THE DISINFLATION PROCESS IN ROMANIA WITHIN THE CONTEXT OF THE EUROPEAN INTEGRATION

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Abstract:
The accomplishment of a high rank of stability of prices represents one of the conditions of the euro currency, therefore inflation represents one major problem for the Romanian monetary authorities.Under these conditions to know the factors that lead to inflationary pressure is necessary in taking monetary policy decisions.This paper analyses the inflation process in Romania after 1990.The purpose is to identify the most important causes which have determined the inflation development in our country. Given the evolution of the inflation rate, we study the inflation phenomenon over the period 1990-1999 (the inflation process) and 2000-2009(the desinflation process). Although, in Romania there has been a powerful disinflationary phenomenon, the consumer price has risen very much in the first years of disinflation process. The increase of inflation in the first decade is determinated by the price deregulation, the wage increase which overcome the increase in labour productivity and the Romanian leu currency devaluation compared to US dollar.In order to achieve my objectives for this paper, I have used monthly data from 2000-2009, using the unifactorial model of regression.The results show that inflation in the period 2000-2009 is determined by wage increase, M2 money supply variation, the exchange rate variation and the international oil price.

Keywords: inflation, European integration, causes of inflation, regression, prices

JEL Classification: C25, E31

INTRODUCTION

Most of the countries involved in a transition period from Central and East Europe have dealt with a strong inflationary process, having in the first years of transition corective inflation and followed by the persistent imbalance between demand and supply which transformed it into structural inflation.

To involve in the process of integration means to fulfil the objectives and priorites mentioned in the National Adhesion Programme of Romania, meaning: reducing a great amont of inflation, assuring a sustenable foreign position, improving the banking system and controlling the budget deficit.The access of Romania to Economic and Monetary European Union represents an important step of European integration which means abandoning the national currency and adopting the euro as a legal tender.Most of the European Union accession countries have had major progress towards macroeconomic stability, especially there has been a substantial decreasing of inflation rate.This thing implies the importance of price stability as a main objective of central banks from the accession countries.Inflation is extremely important according to the EU policy agenda, as can be seen from the main conclusions reached by the Helsinki seminar held in November 1999: "Accession countries need to continue to implement monetary policies geared towards achieving and maintaining price stability, and to support this process with prudent fiscal policies and adequate structural reforms." [10].

The integration of Romania to European Union has contributed to reducing the inflation rate through measures needed for the criteria of nominal convergence mentioned in the Maastricht Treaty, in order to adopt the euro currency.

LITERATURE REVIEW

The specialized literature reveals a large field of empirical studies regarding the causes of inflationary process.Therefore, Golinelli and Orsi (2001) analyse the inflationary process in three EU accenssion countries (the Czech Republic, Hungary and Poland), identifying the main causes of inflation, which are: the exchange rate, which can be a helpful mechanism of adjusting prices, the progressive market deregulation and the pressure of demand.

IMF (1996) shows that the output gap does not play an important role in explaining inflation in developing countries.But the changing of money supply and nominal exchange rate can better explain inflation.On a short term, inflation is seen as a result of deficit financing through money creation or through time inconsistent monetary policy.

Lougani and Swagel (2001) have analysed the experience of 53 developing countries between 1964 and 1998.The study reveals that either the money supply growth or exchange rate movements explain two thirds of the inflation variation in the short and long term. Inflation expectations play an important role in the inflation process in developing countries: past realizations of inflation explain between 10 and 20 percent of inflation movements.

Using the ordinary least squares method, Armest and Rad analyse the causes of inflation from Iran during 1961-2006.The regression parameters show that liquidity (M2) and the import goods index have a positive influence upon the prices level, while the actual gross domestic product (GDP) has a negative effect upon inflation rate.

