MONEY: FROM STATISTICAL DEFINITION TO MONETARY POLICY FOR ADOPTING EURO.

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Abstract: *The evolution of monetary aggregates is closely related to the economic cycle, especially the evolution of GDP. The study aims to analyse the primary monetary aggregates (M1), the secondary (M2) and the tertiary (M3) in three Central and Eastern European countries: Romania, Bulgaria and Poland. The countries were chosen as follows: Romania and Bulgaria on the basis of the economic and geographical closeness and Poland as a benchmark for the first group. The data used are money supply, monetary aggregates: primary, secondary and tertiary, in Romania, Poland and Bulgaria, for the period January 2004 - March 2011, the monthly series are obtained from central bank websites, Poland's Central Bank and Bulgarian National Statistical Institute. The evolution of monetary aggregates of the three countries was compared with the Euro area and it was noticed a high degree of similarity between countries more developed economically as compared to less developed countries. From the viewpoint of optimum currency areas, it is necessary that the countries that adopt the Euro would respond symmetrically to external shocks and also have similar economic behaviour. Our study aims, in this respect, to analyse the components and the characteristics of the monetary aggregates, as well as the trends existing within them. The analysis of the correlation between monetary aggregates will show how the way in which the monetary mass and aggregates behave and which the sense of connection established between these countries is. We find that Romania and Bulgaria have a similar comportment, the correlation between these being the highest, we observe some differences between Romania and Bulgaria versus Poland.*

Keywords: *Monetary Aggregate, Gross Domestic Product, Monetary policy, Euro Zone*

JEL Classification: *E42, E52*

1. Introductory notions

The evolution of monetary aggregates is closely related to the economic cycle, especially the evolution of GDP [Fagan, Henry, 1998]. The study aims to analyse the primary monetary aggregates (M1), the secondary (M2) and the tertiary (M3) in three Central and Eastern European countries: Romania, Bulgaria and Poland. The countries were chosen as follows: Romania and Bulgaria on the basis of the economic and geographical closeness, and Poland as a benchmark. The study aims to observe the similarities concerning money supply that exist between these countries and the importance of monetary aggregates as an instrument of monetary policy in these countries. Following the EU accession, these countries will adopt the euro, the forecasts being: Romania - 2015, Bulgaria - 2013, Poland 2012 (2013); The theory of optimal currency areas shows how important is the economic synchronization for countries with a single currency.

Within the Economic Monetary Union, the definition of monetary aggregates is stated, since 2007, according to the methodology of the European Central Bank (NBR Monthly Report, 2009):

1. Narrow money supply (M1) includes currency in circulation (banknotes and coins) and deposits readily convertible into cash or used for payment by bank transfer called overnight deposits.
2. Intermediate money supply (M2) includes narrow money (M1) plus time deposits with maturity of up to two years and adding deposits redeemable at a period of notice of

up to 3 months. The definition of M2 mirrors the interest in analyzing and monitoring a monetary aggregate which, apart from cash, includes deposits with a high degree of liquidity.

3. Broad money supply (M3) comprises intermediate money (M2), and marketable instruments issued by the monetary financial institutions sector; money market instruments, especially money market fund shares/units and repurchase agreements are included in the aggregate (a high degree of liquidity makes these instruments close substitutes for deposits).

The way of defining monetary aggregates in Romania and Bulgaria before the harmonization with the European Central Bank requirements was:

- M_1 - Narrow money supply, which comprises: currency outside the banking system, sight deposits (until December 1991 time deposits of economic agents as well);
- Quasi-money – which, together with M_1, form M_2 (broad money) and which comprises: household savings, term or restricted deposits in Lei, foreign currency deposits of residents.

