INFLATION AND MONEY GROWTH: THE CASE OF ALBANIA

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Abstract
The goal of this study was to test the relationship between inflation and money growth for Albania case, in the long run from to 1996 to 2008 years. The study it is conducted by analyzing the quantity theory of money, related this last with inflation. All this work is done by examining the economic events, mainly macroeconomic indicators during the 1996-2008 periods using Regression Analysis methodology. Next, it is compared the Albanian's result with the other countries that have the same characteristics in the aspect of economical, social, political geographical as Albania country. When are investigated the result of those countries, we obtain a strong positive correlation between Inflation and Money Growth. The result have shown than, an excess injection of money supply was reflected by an increase in price level and via-versa. The crucial conclusion of this surveying was, quantifying the impact of money supply on the inflation rate in Albania, and uses it as a stage in order to make target for the inflation for the following years.
Keywords: Money Growth, Albania, Inflation, Quantity Theory of Money.

1. Introduction

Albania is one of the transition economies that have performed very well at fighting the inflation. Since it was a post communist country, the price levels increased sharply after the fall of communist system in 1990 and during the born of private enterprise system 1992-ongoing. In addition, the people were given for the first time the right to have a private property and the freedom to choose. Above all, thanks to many serious reforms regarding economic developments, the output level increased enjoyably for each year. Contrary to other years, 1997 was the dark year for Albanian people, (Christopher J, 2000, pp.1-3) it was the year of pyramid scheme bankruptcy. Many people deposited the money at banks hoping to double or triple them in a very quick time. Unfortunately, most of them lost their money deposited in the so-called pyramid schemes. However, after the collapse of pyramid schemes the flare of prices didn`t last any longer. In 1999 the inflation changed directions from higher to lower and stable rates. Experiencing such inflation rates means a good performance of monetary policy as well.

Three main objectives of this paper are as follow: The first is to examine if there is a relationship between money growth (M2) and inflation rate (CPI) in Albania. The second is to show whether an increase in money supply will cause an equivalent increase in inflation rate. The third is applying regression analysis in Excel and examining whether the constant[1] (real GDP growth rate) is negative where QTM equation has the form of $\Delta P = \Delta M - CONSTANT$ at a fixed velocity.

2. Literature review

To carry out the research, it was indispensable to understand the quantity theory of money and application of its equation at an integrated level. Another important task was to extent it so as to develop the econometric model, helpful to show the impact of money supply quantitatively on inflation rate. Money supply, velocity, price level and real GDP are the necessary data used to formulate the QTM equation. If the velocity and real GDP were fixed and constant respectively then there should be a one-to-one relationship between money growth and inflation in the long run. Accordingly, Bruggeman at el. (2005) test the link between money growth and inflation in the euro area using money augmented Phillips curve as the underlying model to describe fluctuations in inflation for the period 1986Q1 to 2003Q2 and suggests that there exist a positive relationship between monetary growth and inflation over long-run horizons. Another important research study that demonstrates short-run consequences of periods of strong monetary growth for inflation dynamics in 15 industrial economies was conducted by Roffia and Zaghini (2007), who found a positive link between monetary aggregates and prices over a 3-year horizon. A similar study concerning money growth and inflation was conducted by Amisano and Fagan (2010), applying Bayesian techniques from1960s up to 2010. They come to the conclusion that money growth provides timely warning signals of transitions between inflation regimes. Moreover, Herwartz and Reimers (2006) takes the argument a step further testing the relationships between money supply, prices and real output for a wide range panel of 110 economies and find that homogeneity between prices and money cannot be rejected and the main authorities, central banks can achieve and maintain price stability by controlling monetary growth even for high inflation countries . Somewhat a different study that yielded similar results was conducted by Kalra (1998) on inflation and money demand in Albania during 1993-1997 suggesting that in the long run exist a positive relationship between price level, exchange rate, money and interest rates. Most importantly, Teles (2010) investigates whether the quantity theory of money is still alive the data chosen refer to 1970, 1990 and 2005 for all OECD countries, drawing on statistics of the IMF as well as the OECD. The findings for that investigation states that quantity theory of money is still useful and for countries with low inflation, the relationship between average inflation and the growth rate of money is tenuous at best. Dwyer and Fisher (2009) use a set of countries and find a positive correlation across all countries. The correlation falls as countries with higher excess money growth are excluded, but the correlation is 0.47 across countries with excess money growth of ten percent or less.

