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THE ROLE OF MONEY AS AN IMPORTANT PILLAR FOR MONETARY POLICY: THE CASE OF ALBANIA

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Note: The views expressed herein are of the author and do not necessarily reflect the views of the Bank of Albania.

The paper is based on data published until Q1 - 2012.

CONTENT

ABSTRACT

The main focus of this paper is to appraise the money demand function and the velocity of broad money, M3, in the medium and long-term, given its role as a second pivotal pillar for the monetary policy of the Bank of Albania, in accordance with its primary objective, that of price stability. The results show that the demand for money is stable, even in the aftermath of global financial crisis, as well as its performance contains important information for the inflation trend.

Keywords: Monetary policy, quantitative theory, Phillips curve, reference value, VECM, P-STAR approach

JEL Classification: C32, C51, C52, E31, E41, E52, E58.

1. INTRODUCTION

To achieve the primary objective of the monetary policy[1], such as in the case of European Central Bank (ECB), the Bank of Albania (BoA) has pursued a policy in which the broad money monetary aggregate, M3, has served as an intermediary objective of the monetary policy to measure the inflationary pressures in the economy. According to this approach, growth of money supply beyond the economy's demand for it, signals and is a premise of the growth of the inflationary pressures[2]. The informative role of

[1] In accordance with Article 3, letter "a", of the Law No. 8269 "On the Bank of Albania", dated 23/12/1997, the primary objective of the monetary policy is to achieve and maintain price stability, which means achieving low but positive inflation rates and maintaining them for periods of times relatively long. In quantitative terms, with price stability the Bank of Albania means safeguarding the consumption price inflation at 3.0%, with a ± 1 percentage point fluctuation from the objective.

[2] The quantitative levels of the adequacy of the monetary expansion are reviewed during the year, in accordance with the trend of the monetary developments and the correcting measures proposed by the Bank of Albania in the monetary programme. The Bank of Albania, in communication with the public, highlights mainly the quantitative target of the inflation rate and the anchorage of the inflationary expectations around this objective, keeping somewhat "in the shadow" the intermediary objective for money growth and the other operative objectives overall. Look also Bank of Albania, (2012).

the broad money reflects partially the point of view of the Bank of Albania[3] that:

(i) "inflation is ultimately a long term monetary phenomenon and as such, it is influenced by the growth of the monetary mass in the economy"
(ii) "upholding price stability gives a direct contribute in safeguarding the macro-economic balances in Albania, in lowering the risk primes, in a stable economic growth and in the welfare long term improvement in the long run, as well as in supporting the stability of the financial system".

In this aspect, the Bank of Albania must maintain a stable price level and ensure its decision-making is based on a comprehensive analysis of economic and financial indicators. These indicators allow the identification in time of the inflationary pressures and the reaction of the monetary policy in accordance with its objective. The analysis of the economic indicators is oriented toward the inflationary developments in the short and medium term. Its focus is related with the production indicators and those of the financial conditions in the country. This aspect of the analysis takes under consideration that the inflationary pressures along this period of time are influenced mainly by the interaction of the demand and supply in the goods and service markets. On the other hand, the analysis of the monetary indicators is focused on the longer time horizon, which is supported by the long term relation between money and inflationary pressures.

To this approach, the BoA's monetary policy strategy reflects the substantial influence of Milton Friedman's research during the 1950s and 1960s. From another perspective, contrary to the monetary policy strategies of the U.S. Federal Reserve and many inflation targeting central banks, which assign no special role to monetary aggregates, it resembles more a two-pillar approach as it is nowadays the framework of the ECB's monetary policy[4].

[3] Look Bank of Albania, (2012), pages 6 – 12.

[4] Look at ECB, (1998); ECB (1999a); ECB (1999b); ECB, (2000a); ECB, (2000b); ECB, (2001a); ECB, (2001c): ECB, (2001d); ECB, (2001e); ECB, (2004); ECB, (2011), Svensson (2008) suggest this was the monetary policy framework of the Bundesbank and one of the reasons for its success.

Therefore, substantial changes of the Albanian economy and the evolution of economic thought, call for an open debate on the challenging nature and objectives of the Albanian monetary policy and the need to establish a new strategy, where money would be given a prominent role within it[5]. In fact, current monetary statistics are one of the most reliable and accurate sources of statistical information in Albania. Empirical assessments suggests that monetary aggregates may provide useful information regarding long run trends in inflation for cross-checking analyses[6] and therefore monetary aggregates should be given a more primary role. This in return is expected to constitute a priority change in the BoA's approach to inflationary and economic activity development. The challenge would be how to create an all-encompassing strategy so that no new relevant information is lost during the decision-making process and which at the same time would structure all incoming data in a way that we would be able to identify risks related to the fulfilment of the legal obligation, price stability, in a timely and consistent manner.

Consequently, based on Issing (2002), the next challenge to give money an important role requires to estimate a reference value (RV) level for annual broad money growth that would ensure price stability according to BoA's objective and support economic growth, such as in the case of ECB's two-pillar approach[7]. Deviations of current monetary growth from the RV would, under normal circumstances, signal risks to price stability. To this end, in terms of economic theory, the RV must be derived in a manner consistent with the BoA's quantitative definition of price stability over

[5] Shih Tanku (2008).