2. Literature Review

The monetary union (or currency union) - means adopting the same currency in neighbouring countries or that of the most important commercial partner; we witness the dollarization in Latin America (Ecuador, Peru) and the euro area. For Romania an important significance has been given by the "euro zone"; now that our country is a EU member, it should focus on continuing the process of integration into European economic and monetary union and the next step is to adopt the euro. Establishing the euro area was a long process that had as its starting point the Delors report of 1989, which proposed a realization of monetary union in three steps. The benefits of achieving a monetary union are related to the existence of an optimal currency areas, optimum currency area is defined as a geographical region in which the member states must use fixed exchange rates or a single currency, while there are also criteria that a country must satisfy to be part of an optimal currency area (Mundell, 1961):

-high degree of labour mobility;
-diversified production;
-degree of openness of the economy;
-symmetry of external shocks.

From this point of view, the European Union is not entirely an optimum currency area, there are differences in labour mobility (in particular because of language barriers). However, joining an economic union and then a monetary union, with the implementation of EU acquis and the liberalization of the movement of labour force showed that the level of integration in the euro area is increasing (Bîtcă et al, 2007), and also that the euro zone economies become integrated as a result of monetary union[Baldwin, 2006].

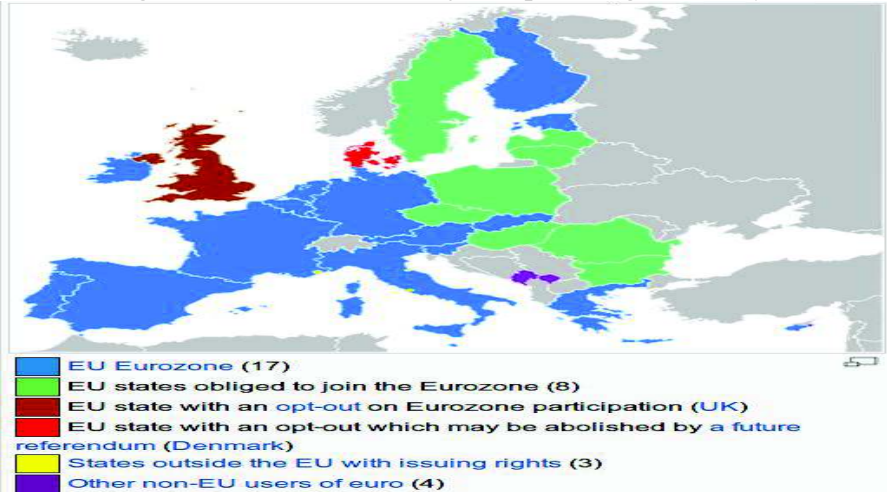
A preliminary stage of adopting the euro is compliance with the provision of the Maastricht Treaty (1992):

- the average inflation rate should not exceed with more than 1.5 percentage points the average of the most performant three members
- the long-term interest rates should not exceed with more than two percentage points the average of the top performing members
- consolidated budget deficit should be less than 3% of GDP
- public debt should be below 60% of GDP
- exchange rate fluctuations against the euro should fall within a corridor of + / - 15% of the average level.

Bulgaria: in 1997, as a result of excessive borrowing, Bulgaria became insolvent, the establishment of Monetary Council was decided in July 1997, the exchange rate level was fixed at 1000 leva for a German mark. The establishment of the Monetary Council has been beneficial in terms of controlling inflation, thus, from the peak of 1044% in

1997, the inflation was reduced to 18.7% in 1998, 2.6% in 1999, 10.3% in 2000, 7.4% in 2001, 5.8% in 2002 and in the EU pre-accession period (2003-2007) it fluctuated between a minimum of 2.3% and a maximum of 7.3%. Getting over the critical period, which was caused by entering into insolvency in 2000s, by structural reforms and by EU accession in 2007, made Bulgaria to fix its target of joining the euro zone as 2012.

Fig.1 Eurozone and the use of European single currency



(Source: http://en.wikipedia.org/wiki/Euro)

Poland: After 2000, the Polish Central Bank will focus on inflation targeting, and is due to adopt the euro by 2014, which supposes compliance with ERM II requirements two years before acceding to the euro area. Poland is a success story, managing the performance to continue its growth even during the crisis.