Finally, Muço at el. (2004) analyses relationship between money supply and inflation in Albania from 1994 to 2003 basing estimations on a vector auto-regression model (VAR) of key macroeconomic variables such as: money growth, inflation, exchange rate, remittances and the trade balance. Their findings indicate a weak link between money supply and inflation up to mid-2000. However, from

[1] In the equation of quantity theory of money constant implies real GDP growth rate

2000 ongoing a greater link between money supply and inflation was detected.

3. Albanian application

3.1 Inflation and money growth as a macroeconomic policy goals

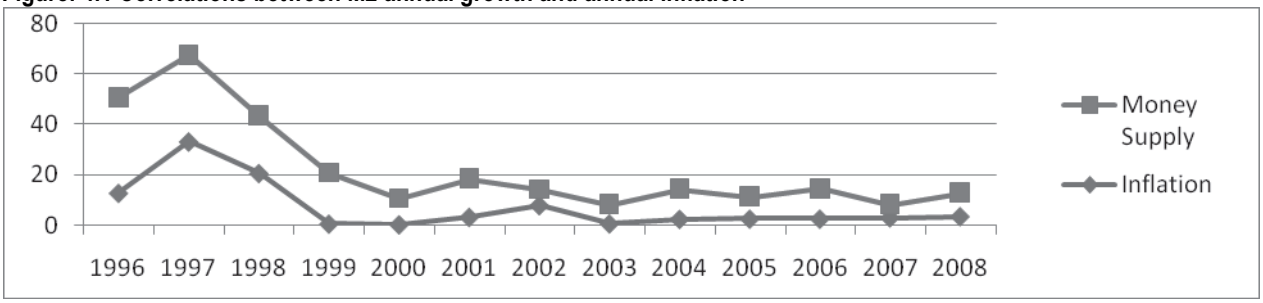
The Bank of Albania is the monetary authority of the Republic of Albania. It has the exclusive right to design, approve and implement the monetary policy in Albania with a view to accomplish its mandated objective: achieve and maintain price stability. According to the Law "On the Bank of Albania", the primary objective of the Bank of Albania is to achieve and maintain price stability. By ensuring price stability, the Bank of Albania provides a direct contribution to sustaining macroeconomic balances in the country, promoting economic growth and improving the standard of living, as well as safeguarding the financial stability of the system[2]. Central bankers have come to realize that price stability should be the primary, long run goal of monetary policy. However, because the output fluctuation should also be a concern of the monetary policy, in short way we can say that the goal of price stability should be seen as the primary goal only in the long run. Attempt to keep inflation at the same level in the short run no matter what would likely lead to excessive output fluctuations[3].Albanian lek is allowed to float so freely and the Bank of Albania has followed a policy of targeting inflation but it is in informal way.

3.1.1 Inflation and money growth trends

For each year the Central Bank of Albania has started a clear quantitative target inflation for annual inflation usually within a fairly narrow band (e.g. 2-4 per cent). T his increased transparency has also helped monetary policy, especially in light of the relatively successful performance to date by the central bank in achieving this target. Turning to the relation between changes in money supply and inflation, Figure 4.1 shows the co-movement between the two variables from 1994 to 2003. It is clear that there is virtually no correlation up to 2000; during that time, changes in money supply were driven by demand shifts. Sometimes they move in opposite direction, for example in 1994/95, when money growth was robust while annual inflation was falling rapidly to single-digit levels, or in 1997 when money growth declined while inflation rose sharply in the wake of the pyramid scheme crisis. However, a positive correlation emerges after the introduction of indirect instruments of monetary control in September 2000, as figure 4.1 shows clearly[4].