The rising in credit to government as a result of the fiscal deficit can lead to an increase in the price of non-tradables. This, in turn, will produce an appreciation in the real exchange rate, thereby reducing the country's export competitiveness.Reducing the fiscal deficit is necesary not only to the competiveness of the export country [6].The authors show that inflation in Albania is in direct relationship with money supply and the exchange rate and in opposite relationship with the real income.The impact of exchange rate on inflation can be seen in a month’s time, while the effect of the real income and of money supply on inflation can be seen in two-four month’s time.

Another major factor of inflation is the exchange rate.A raising of import prices towards devaluation would affect the inflation expectations, which, on their turns tend to depreciate the exchange rate as the dealers buy foreign currency to maintain purchasing power [7].

The enlargement of European Union from 15 to 27 states lead to decreasing the expected inflation reference value (according to nominal convergence criterion in the Maastricht Treaty) with 0,15-0,2%, but with a great deal of a major diminishing [15].

In Romania, the main causes of inflation during June 1997-August 2001 were the monetary factors, the leu currency devaluation regarding US dollar and the inertia of expectations.The monetary factors have a bigger influence upon consumer prices than exchange rate.The nominal wages are not an important factor that explain the variation of prices [2].

Hammermann (2007) has investigated the nonmonetary determinants of inflation in Romania explaining the differences of inflation in eight member states which joined the European Union in 2004.The results of the study show that employment together with indicators reflecting the prolonged structural change explain most of the inflation gap.

THE RESEARCH METHODOLOGY

In order to reach my objectives from this paper I have used the method of correlation and regression to determine the existence and intensity of relationship between inflation and its factors.In providing the regression model I have used monthly data which were taken from the

statistical evidence of the National Institute of Statistic, the Romanian National Bank and Central European Bank from 2000-2009 concerning inflation rate as against December 1999, the average net wage, the money supply M2, the leu/euro exchange rate, the leu/USD exchange rate and the international oil price.The assement of regression parameters was done by using the ordinary least squares method.

INFLATION BETWEEN 1990 AND 1999

The movement from centralized state economy to market economy has happened in the same time with the inflationary phenomen of 1990-1999.The strong manifestation of inflation was determined by the artificial stopping of inflation before 1989 [20].

The inflation from this period was very high and volatile, being a factor of instability for the Romanian economy.Another feature for the transition process was the price deregulation.

Inflation became a problem in November 1990 when the government resolution 1109/1990 became valid regarding price deregulation and social protection measures, according with "State enterprises and trading companies have prices and tariffs according with supply and demand, in all cases when on the Romanian market there are at least three economic units which produce, perform and sell the same good, work or service, through negotiation with the users".In only two months from the price deregulation, the inflation rate has increased with 37,7%.The price deregulation has contributed to more economic political and social imbalance and contractions which the Romanian society has dealt with at that moment.During 1991-1993 the inflation rate has risen due to numerous resolutions regarding the steps of prices deregulation, the inflationary peak taking place in 1993, when the inflation rate went up to 295,5%.That happened because value add tax (VAT) was introduced in April, the trading margin was deregulated and the price deregulation continued to happen.In 1992 the economy subsidies decreased or even dissapeard and the prices of many products or services were made according with supply and demand, so as by the end of the year the goods's prices have risen by 13,2 as against October 1990.

Although the price deregulation and the measures to eliminate subsidies continued during 1994, the inflation rate has significantly reduced more than half compared with 1993 (consumer price index in December 1994 as against December 1993 was 161,7).Dropping inflation rate continued

during 1995 and 1996, 1995 being the year with the lowest inflation from the analysed period (27,8%).The last step of price deregulation and elimination of all subsidies determined an inflation reburst, the average monthly inflation being that year of 8%.

The inflation calmed down in the following two years, but had high levels (40,6% in 1998 and 54,8% in 1999) due to the economic downfall, prices and tariffs evolutions, increasing VAT and exchange rate depreciation which have created inflationary pressure.

The burst of inflation in Romania has based on wage increase which overcome the increase in labour productivity.The highest wage increase took place at the end of 1993 when the average net wages tripled by the same time compared to last year and in the analysed period rising by 168 times.