[6] Shih Luci dhe Ibrahimi (2005), Themeli dhe Kolasi (2006), Celiku, et. al., (2006), Issing (2006), dhe Themeli (2008).

[7] In 13 October 1998, in outlining the framework of its stability-oriented monetary policy strategy, the Governing Council of the ECB stressed that the achievement of price stability has to be seen in a medium-term context given the inability of monetary policy to anchor inflation pressure over shorter periods. In light of the fundamental monetary nature of inflation over the medium term, the ECB assigned a prominent role to money. This element, known as the "first pillar" of the strategy, was signalled by the announcement of a quantitative reference value for annual money growth rate for the broad money, M3. Based on different analyses, the Governing Council of ECB decided to set the first reference value at 4.5%. The other element of the strategy, subsumed under its "second pillar", consider the analysis of a broad range of several non-monetary indicators to assess risks to price stability.

the medium term and the long-run link would relate to the equation of exchange, that is, the definition of the velocity of money (quantity theory of money)[8]. In the practical aspect, this is expressed as the function of the vector of money circulation according to the Fisher equation, which represents a proportional relation between money and inflation, since economic growth and the circulation velocity of money achieve the balance level in the long term[9].

Under the two-pillar approach[10], the RV should represent a public commitment by the BoA to analyse monetary developments thoroughly and to ensure that information in monetary developments is given appropriate weight in the decision-making process. However, the RV should not be misunderstood as another objective of the monetary policy, together with the target for inflation rate and money growth, which may be potentially competing and conflicting with each other. Furthermore, it must not entail a commitment on the part of the BoA to change interest rates to correct deviations of monetary growth from the RV in accordance with its final objective. Instead, as in the case of ECB, the RV intends to help the decision-making in achieving and maintaining price stability in accordance with the published quantitative objective and in identifying in time the inflationary pressures in the medium and long term.

Therefore, it presents the information contained in monetary developments in a coherent manner and conveys to the public, the notion of diversified analysis and ensures robust decision-making based on different analytical perspectives[11]. Against this background, Brand et al (2002) suggest the RV has to fulfil two basic criteria. First, the monetary instrument on which the RV is calculated must have a stable (or at least predictable) long term relationship with the price level (but also with other macro-economic indicators)

[8] See also ECB (1998); Beck and Wieland (2007).

[9] In terms of empirics, this relationship has manifested itself most clearly in periods of very high inflation, however, recent assessments, have re-emphasized its validity in periods of moderate inflation. See, for example, ECB (2004), Gerlach, S., (2004), Bordo and Filardo (2006) consider different inflation zones including low inflation and deflation.

[10] See: ECB (1998); ECB (1999a); ECB (1999b); ECB (2000a); ECB (2000b); ECB (2001a); ECB (2001b); ECB (2001c); ECB (2001d); ECB (2001e); Masuch, et. al., (2001); ECB (2004).

[11] See: ECB (2000a) and Masuch, Pill and Willeke (2001).

medium term. Second, monetary developments must carry the information related with the inflationary developments in the future. If these conditions are fulfilled, than the RV should represent clearly a growing rate of monetary indicator, which should be in accordance with the price stability in the medium term since deviation from it signals the risk of inflationary pressures in the future.

In the case of Albania, previous empirical work addressed the issue in terms of the demand for money, in which is reported that the monetary indicators are co-integrated with the production, the interest, inflation and exchange rates in a stable long-run relationship[12]. Other empirical studies[13] show that the broad aggregate M3 provides satisfactory leading indicator properties for future inflation, especially over the medium-term horizon. But, these studies are based on information referred to the period before 2007. Therefore, in the verge of consequent structural changes of the Albanian economy and the global financial crisis (GFC), it is of particular interest whether these properties identified have remained the same. At the same time, this discussion material represents a qualitative instrument that is related with the calculation of a RV for the annual growth rate of the money stock, but which should be in accordance with the medium term price stability. In general, the material analyses the monetary approach of the central bank, especially the harmonization of the monetary policy strategy of the Bank of Albania for anchoring the inflationary expectations in the future with Friedman's monetary approach.

The purpose of this paper is quadruple. First, the paper presents an empirical analysis on the money demand function and its stability in time. Second, it reports the money explicatory ability toward the anchoring of the inflationary expectations in the future. Third, at the best of our knowledge, this is the first time that a reference

[12] Tanku (2006) used the bound test to ARDL approach and Shijaku (2007) used VECM approach. The later, also replicated the empirical model based on ARDL approach, but found no empirical evidence to continue beyond the bound test approach. Other empirical works are inconclusive, reflecting shortcomings as regards the length and accuracy of the data series. Kalra (1998) and Tase (2004) found evidence of a stable relationship, while Muço et al. (2004) and Kolasi, et al. (2004) suggest money demand instability.

