 and January – April 2005 with the prices increase in those months in the years 2001 – 2003, respectively 2002-2004, we have remarked a (mathematical) negative difference in some countries due to the appreciation of the domestic currency (as a result of capital account liberalization) and the elimination of customs duties applied to imports from the European Union (the result of the Common Customs Policy), despite the increase in agricultural products prices.

Contrary to the general perception, the econometric results indicate a very small annual increase of food inflation rate, between 0.05% and 0.16%, and an annual increase overall inflation rate of 0.01-0.03%, in the case of annual increase of agricultural products prices by 1%.

Corroborating the results of the two approaches, we can conclude that the inflationary impact of CAP implementation was relatively small, in some countries this being offset by the cheaper food imported from other EU countries.

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