Another factor that speeded inflation after 1990 was the Romanian leu currency devaluation compared to US dollar, the rising average of the American currency being aproximatively 69%, the highest devaluation being in 1991 and 1992 when the average exchange rate leu/dollar rose yearly with 255% and 303%.

Inflation during 1990-1999 has not been generated by wars or natural disasters, but happened during peace, when the economic system changed from one into another, when the economy suffered a process of devaluation and deterioration, with the highest losses from national income in the twentieth century [3].

The price deregulation process had a great impact on the Romanian inflation, having high values at those periods.Demekas and Khan (1991) have shown that most of the prices have been deregulated in three steps in November 1990, April 1991 and June 1991, so as by the middle of 1991 almost 80% from the consumer prices are determined by market.

CAUSES OF INFLATION BETWEEN 2000-2009

Although the consumer prices in Romania have risen in the analysed period, there has been a powerful disinflationary phenomenon, the annual rate of inflation reducing from 40,7% in 2000 up to 4,74% in 2009.The trend of inflation rate was a decreasing one, except for 2007, when it changed its evolution, as it can be seen in figure 1.

The causes of inflation are numerous, both internal and external.From the many factors that have an impact upon inflation I have chosen the ones with a great importance.Knowing the causes of an inflationary process presents a great importance in leading monetary policy and assuring a low level of it.

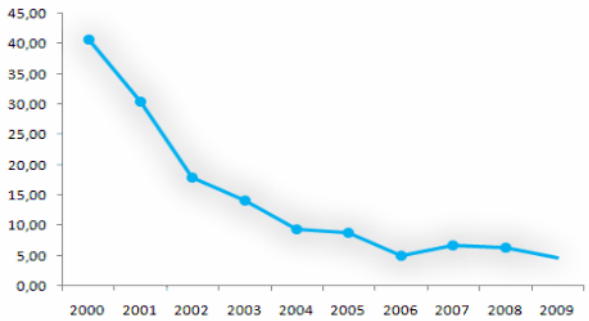

Figure 1.The evolution of inflation rate in Romania during 2000-2009

I have studied the impact of these factors upon inflation rate using unifactorial regression models.

The unifactorial regression model regarding inflation rate and average net monthly wage

The increase of wages in the analysed period by 8,5 times have had pressure on the internal demand, being therefore an inflationary pressure factor.On the other hand, the gaps between the rising in industry wages and the rising of labour productivity has lead to rising unit labour costs wich would affect the prices, known in the field as the Balassa-Samuelson effect.Dumitru (2008) has studied the Balassa-Samuelson effect during 1998-2006 and reveals the impact of this upon the inflation rate in Romania which is between 0,69 in 2005 and 4,76% in 2000, being one of the causes of differences of inflation in contrast with the European Union level. We will have this regression function in order to determine the influence of wage upon inflation :

$\Pi = a + b*NW$, where (1)

Π – the inflation rate as against December 1999;

NW – the average net wage;

a, b - regression parameters.

The value of regression parameters are shown in the following table.

Table 1.The equation regression statistics regarding inflation rate and average net monthly wage

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,95132201
R Square	0,90501356
Adjusted R Square	0,90420859
Standard Error	22,9372224
Observations	120

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	591503,2703	591503,2703	1124,2826	3,70175E-62
Residual	118	62081,70818	526,116171		
Total	119	653584,9785			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	25,0567886	4,457949281	5,620698439	1,293E-07	16,22883542	33,88474171
NW (RON)	0,18075365	0,005390752	33,53032398	3,702E-62	0,17007849	0,191428801