[13] See: Luci and Ibrahimi (2005); Themeli and Kolasi (2006); Celiku, et. al., (2006), Themeli (2008).

value related to the annual money growth rate is calculated, to give this indicator an important role in the future in the drafting and implementing process of the monetary policy of the Bank of Albania. Very importantly, should be mentioned that the studied sample improves further precedent works and updates their findings, including the post-crisis period as well, which allows for new information in accordance with the medium term strategy of the Bank of Albania.

The remainder of the paper is structural as follows. Section 2 describes the monetary policy strategy of the Bank of Albania, including the role of the demand for money in that strategy. Section 3 describes the empirical methodology we used to estimate the money demand in the case of Albania and the linkage between money and inflation. The following section presents the empirical findings. The last section summarizes the material's findings.

2. BANK OF ALBANIA MONETARY POLICY STRATEGY

In accordance with the primary objective of the monetary policy[14], as in the case of the European Central Bank (ECB), the Bank of Albania uses the broad money monetary aggregate, M3, as indicator of the inflationary pressures in the economy. In fact, since the drafting of the monetary policy in 1992, in accordance with the technical programmes of the International Monetary Fund, the Bank of Albania has operated under monetary targeting framework and support of direct administrative instruments and flexible exchange rate[15]. Within this framework, broad money monetary aggregate, M3, served as an intermediate target of monetary policy to measure the inflationary pressures in the economy, according to which its

[14] In accordance with Article 3, letter "a", of the Law No. 8269 "On the Bank of Albania", dated 23/12/1997, the primary objective of the monetary policy is to achieve and maintain price stability, which means achieving low but positive inflation rates and maintaining them for periods of times relatively long. In quantitative terms, with price stability the Bank of Albania means safeguarding the consumption price inflation at 3.0%, with a ± 1 percentage points fluctuation from the objective.

[15] The value of lek against other currencies is established freely by the relation of demand and supply in the exchange market.

growth beyond the economy demand for it, signals and is a premise for the growth of inflationary pressures[16]. The main objective, hence, was "to maintain the value of the national currency (the Albanian Lek - ALL) both inside and outside the country"[17].

In the coming years, the Albanian's monetary policy strategy went through major transformations. First, in 1996, the main objective of the central bank was redefined as "to achieve and maintain price stability"[18]. Second, during 1997, the legal elements of the BoA independence were improved and established by law. Third, by the end of 1998, BoA restarted to publish the quantitative target of price stability formulated in terms of the annual change of the Consumption Price Index (CPI)[19], according which the aim was a growth of the CPI level in Albania within the 2-4% target range[20]. Meanwhile, from 2006, this target was redefined at 3.0% with a ± 1 percentage point tolerance around it[21]. Lastly, from 2015, the target is achieving and maintaining the medium term price stability at 3.0%[22]. The primary indicator of the balance of the inflationary pressures in the economy is the deviation of the medium term forecasted inflation from its target. This is synthesized later according to the evaluation of the inflation forming process and the

[16] This was based on the quantity theory of money and the objective for low and higher economic growth, as well as the assessment of velocity of money. Initially, this target was defined on monthly basis due higher uncertainties during 1992, then at three-monthly basis until it was passed entirely on an annual basis. [See also Fullani (2009)].

[17] Themeli (2008) reveals that in choosing this framework, the BoA has been constrained by underdeveloped financial markets, lack of institutional capacities and small foreign currency reserves.

[18] Law no. 8076, dated 22/02/1996, "On the Bank of Albania".

[19] Beside it, with the purpose of improving the monetary policy decision-making, BoA uses also other measurements of the inflation, like the core inflation, tradable and non-tradable goods inflation and inflationary expectations of the economic agents.

[20] For the time being, on the one hand, this target range approach was seen in view to anchor inflation and its expectations at a low positive level. On the other hand, it would create the necessary space for higher economic growth, compared to other countries, and facilitates a smoother convergence process with the developed economies.

[21] The target inflation will continue to be measured with the annual change rate in the CPI, which is calculated and published by the Albanian Institute of Statistics (INSTAT). [Bank of Albania (2012), p. 10]

[22] In practice, to measure the growth of prices in the economy are used a set of indicators like the Consumption Price Index, the Production Price Index, payment index and other indexes, which measure the prices of specific products. Look Bank of Albania (2015).

reaction according to the evaluation of the transmission mechanism of the monetary policy.

On the operative aspect, in the early 2000, the implementation of the monetary policy mirrored better the principles of the free market. The achievement of the target was made possible through a framework of indirect monetary instruments[23]. The one week Repurchase Agreements (Repo) rate, which would be applied in the Bank of Albania regular weekly auctions, became the most important instrument of the BoA's monetary policy[24]. The operative target of the monetary policy, from 2012, is the orientation of the short term interest rates in the interbank markets toward the core interest rate of the Bank of Albania, as well as the minimization of their fluctuation.