[2] www.bankofalbania.org , "Monetary Policy Document for the 2009-2011 Period , Revised in June 2010, (10.10.2011)", pp.2-4.
[3] Frederic S. Mishkin, The Economics of Money, Banking and Financial Markets, Eighth Edition, Columbia University, *2007,* p.398.
[4] Marta Muco at el (2003), "Inflation, exchange rates and the role of monetary policy in Albania", Working paper, pp.4-5, (15.11.2011).

Figure: 4.1 Correlations between M2 annual growth and annual inflation



3.1.2 Money growth and price level stability

As main factor that can gave an explain inflation behavior over time are, monetary and fiscal policy, both of those variables have had a big impact mainly during the years 1996 to 1998 as we see in the figure 4.1 above. In the other years inflation increased faster as the need for government finance continued at a high level, while the source of financing shifted from broad money to money creation by the central bank, reflecting the severe economic crisis after the collapse of the pyramid schemes. According (Rother. C. 2000, p.6), the stabilization policies of 1998 succeeded in reducing the need for government finance needs and tightening monetary conditions as evidenced by the behavior of the monetary base. Inflation returned to a downward path which continued in 1999 despite renewed expansion in base and broad money. After 2000 year BoA started to use the nominal anchor such target inflation and using indirect instrument in conducting the variables of the monetary policies.

3.1.3 Inflation and Money growth in the economy

Table 3.1 Monetary sector projections

Years	2006	2007	2008	2009	2010	2011	2012	2013
Inflation (%)	2.4	2.9	3.0	3.0	3.0	3.0	3.0	3.0
Money supply (%GDP)	74.1	78.9	83.3	87.3	90.6	92.4	93.9	94.1
Private Sector credit (% GDP)	21.2	27.9	34.1	40.0	44.9	48.4	51.3	52.0

Source: Ministry of Finance, International Monetary Fund and INSTAT (for inflation in years 2006 and 2007) (12.12.2011).

The monetary policy objectives of the Bank of Albania will consist of keeping inflation at the level of 3% with the possibility of a variation of ±1 percentage point around this central value, a fact which will allow continuing macroeconomic stability and economic growth rate. The level of the currency outside the banks will decline, but this will be more than offset by an increase in private deposits in banks, resulting in an increase in money supply, expressed as a portion of GDP from 74.1% in 2006 to 94.1% in 2013.[1]

3.2 Data and research methodology

3.2.1 Data

In order to test the theory we need to gather data which must be relevant. In this example the data cover the period 1996-2008.The data for Albania include money growth (M2) and inflation rate which is measured using consumer price index. It has been used money-quasi money growth (M2) and inflation rate (CPI) exhibited at below table. Data for money supply (M2), money-quasi money growth (M2) and inflation rate are provided by Central Bank of Albania and World Bank. To carry out the study we develop an econometric model as it is mentioned above we use a regression equation model as:

Inflation = α + β*ms

Where:

Inflation: is the percentage change in price level

α: is the intercept and equals the constant in equation (1c)

β: is the value for the slope coefficient

ms: is the quantity of money supply that change yearly.

Upon this basis, we will test the hypothesis that "α" is negative and "β" or the slope is almost 1.