The correlation coefficient (Multiple R) signifies the fact that between the two indicators there is a strong relationship and the determination coefficient (R Square) shows that 90,5% from the consumer prices is explained by the increase of wages.Because the Significance F is less than 0,05, the regression model can be used to analyse the dependence between variables.The "b" parameter , also called regression coefficient is 0,1807, which means that by increasing the average net wage with 1 leu we will determine the rising of prices with 0,1807.The coefficient is important, confirmed by the value of *t stat* which is 5,6206 and the significance scale (P value = 3,702E-62).The trust scale (0,17007849≤NW≤0,1914288) shows that if the average wage would rise with 1 leu, the increase of consumer prices as against December 1999 will be situated between 0,17 and 0,19%.Intercept is the available feature and shows that if the wage would be 0, the inflation rate would be 25,05%.Replacing the parameters in the regression function (1) we obtain:

$\Pi = 25,05 + 0,18*NW$

The unifactorial regression model regarding the inflation rate and money supply M2

In monetarists' opinion, the money supply is the only cause of inflation, showing that "inflation is always and everywhere a monetary phenomenon" [apud 4].M.Friedman thinks that inflation is caused by the abundance of money in the economy, omitting the other causes of this complex phenomenon.During 2000-2009, M2 raised by 14,5 times, having a strong impact upon inflation (Multiple R = 0,922727).The determination coefficient shows that 85,14% is represented by the influence of money supply M2 upon rising the prices.

Table 2.The equation regression statistics regarding inflation rate and supply money M2

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,922726786
R Square	0,851424722
Adjusted R Square	0,850165609
Standard Error	28,68687911
Observations	120

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	556478,4086	556478,41	676,21019	1,10719E-50
Residual	118	97106,56992	822,93703		
Total	119	653584,9785			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	60,58911239	4,539718121	13,346448	2,494E-25	51,59923468	69,57899009
M2	0,001221719	4,69819E-05	26,004042	1,107E-50	0,001128682	0,001314755

The regression equation is:

$\Pi = a + b*M2$, where (2)

Π – the inflation rate as against December 1999

M2 – money supply M2

a, b – regression parameters

Significance $F \leq 0,05$ which signifies the validity of regression model.If M2 was 0, the inflation rate as against December 1999 would be 60,58%.The rising of money supply M2 with 1000000 lei leads to the rising of consumer prices with 0,0012%.The significance of regression coefficient is given by a less value of the significance level (P-value = 1,11E-50).The trust interval 0,001128682-0,0013148 shows us that inflation rate is between 0,0011 and 0,00139%, when M2 would increase with 1000000 lei.Replacing the values obtained previously (2), we have:

$\Pi = 60,5891 + 0,0012*M2$

Mandel and Tomšik (2008) have analysed inflation in Czech Republic between 1996 and 2007 showing that excess of money supply represents a supplementary variable of inflationary pressures, case in which a central bank applies the strategy of targeting inflation.

In Romania's case, during 2000 and 2009, the money supply has overcome the rhythm of rising of GDP, the difference between the rising rates of the two indicators reaching the maximum value in 2005 (16,97%).In 2003, the GDP has overcome the rising rhythm of money supply, whereas the inflation rate has dropped in those years.

The unifactorial regression model regarding the inflation rate and the leu/euro exchange rate

One of the external factors that affects the level of inflation rate is the exchange rate.This influences the prices of imported goods with an effect on overall inflation.The downfall of leu currency towards euro and dollars has lead to rising prices of goods and services, on conditions when the exchange rate is a point in establishing prices and tariffs of administered prices, but also in

free forming of market prices.The impact of exchange rate over rising prices is powerful when the imports from European Union have an important place in the international trade of Romania.The share of imports from European Union in the total imports is between 63% in 2005 and 73,3% in 2009.In order to analyse the way in which the rising of consumer prices happens as a result of modifying the exchange rate, we will use the next regression function:

$\Pi = a + b*ER\ euro$, where (3)

Π – the inflation rate as against December 1999

ER euro – exchange rate leu/euro

a, b – regression parameters

From Table 3 it can be seen that there is a strong relationship between the inflation rate and the exchange rate leu/euro (Multiple R = 0,820135) and the variation of prices is explained 67,26% with raising exchange rate.