Furthermore, the Bank of Albania has also dedicated attention to the improvements in the analytical and technical framework, research and monetary policy decision-making and of the dimensions of its communication to the public. First, it has dedicated great importance to building time series on the expectation of the economic agents (like the Business Confidence Index and the Consumer Confidence Index), surveys of the expectations of the economic agents for inflation, exchange rate and interest rate. These indicators ensure valid data for the current and expect trend of inflation, as well as the risk balance in the economy. Second, the monetary policy decision-making is supported by a broad analysis of economic, monetary and financial indicators. in its public communications, the BoA strongly emphasises the quantitative determination of the target for the rate of inflation and anchoring inflationary expectations around this objective, even though keeping somewhat "in the shadow" the intermediate target for annual money growth and other operational objectives. At the same time, any further change of the monetary policy strategy is mirrored in the Monetary Policy Document, while the monetary policy and the decisions made for its implementation

[23] Bank of Albania continued to use the money growth as an intermediate target, which in accordance with International Monetary Fund was determined through a Monetary Policy to Balance of Payment approach.

[24] This interest rate continues to be decided by the Supervisory Council of the Bank of Albania and expresses the monetary policy approach of the BoA. At the same time, it serves as a reference system for defining the other interest rates decided by the BoA.

are communicated to the public through several main documents, like the quarterly monetary policy report, periodic analyses, the periodic report in the Parliament of the Republic of Albania and the publication of the decisions of the Supervisory Council of the Bank of Albania related to the monetary policy within the day of the decision-making.

3. METHODOLOGY

This section is focused on the calculation of the RV on the broad money monetary aggregate, M3, which in the future will serve as the main instrument in the medium and long term indirect analyses. Therefore, firstly, based on the works from Issing (2002) and Brand et al (2002), we will evaluate if the money demand function is still stable, especially after the GFC, and later we will analyse if it still exist a long term relation between money and the price level.

A. MONEY DEMAND FUNCTION

In the theoretical and empirical literature[25], the stability of the relationship between money and prices is typically evaluated in the context of a money demand function. This function expresses the money demand in relation with the price level and other macro-economic indicators like production, the interest rate and the exchange rate. Thus, the first criterion is based on the empiric evaluation following Shijaku (2007), expressed as:

$$M = \beta_1 \rho + \beta_2 \gamma + \beta_3 E X + \beta_4 i + \beta_5 t + \beta_6 D97 \qquad (1)$$

Where, M is real logarithm of domestic demand for narrow and broad money [like the narrow money monetary aggregate (M1), the intermediate one (M2) and the broad money (M3)], ρ is the first difference logarithm of the price index (headline CPI), γ is the

[25] Coenen and Vega (1999), Calza, et. al. (2001), Carstensen (2004), Dreger, et. al. (2006), Beyer (2009), Belke and Czudaj (2010), Padham (2011), Hall, et. al. (2012).

logarithm of real GDP, EX is the logarithm of Albanian real effective exchange rate, i is the interest rate on 12 month time deposits in lek, t is a time trend and D97 is a trend break dummy and a shift dummy, which takes the value 0 for the period 1993 Q4 – 1997 Q2, and 1 otherwise.

Against this approach, the money demand equation is reconceptualised keeping in mind two changes. First, in empirical researches, we specify the money demand as a function of the real balance stock. Thus, we used the real interest rate instead of the nominal interest rate, which allows us to avoid the juxtaposition of nominal and real indicators[26]. Second, the stability criterion is tested starting from 2001 Q1 given that in late 2000, the Bank of Albania changed its administrative operational instruments from those of direct to indirect ones[27]. Thus, the inclusion of the binary variable on the structural breaks potentially related with 1997 would be irrelevant, since the sample estimation starts from 2001Q.

Formally, under the VECM approach, the equation for the money demand is expressed as follows:

$$\Delta X_{i_t} = \beta_0 + \alpha_i \left(X_{i_{t-1}} + \sum_{i=1}^{p-1} \beta_i X_{i_{t-1}} \right) + \sum_{i=4}^{p=1} \beta_i \Delta X_{i_{t-1}} + \varepsilon_{i_t} \qquad (2)$$

Where, Δ is the difference operator, β_0 is a vector of constant terms, β_i are the matrices of the coefficients measuring lagged effect of variables on each other, α_i is the parameter for the speed of adjustment towards equilibrium, $= \varepsilon_t = [\varepsilon_{st}, \varepsilon_{bt}]$ is the vector of error terms and $\varepsilon_t \sim iid(0,\sigma^2)$, $X_{it} = (M, P, Y, EX, i)$ is a vector of κ observable endogenous variables, with i representing the real interest rate on 12 month time deposits in lek and all other variables are as previously defined.

[26] According to Achsani (2010) using the real money balance as dependent variable will also mean that price homogeneity is explicitly imposed into the model. Additionally, studies by Boughton (1981), Johansen (1992a) and Sriram, 1999), suggests that there are less severe econometric problems associated with using real rather than nominal balances. Shijaku, H., (2007) implies that mixing nominal and real may lead to puzzling results.

[27] The main instrument used to transmit the monetary is the interest rate on (reverse) repurchase agreements of one week maturity (REPO or reverse REPO) in open market operations. Hence, the link between money and interest rate is theoretical more compelling.