3.2.2 Regression Analysis, Albania

This section deal with estimation of the regression equation model we developed. To conduct regression analysis it is used Excel 2007. By going first to "data" then "data analysis" after that "regression" it is selected the money growth as independent variable and inflation rate as dependent variable and at 5% significance level it is got the results exhibited in annex: Most importantly, we focus on empirical results. Such as, dealing with the statistical regression equation:

Where:

Inflation = $b_0 + b_1$ms

After removing data input of velocity of money as mentioned above for the regression analyses, we have the constant of dependent variable (inflation) b_0= -3.51676 and coefficient of independent variable (money supply) b_1= 0.6776283. The regression analyses result presents that the money supply has positive relationship with the

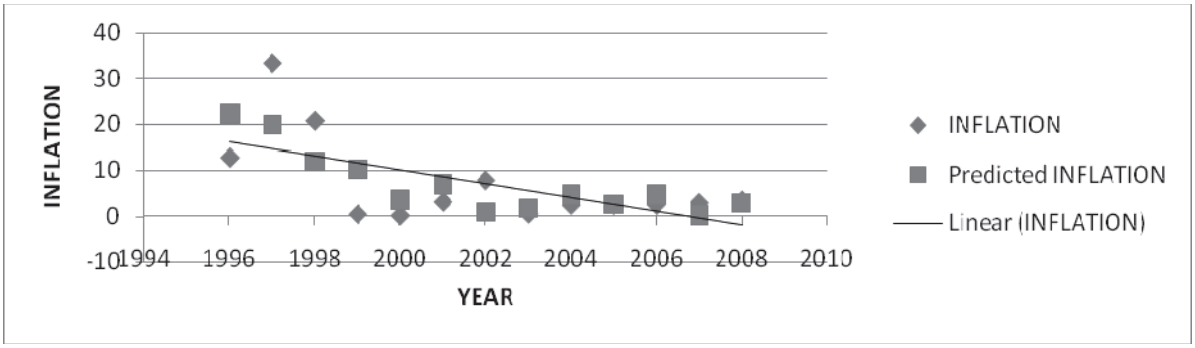
[1] Albania: poverty reduction strategy paper-National strategy for development and integration. August 2008, IMF Country Report No. 08/269. p.84

inflation. Where, one unit increase in money supply will increase inflation by the 0.677 coefficient. So, if we apply these results into our regression model presented above in section 4, the model will be:

Inflation= -3.51676 + 0.6776283*ms

Again in the table, in annex it can be seen that the t-statistics for this equation is 3.53 where the critical value of (t) for thirteen observations is 2.2. In order to reject the null hypothesis the t-value must be greater than t-critical value. Thus, it allows rejecting null hypothesis and accepting hypothesis 1. In addition, similar to the results of t-test the p-value test also confirms that the result of regression model is to reject null hypothesis and accept an alternative one where the p-value must be lower than the p-critical value. Here, the result shows the p-value of 0.0047 where p-critical value is 0.025. Another evidence that make us to believe that there exist a relationships between those two variables is the analysis of variance which use the value of the F statistic or F ratio. So as we see the result of the F statistics in the annex, the result is 12.47, is the same with the result of the Regression calculated by Excel. Now we have to find if this value is higher or lower from the critical value of the F distribution in order to accept or reject the null hypothesis in the end. So as we see from the table of the F distribution, where we have 1df for the numerator and then we move down in the table until we reach 11 df for the denominator. The critical value of the F that we find in the table for the 5% level of the confidence is 4.84. Since the calculated value of the F statistic of 12.47 exceeds the critical value of 4.84 for the F distribution with the 1 and 11 df we reject at the 5% level of significance the null hypothesis that there is no statistical significant relationship between the independent variables and dependent variables and so we accept the alternative hypothesis at the 5% level of significance that not all coefficients are equal to zero.