Table 3.The equation regression statistics regarding inflation rate and exchange rate leu/euro

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0,820134547
R Square	0,672620675
Adjusted R Square	0,669846274
Standard Error	42,58294089
Observations	120

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	439614,7696	439614,77	242,43816	2,17507E-30
Residual	118	213970,2089	1813,3069		
Total	119	653584,9785			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-158,9032746	20,65891232	-7,6917542	4,823E-12	-199,8135449	-117,9930044
Exchange rate leu/EURO	93,08830558	5,97853312	15,570426	2,175E-30	81,24918249	104,9274287

The validity of regression model is confirmed by the F test value and the significance scale (Significance F = 2,17507E-30 < 0,05).The regression coefficient shows that if the exchange rate leu/euro increases with 1 leu, the prices will raise with 93,08%.The trust interval of the coefficient signifies the fact that if the exchange rate raises with 1 leu, the inflation rate as against December 1999 is situated between 81,24 and 104,92%.Replacing the values of parameters, the regression function (3), becomes:

$\Pi = -158,90 + 93,08*ER\ euro$

The evaluation of leu/USD exchange rate impact suggests that between the two indicators there is no relationship, given the fact the correlation coefficient is 0,071916 as it can be seen in the following table.

Table 4. The regression statistics regarding inflation rate and exchange rate leu/USD

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,0791599
R Square	0,0062663
Adjusted R Square	-0,0021552
Standard Error	74,189943
Observations	120

The unifactorial regression model regarding the inflation rate and the oil price

The rising prices of oil on international market have pressure upon consumer prices in Romania.The size of direct effect of oil prices raise depends on the oil cost in the national income, by the dependence scale of imported oil and the capacity of final users to reduce its consumption[13].The evolution of oil price is affected in a great deal by seasonality, reaching its highest peak of 85,93 euro/barrel in June 2008, followed by a dramatic downfall in the second semester of the year.The influence of oil price over the increase in consumer prices will be established with the function:

$\Pi = a + b*OP$, where (4)

Π – the inflation rate as against December 1999

OP – oil price on the international market

a, b – regression parameter

Table 5.The equation regression statistics regarding inflation rate and oil price

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0,6922575
R Square	0,479220446
Adjusted R Square	0,47480706
Standard Error	53,7077539
Observations	120

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	313211,2847	313211,28	108,5834	2,01161E-18
Residual	118	340373,6938	2884,5228		
Total	119	653584,9785			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	18,7214267	14,14852699	1,3232068	0,1883249	-9,296508333	46,73936173
Oil price	3,443219982	0,330432731	10,420336	2,012E-18	2,788873222	4,097566741

The correlation coefficient (Multiple R = 0,692257) shows that between international oil price and consumer prices in Romania there is a relationship of medium intensity.47,92% from the variation of prices is due to the rising oil quotation.The value of F test and of significance scale shows the validity of the regression model, which justifies the study of dependence between the two variables.The available intercept is 18,7214267, which means the inflation rate as against December 1999, when the price of barrel would be 0 euro.Rising the oil price with 1 euro/barrel determines an increase of consumer prices with 3,44%, the trust interval of the regression coefficient (2,788873222≤OP≤4,09756674) showing that if the oil barrel rose with 1 euro, the inflation rate would fit into this interval.

CONCLUSIONS

Testing econometric model reveals that among variables taken into account, the average net wage, the M2 money supply and the exchange rate leu/euro have a strong influence upon inflation rate, the rising of it being explained by the action of these factors almost 70-90%, while the price of oil barrel on international market influences the variation of inflation rate in a smaller measure (approximately 48%).

The pressure of trade unions have lead to major wage raises which overcome the level of productivity, wich lead to rising unit labour costs.These evolutions generated inflationary effects both by wage pressure on the demand excess, but also by unit labour costs on the prices established by producers.