Following Shijaku (2007), our equation is specified in a framework of equilibrium in the goods and money markets, implying that its empirical analyses are based on the macro-economic theory. First, Y represents a scale variable related the number of transactions and/or overall welfare. Hence, we expect the income variable to have a positive effect on money demand[28]. Second, as Korap and Saarcioglu (2005) suggested, the money demand is a function of the encouraging and/or discouraging motives to hold money especially related with the interest rate inside or outside the country, the return from equities, changes in the exchange rate and the inflation rate, while their sign depends on the strength of the welfare effect against the substitution one[29]. On the one hand, the real interest rate, (i), acts as real moneys own interest rate or as a real opportunity cost indicator measuring the real earnings of alternative assets [Calza et al (2001)]. According to Dreger, et. al. (2006) the coefficient should be negative. Tanku (2006) except it to be positive, but also reveals that the possibility that a negative coefficient is not excluded due to the possible pass-through effect of the interest rates in the alternative investments and credit instruments[30].

In addition, the EX and P constitute another part of portfolio of economic agents. On the one hand, inflation rate (P) account for the rate of return of real assets (or negative rate of return of money) and therefore an expectation of an increase of asset prices would probably decrease the demand for money given that additional inflation increases the opportunity cost of holding money. Thus we expect a negative coefficient for this variable. On the other hand, Padham (2011) believes any increase in stock price might increase the nominal wealth, as returns on investment increases. This might induce people to hold more money and hence demand for money

[28] Quantity theory-based approaches predict unit income elasticity; inventory theories suggest a lower value, whereas portfolio approaches often conclude that the income elasticity could be considerably larger than unity. See also Tanku (2006) and Shijaku (2007).

[29] See: Friedman (1988), Calza et al (2001), Dreger, et. al. (2006), Tanku (2006) and Padham (2011).

[30] Tanku (2006) implies that in both cases, this will increase the opportunity cost of holding money with negative effects on money demand. Hence the possibility that a negative P emerges from the estimation is not excluded.

balances increases. Similarly, if depreciation of the domestic currency is perceived as an increase in wealth, then demand for domestic currency will increase. But, increases in exchange rate may stimulates expectations to further depreciation of the domestic currency, and therefore people might reshuffle their portfolio and prefer to hold large chunk of other attractive and lucrative equities in the portfolios (i.e., substitute toward foreign currency) and conversely[31].

In the empirical aspect, beyond the priorities expressed by Shijaku and Kalluci (2012)[32], another particularity of the VECM approach is related to the fact that this method, differently from the theoretical limitation (but not statistical) of the method Autoregressive Distributed Lag (ARDL) used by Tanku (2006), is not based on the existence of a co-integrated relation (one-side causality)[33], which goes against Friedman's monetary supposition of the Bank of Albania on the monetary policy[34], while we test the money demand stability. On the other hand, we cannot exclude the possibility of the existence of a more than long term relation, as well as we cannot suppose a priori that a part of the indicators are exogenous.

B. MONEY AND INFLATION: THE P* APPROACH

The monetary pillar is an informational approach. It uses money in a price-stability oriented monetary policy strategy and rest on the notion of Lucas (1980) that a given change in the rate of change of quantity of money induces an equal change in the rate of price inflation. The key implication to make this approach applicative is to empirically prove that money contain information

[31] See also Tanku (2006) and Padham (2011).

[32] See also Giorgioni and Holden (2001), Calza et al. (2001) and Juselius (2003) and Tanku (2006).

[33] The model was also valuate with ARDL, whilw the found results according to the ARDL test of the limits support the existence of the on-side causality between the dependent indicators (money stock) and the independent ones under its specification with 4 time delays.

[34] Since the Bank of Albania's medium Term Monetary Policy Strategy presents a clear justification, than the first criterion that was related with the money demand stability was evaluated with the support of the VECM approach.

on inflation developments, to be used by the central bank in its policy formulation process [Paesani (2003)]. This section, hence, provides preliminary evidence on the link between money growth and inflation in Albania, based on Philips-curve (P*) type model by Themeli (2008) along the lines of Gerlach and Svensson (2001), expressed as:

$$\pi_{t+1} = \alpha_{\pi}\pi_t + \alpha_{\pi}\pi_t + \alpha_m m_t + \alpha_{\tau}\tau_{t+1} + \alpha_z z_t + \varepsilon_{t+1} \qquad (3)$$

Where, π_{t+1} represents the difference between the next-period inflation expectations and next-period inflation objective obtained from the annual "Monetary Policy document' published by the BoA; π_t is the difference between current inflation[35] and current inflation objective; m_t is the real money gap or the difference between current real money stock and its potential HP-filter value[36]; τ_{t+1} is the foreign price expectations for Albania[37]; z_t is a set of other supply-side shocks such as real the HP filter output gap, $\check{Y}$, and real M2 money gap growth, m_t; ε_{t+1} is the vector of error terms and $\varepsilon_{t+1} \sim iid(0,\sigma^2)$; $\alpha_{\pi} \equiv \alpha_m \equiv \alpha_{\tau} \equiv \alpha_z > 0$.