Romania: After accession to the EU, Romania must abide by the obligations of EU membership and will have to join the euro zone, the time horizon forecast is after 2015, with a period of at least two years preceding that, during which it will comply with the regulations of exchange mechanism of ERM II, which involves a controlled national currency fluctuations against the euro within a deviation band of +/- 15%. Romania meets only one of the provisions of the Maastricht Treaty, namely the public debt and, on the edge, the exchange rate fluctuation. Through the reforms and agreements with International bodies, it is aimed at the reduction of the budget deficit below 3%, while the central bank aims to control inflation, although this year's inflation target will be exceeded.

3. Data used and methodology

The data used are money supply, monetary aggregates: primary, secondary and tertiary, in Romania, Poland and Bulgaria, for the period January 2004 - March 2011, the monthly series are obtained from central bank websites, Poland's Central Bank and Bulgarian National Statistical Institute.

To analyse the evolution of money supply and monetary aggregates in the three countries, we shall calculate the correlation that exists between the evolution of M1, M2 and M3, so the correlation is defined as:

$$\rho = corr\ (x, y) = cov\ (x, y) / \sigma_x\ \sigma_y = E\ [(X-X_{m)}(YY_{M)}]/ \sigma_x\ \sigma_y,$$

- where $X_{M,}Y_M$ represent the mean of X, respectively Y,
- and $\sigma_{x,}$ σ_y represent the mean squared deviation of X, respectively Y.

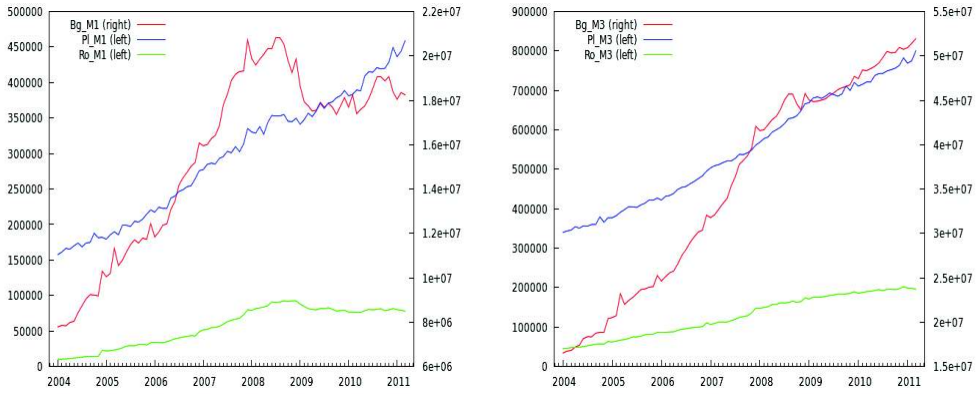
The analysis of the correlation between monetary aggregates will show how the way in which the monetary mass and aggregates behave and which the sense of connection established between these countries is.

4. The analysis of monetary aggregates (M1, M2, M3) in Romania, Bulgaria, Poland

For these countries, the period analysed is related to two major events:
- European Union adheration.
- economic crisis.