The monetary factor has pressure on the consumer prices, because the money supply rhythm has overcome the rising rate of GDP in the analysed period, except for the years 2003 and 2008.

Since the majority of imported goods are from European Union and their prices are in euro, the inflation from Romania can be explained in accordance with the devaluation of our national currency compared with the European currency.The value of the correlation coefficient between the inflation rate and the exchange rate leu/USD shows that the leu devaluation with the American dollar does not influence the inflation rate.

The average influence of oil price on inflation rate can be explained by electricity, gas and fuel expenses.These represent approximately 16% from the total consumption expenditures, the share of these in the consumption basket is the second after food products.

BIBLIOGRAPHY:

1. Armesh Hamed, Rad Abas Alavi, *Causes of inflation in the Iranian economy,www.wbiconpro.com/218-Hamed.pd*
2. Bo□el Cezar, *Causes of inflation in Romania, June 1997-August 2001.An analyse based on the structural autoregressive vector,* Publishing house no.11, Romanian National Bank, 2002
3. Ciumara Mircea, Ciutacu Constantin coord., *Inflation in Romania: modelling the inflation phenomenon,* Expert Publishing House, Bucharest, 2004
4. Dem Amadou, Mihailovici Mihaela, Gao Hui, *Inflation and hyperinflation in the 20th century – causes and patterns,* Columbia University, School and International and Public Affairs, 2001
5. Demekas Dimitri, Khan Mohsin, *The Romanian Economic Reform Program,* IMF Working Paper, 1991
6. Domac Ilker, Elbirt Carlos, *The main determinants of inflation in Albania,* Working Paper, 1930, The Worl Bank, 1998

7. Domac Ilker, *Explaining and Forecasting Inflation in Turkey,* World Bank Policy Research Working Paper 3287, April 2004
8. Dumitru Ionuţ, *Balassa-Samuelson effect in Romania-the role of statutory prices*, Munich Personal Repec Archive, 2008
9. European Central Bank, *Statistical Data Warehouse*, http://sdw.ecb.europa.eu/browse.do?node=2120782
10. European Central Bank, *The Eurosystem and the EU enlargement process*, Monthly Bulletin, February, 2000
11. Golinelli Roberto, Orsi Renzo, *Modelling inflation in EU accession countries: the case of the Czech Republic, Hungary and Poland*, Eastward Enlargement of the Euro-zone Working Papers, Free University Berlin, Jean Monnet Centre of Excellence, 2001
12. Hammermann Felix, *Nonmonetary Determinants of Inflation in Romania:A Decomposition*, Kiel Working Paper No. 1322, 2007
13. International Energy Agency, *Analysis of the Impact of High Oil Prices on the Global Economy*, 2004
14. International Monetary Fund, *The Rise and Fall of Inflation: Lessons from the Postwar Experience*, World Economic Outlook, October, Chapter VI. Washington, D.C.: International Monetary Fund, 1996
15. Lewis John, Staehr Karsten ,*The Maastricht Inflation Criterion: What is the Effect of Expansion of the European Union?*, Eesti Pank Bank of Estonia, Working Paper Series, 11/2007
16. Lougani, P. and P. Swagel, *Sources of Inflation in Developing Countries*, IMF Working Paper, nr. WP/01/198, 2001
17. Mandel Martin, Tomšik Vladimir, *Monetary Approach to Inflation – Model of Inflation in a Small Open Economy and its Application to the Czech Republic in the Period 1996–2007*, Macroeconomics, 2008
18. National Institute of Statistic, *Data bases TEMPO-time series* https://statistici.insse.ro/shop/?lang=ro
19. Romanian National Bank, *Periodicals*, http://www.bnro.ro/Publicatii periodice-204.aspx
20. Turliuc Vasile, Cocriş Vasile, et al, *Money and credit*, Ed.Al.I.Cuza, Iaşi, 2009