This approach, as outlined by Themeli (2008), provides some advantages. First, the model is based on inflation expectations and objective of the central bank. Second, it considers the real money gap. Therefore, there is a more realistic connection between monetary aggregates and inflation. Besides, real money gap also operates along the same lines as the output gap in determining short-run inflation dynamics. Finally, the model allows for a simultaneous estimation of short-run inflation dynamics (based on a Philips-curve type relation) and money demand (based on conventional explanatory variables and specified in error-correction terms).

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[35] This model uses 4 quarter lag of the price level, pt, initially transformed into natural logarithm form.

[36] Themeli (2008) believes equation (3) implies that if the P* model holds, then the real determinant of price inflation is the real money gap instead of the nominal money growth employed usually by monetary targeting central banks.

[37] To account for the idiosyncrasies of the small and open Albanian economy Themeli (2008) included imported prices in the Phillips-curve.

At the same time, based on the suggestion of Themeli (2008), the model specified above was adapted to mirror the deficiencies derived as a consequence of data quality and the evaluation method. First, the specified model is based on a sample that mirror a longer period of time, thus raising the confidence of the empirical evaluation. Second, $\check{y}$ is calculated based on the production gap built according to the production function Cobb-Douglas38, instead of using the HP filter approach. Third, the co-integration approach according to Engel and Granger (1987), is improved based on it according to Johansen (1981). This implies that the model specification is done according to the VECM approach, which is used to calculate the optimal level of the money stock. Furthermore, the method applied for the evaluation of the P* model is improved too based on the GMM approach, which constitute an alternative solution in the cases where the specified model suffers from endogeneity between indicators, in our case that between inflation rate and money. First, this approach allows the usage of instrumental variables to deal with the endogeneity problems between RHS variables and the disturbances[39]. Second, the Hausman test, based on the J-statistic hypothesis, can be used to test the validity of over-identifying restrictions hypothesis.

C. A BENCHMARK REFERENCE VALUE FOR THE ANNUAL MONEY GROWTH

The following section focuses on the RV according to the Fisher equation where the vector of the money circulation is expressed as the money stock function, real income and the inflation rate. For this reason, the money circulation frequency expresses the frequency with which money is transferred between different money holders and by how often this instrument is necessary for the service of a particular level of nominal transactions. Accordingly, solving in

[38] The indicator presents the nominal deviation of the actual GDP from its potential level evaluated according to Kota (2007)

[39] Ordinary Least Square (OLS) and weighted LS (WLS) are biased and inconsistent if right-hand side variables are correlated with the disturbance term. See also Shijaku and Gjokuta (2012).

terms of money growth[40], it implies that the change in the stock of money in an economy equals the change in nominal transactions minus the change in velocity, expressed mathematically as:

$$\Delta m' = \Delta\gamma + \Delta\rho - \Delta v \qquad (4)$$

Where, m' represents the money stock, γ the volume of real transactions in an economy or the real income, ρ the price level and v the income circulation velocity.

In line with Issing, (2002) and Brand, et al (2002), the assessment of the RV is based on the application of a simple method that neglects the possible impact of other macroeconomic variables, e.g. inflation and interest rates, or the money income velocity series. Under this approach, $\Delta\gamma$ and $\Delta\rho$ represent the potential income growth and central bank inflation objective and the indicator to be estimated is Δv. This indicator is evaluated under the hypothesis of the stable behaviour (integrated of null order) around a linear trend and according to the approach of standard unit root tests, like the Augmented Dickey-Fuller (ADF) and the Phillips Perron (PP), expressed as:

$$v_t = \alpha + \beta \cdot t + \varepsilon_t \qquad (5)$$

Where, t represents an indicator of the time trend, ε_t some mean-zero stationary process such that the assumption for medium-term velocity development can be summarised by estimates of β

[40] Following Brand, et al (2002), we made some further assumptions. First, real income is in the long run mainly determined by supply-side factors. Second, velocity is either a stable or predictable function of a small number of explanatory variables. Third, the quantity of money in an economy can be assumed to be determined independently of any of the other three variables as it is supplied by the central bank. To this end, conveying the Fisher identity into the quantity theory of money, would allow for the assumption on the so-called "neutrality" of money, apart from that on a stable relationship between quantity of money and the price level. The former, assumes that changes in the money supply can in the long run lead to changes in nominal but not in real variables. Besides, based on monetary approach, prolonged periods of monetary growth in excess of what would be demanded to finance an economy's growth potential eventually result in inflation. Therefore, the behavior of velocity is of fundamental importance for a central bank as changes in this variable may directly affect the link between money and prices.

in equation (5.1). In contrast to this, velocity is found to be non-stationary; theoretically it would deviate even further from the trend over time. Against this background, under the unit root assumption, velocity can be differenced to obtain a stationary series. Taking the time difference of velocity in equation (5), using the notion:

$$\Delta v_t = \mu + \eta_t \qquad (6)$$

Where, μ represent the random walk drift parameter, η_t is some mean-zero stationary process. This would permit the estimation of the term μ, which could form the basis for the expected money velocity trend over the medium term.