Figure 5.1: Money Growth Line Fit Plot, Albania



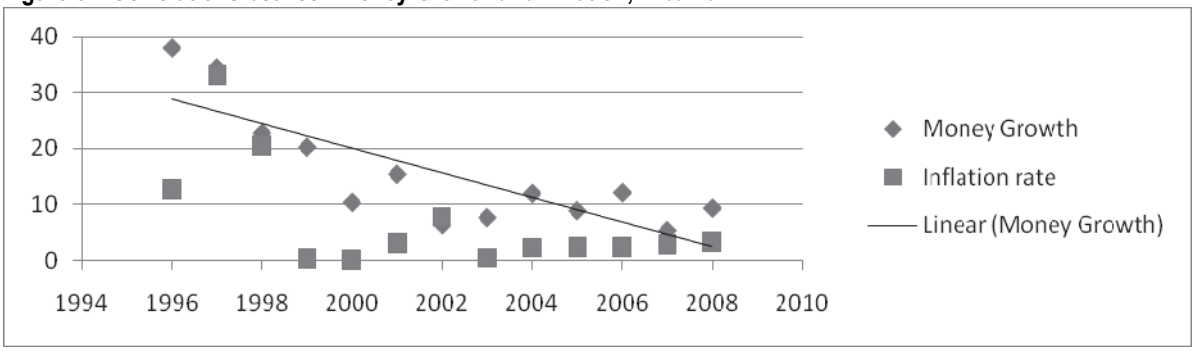
Based on the Figure 5.1 we can see a relationship between the actual inflation experienced in Albania and the predicted inflation as a result of function computed above. Also, there appear to be a positive relationship between actual inflation and predicted inflation meaning that actual inflation is close to the predicted inflation.

Where:

-INFLATION: shows the actual inflation

-Predicted INFLATION: shows the predicted results, which are computed by the linear regression above.

Figure 5.2 Correlations between Money Growth and Inflation, Albania



At first, if we look to the Figure 5.2, there appear to be a relationship between money growth and Inflation rate in Albania during 13 years taken in our analysis. Secondly, the relationship between money supply and inflation is positive, meaning that as money supply increases also inflation increases. Thirdly, the form of the graph seems linear and suitable to model this relationship with a line. Additionally, as relationship appears linear, it is suitable to calculate the correlation coefficient. Being a numerical summary, the correlation coefficient describe the strength and direction of linear relationship and equal to r=0.73 .Since r = 0.73, it is positive and near positive 1,as a result, we conclude that this linear relationship is moderately strong and positive. Furthermore, the slope of the line (0.67) indicates that for every increase of 1 unit money supply, we would expect the inflation to increase by 0.67

units. Contrary to other years, during 1999, 2000 and 2003 money supply increases by 20.27, 10.36 and 7.63 units but inflation rises only by 0.4, 0.1 and 0.5units respectively. Afterwards, the α -intercept of -3.5167 indicates that; in case money supply change by zero units ,we would expect inflation to be -3.5167 units .Finally, the r^2 value of 0.5313 shows that 53.13% of the variation in the dependent variable which is inflation can be explained by the variation in the change in money supply or our independent variable.

4. Conclusion

To sum up, it is investigated the link between inflation and money growth for Albania during 1996-2008 years. As a first step, it is developed an econometric model through which it is made a statistical test of quantity theory of money. After that, we applied regression analysis for M2 and CPI where found a moderately strong relationship between these two variables for Albania. Meanwhile, found that the constant (real GDP) was negative as it is assumed it to be in the study hypothesis. Moreover, the coefficient of money supply (M2) 0.67 tells us that as long as money supply in Albania increases by 1%, inflation rate increases by 0.67%. Most importantly, t test analysis allows to conclude that there exist a relation between changes in money supply and inflation rate for Albania economy. In the Figure 5.2 was shown the linear function between inflation and money growth for Albania, also was shown the linear function between average inflation and average money growth for the Albania. In addition, both those function demonstrate a positive relationship between inflation and money growth. Later, if we see at Figure, 4.1, we realize that, when money supply increases it is accompanied by an increase in inflation rate, and in case the money supply decreases the inflation correspond accordingly. The results in this paper are consistent with the view, that money growth is associated by an increase in the price level. Since the money supply has a big impact on inflation rate in Albania, and this study suggest that money growth is more suitable to predict inflation rate rather than other variables. Finally, to conclude we will quote the Milton Friedman saying: “Inflation occurs when the quantity of money rises appreciably more rapidly than output and the more rapid the rise in the quantity of money per unit of output, the greater the rate of inflation”.

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