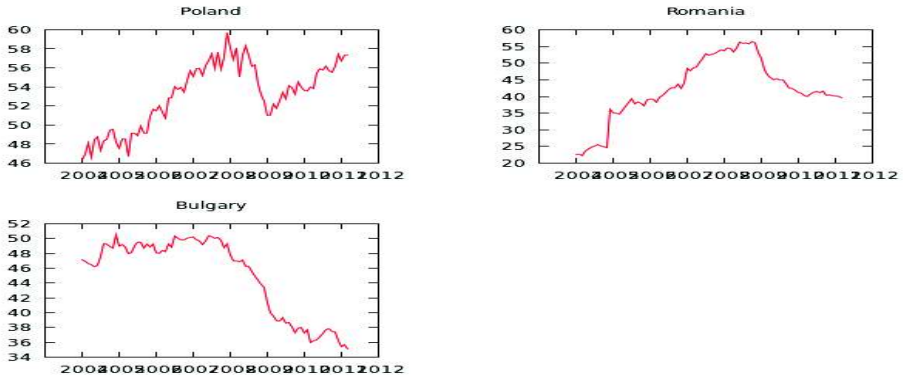
Fig.2 shows the evolution of money supply (M3) and primary aggregate (M1); the money supply in the period under analysis has a growth tendency, consistent with the economic growth witnessed by these countries in the pre-crisis period, except in the case of Bulgaria where from mid-2008 to 2009 the money supply (M3) shrinks due to the decrease in GDP.

Fig. 2. Evolution of M1, M3 in Romania, Bulgary, Poland 2004-2011



The primary aggregate (M1) has a much more volatile evolution, this being also due to the fact that the assets constituting the aggregate are of the most liquid type, and thus, particularly sensitive to changes in economic climate; with Romania and Bulgaria, M1 decreases, during 2008 for Bulgaria and the at beginning of 2009 for Romania, while Poland is the only country in which M1 growth continues. The evolution of money supply, being closely related to GDP trend, the conclusions drawn show that in both Romania and Bulgaria the money supply growth rate has slowed down due to the downturn. However, the fact the trend is nevertheless positive raises questions about monetary policies in both countries because the excess of money can turn into inflation.

Fig. 3. Primary component of aggregate money supply M1 in total



In terms of the component of the money supply, it is seen in Fig.3 that, for both Romania and Bulgaria, the primary aggregate (most liquid) is below 45% for Romania and under 38% for Bulgaria, much less than in the pre-crisis period (over 50% for both countries) which shows that the economic crisis has manifested itself at the level of non-bank agents, as well, by lowering the amount of cash and the value of sight accounts. While with Romania and Bulgaria M1 is still decreasing, in Poland, after a period of decline of a similar magnitude to that in the other countries analysed, it recovered to levels comparable to those in the pre-crisis period.

The correlation between the monetary mass and the aggregates in Romania, Poland and Bulgaria

To analyse the evolution of money supply and monetary aggregates in the three countries, we calculate the correlation that exists between the evolution of M1, M2 and M3; so the correlation is defined as:

$\rho = \text{corr}(x, y) = \text{cov}(x, y) / \sigma_x \sigma_y = E[(X-X_{m)}(YY_{M)}]/ \sigma_x \sigma_y$,

- where X_M, Y_M represent the mean of X, respectively Y,
- and σ_x, σ_y represent the mean squared deviation of X, respectively Y.

Table 1. Correlation matrix of Monetary aggregates

M1	**Pl_M1**	**Ro_M1**	**M1**
	0.88	0.97	**Bg_M1**
	1	0.93	**Pl_M1**
M2	**Pl_M2**	**Ro_M2**	**M2**
	0.98	0.98	Bg_M2
	1	0.96	Pl_M2
M3	**Pl_M3**	**Ro_M3**	**M2**
	0.98	0.99	Bg_M3
	1	0.99	Pl_M3

Based on monetary value and monetary aggregates M1 and M2 between January 2004 and March 2011, their correlation matrix was calculated. Statistically, the correlation of the results of the secondary aggregate (M2) and the tertiary one (M3) shows a close link between the developments in the case of Romania, Bulgaria and Poland. With the secondary aggregate, the highest correlation is between Romania and Bulgaria or, respectively, Romania and Poland, this showing that the evolution of money supply in our country, on one hand, presents the features of an underdeveloped economy (such as Bulgaria) and, on the other hand, is similar to Poland - a country with a large population.
The most noticeable differences are found with the primary aggregate, the highest