4. EMPIRICAL ESTIMATION APPRAOCH

In this section we present the applied methodology. In the first part we present the description of the data used during the empirical estimation of the money demand, the P* model and the vector of money circulation velocity. In the second part, the empirical results are presented.

A. THE DATA SET

The empirical estimation treated in this paper is based on data spanning from 2001Q1 to 2012Q1 and the reason is twofold. First, it is widely considered that this period reveals greater macroeconomic stability. Second, it is based specifically in the period in which the central bank changed its operational instruments from the direct ones to the indirect ones[41]. The data on quarterly GDP (γ) and Consumer Price Index (CPI) are taken from the Albanian Institute of Statistics (INSTAT). The rest come from the Bank of Albania database. For the money demand model, monetary aggregates indicators and GDP are deflated by CPI to convert those in real terms and together with real effective exchange

[41] Muço et al. (2004) argue that the use of direct instruments until 1999, besides creating distortions in the market, weakened the relationship between inflation and money. See also Shijaku (2007).

rate (REER) are entered in the model as logarithms. The data on 12 month deposits rate (i) is changed in real terms by subtracting the annual inflation rate in Albania, which represents the annualized inflation rate (ρ) calculated as [dlog(CPI)x400]. It is included as the annual growth rate.

Related to the P* model, π_{t+1} represents the difference between the future inflation expectations and the target inflation of the central bank for the same period[42], while π_t represent its actual rate. As in Themeli (2008), the inflation rate is calculated as the annual change in CPI, in logarithmic form. The data on the output gap, ($\check{Y}$), is taken from the Bank of Albania and represents a deviation in percentage of the nominal GDP from the potential GDP estimated by the Production Function Cobb-Douglas approach [Kota, (2007)]. Further, τ_{t+1} is the import price expectations for Albania measured by using a series combining a trade-weighted index of foreign consumer prices and the nominal effective exchange rate based on Shllaku (2007). Regarding other data, m is the annual growth of real broad money and $\check{m}_t$ represents the estimated residual from the equation (2) on M3. Finally, v is a measure of income velocity of broad money estimated as the sum of annualised divided by M3.

B. EMPIRICAL RESULTS

I. UNIT ROOT TEST

In the empirical analysis, we use three quite distinct methodologies, especially in the aspect of the basic criterion related to the characteristics of the order of integration I(d)[43], which makes necessary the analysis of the indicators used by the unit root test approach. Thus, as part of our eclectic approach, we begin by analysing the unit root properties of the indicators used throughout the specified models. First, implementing unit root test approach

[42] In numerical terms, the Bank of Albania aims that the annual growth of consumer prices in the country to be at 3%. Look also the Bank of Albania's Monetary Policy Document (2012).

[43] Under the stability condition, Enders (2010) reveals that the VEC approach is based on the assumption that variables should be integrated of first order I(1), while the OLS and the GMM model require that the data generating process (DGP) to be I(0).

is necessary to understand data characteristics. Second, based on these results, we can make sure that the methodology utilized is adequate to the characteristics of the available data. Table 4 (in the Appendix) presents the unit root test results based on the Augmented Dickey-Fuller (ADF) and Phillips Perron (PP), while the selection of the optimal time lag is based on Schwarz Info Criterion (SIC). All these tests suggest that during this period real monetary aggregate, real GDP, real effective exchange rate, real deposits, real money growth, and the income velocity are integrated of order one I(1). Other indicators are found to be I(0)[44]. This is evidence in favour of the VECM approach. Meanwhile, the P* model (based on GMM) and the money circulation velocity vector model (based on VECM) are estimated in level. For this reason, $\check{m}$ and v enter in the respective models as the first difference.

II. THE VECM APPROACH

As a starting point, following Hall et al (2012), we begin by specifying a general vector autoregressive (VAR) model, which then is parameterised into a VEC model, allowing us to both test and impose the appropriate co-integration rank on the system. The appropriate 4 lags length on VAR model was based on AIC criteria, which also satisfy stability condition and LM-test for serial correlation. But, based on Johansen (1988, 1991, 1995), we found it legitimate to specify the VECM model with four lag instead of three, since in this way is possible to fulfil the serial correlation criterion, as is reported in Table 9 in the Appendix. The, following Sorensen (2009) and Enders (2010), in the next step we assessed the number of long-run co-integrated relationships between money demand and other indicators, based on the Johansen Co-integration Test (JCT)[45]. The results, Table 6 in the Appendix, suggest that throughout the evaluated sample exists at best a co-integrated relation for each of the monetary aggregates[46]. This allows us

[44] This characteristic are confirmed by the analysis with the KPSS method, which can be provided on request.

[45] The JCI test is based on an unrestricted constant and a linear trend in the variables but not in the cointegration relationship.

[46] Shijaku, H. (2007) found at most three cointegration relationship.

to continue the analysis of the normalized money demand as a function of the GDP, the exchange rate, the interest rate and the inflation one. Then, we test in relation with several over-identifying limitations with the LR test with a (χ^2) distribution. First, we analyze the stationary of the inflation rate, ρ, which results (in Table 7 in the Appendix) disprove the null hypothesis, by confirming that the specified model mirrors a real relation between the integrated indicators of order one, I(1). Second, we test for the individual and common characteristics related with the exogenity on the importance of the α coefficient of the other endogen indicators[47]. The results, Table 8 in the Appendix, present supporting evidence in favor of the null hypothesis at the 1% level of importance[48].

The identification scheme for each specified model as shown in Table 1 is relatively similar and the long-run coefficients obtained in are relatively comparable to the results obtained without LR restrictions[49]. First, we note that demand for money is relatively elastic to changes in exchange rate and this effect is statistically significant. For narrow, M1, and intermediate money, M2, the coefficients have a negative sign. However, when we use as dependent indicator broader money, M3, the coefficient has a positive sign, which is related with the fact that this indicator includes the foreign currency deposit stock as well. These findings support the view that the substitution effect prevails in the Albanian economy. The elasticity is found to be higher for M3, followed by the effect of M1. Tanku (2006) found relatively the same results and argues that a reasonable explanation might be probably the easiness and the efficiency to analyse the exchange rate as an opportunity cost indicator than inflation or interest rate. Second, we note that the performance of economic activity is statistically significant in money demand equation and that the coefficient that accompanies this indicator has the expected positive sign. The coefficient value

[47] In this case, the null hypothesis is that all independent variables are weakly exogenous such that they respond to the lagged residuals of the long-run co-integration equation.

[48] The common weak exogenous test cannot be refused in the case of the intermediate money stock (M2). Therefore, the results in Table 1 associated with this indicator are reported without the limitation LR coefficient α. However, as to Shijak and Kalluci (2012), a VEC model the coefficient α allows the formulation of the money demand under the principle of one-side causality.

[49] Results on the model with LR restrictions can be provided on request.

suggests that for every 1 percentage increase in economic activity (γ), demand for narrow money would increase on average around 0.184 compared to 0.228 for the intermediate money. Income effect is found to be higher for broader money, accounting to an average of around 0.345 per cent. Besides, this impact is found to be lower than Tanku (2006) and Shijaku, H. (2007) and as such support an inventory money demand theory.

Third, in the statistical aspect, the real interest and inflation elasticity appear to contribute significantly to this long-term pattern of money demand, but in the influential aspect, it prevails a relatively weak and less elastic relation. The former, as in Shijaku (2007), is found to be negative in contract to a positive relationship found by Tanku (2006)[50]. The latter, although has a negative sign, its elasticity is relatively lower among the other explanatory indicators. This result is relatively similar in the short and the long term. This implies that the money demand is relatively less elastic against developments in the inflation rate[51]. Taylor (1991) would attribute this to low inflationary pressure within the country, but according to Padham (2011) the argument goes beyond. First, this might clearly reflect the rational behaviour of domestic agent to hold considerable excess reserves of domestic liquid assets. Second, the low elasticity might also imply that tradable goods are as important as alternative asset as foreign currencies are, since they can create inflationary pressures, but on the other side are exposed to the exchange rate risk. Thus, the expected elasticity of the money demand against inflation, as expresses in Friedman's consumption theory, could have shifted to the exchange rate.

Overall, findings are consistent with economic theory. According to Kulkarni and Erickson (2000), the estimated interest rate would support the monetarists' argument of no role of interest rate in money demand. Besides, based on Padham (2011), both real income and interest coefficient are consistent with the Keynesian theory of money demand. Furthermore, as in Tanku (2006), findings clearly show

[50] In following the suggestion by Shijaku (2007), when real 12 months T-Bill rate did not yield better results when it was used instead of real deposit rate. The model was also as in the case of Tanku (2006) was instable and lost the cointegration properties.
[51] Tanku (2006) and Shijaku, H., (2007) found also the same results.

that the exchange rate channel is more powerful and significant than the interest rate one in the case Albania.

Regarding other estimated properties, the sign of the coefficients and the statistical significance of the error term at the 1 percentage significance level reconfirm the co-integration properties found by the JCT procedure. Money demand is therefore found to be co-integrated with other explanatory variables across all specified models in the long-run. The LR equilibrium is achievable and there is an error correction mechanism, which adjusts money market back to equilibrium. As in Tanku (2006) and Shijaku (2008), first, the speed of adjustment continue to be slow among the money components. Second, this process is faster for the more liquid component, indicating that shocks to less liquid components of money demand are more persistent, especially for M3. But the magnitude is even lower than in the case of the bank credit demand found by Shijaku and Kalluci (2012).

Finally, the primary focus of this study is the evaluation of the money demand function in the aspect of a stable relation. Hence, given the relatively short data span over the sample, we tested for the stability condition by means of CUSUM and CUSMSQ test[52], which in these cases give more stable results. The results of these testes are reported in Diagram 1 in the Appendix. They suggest that the residue variation is within the limits at 5% level of importance. This implies that the money demand function throughout the estimated data span is stable in the case of Albania, which means that the first criterion for the evaluation of the reference value is fulfilled.

[52] According to Lütkepohl (1993) aand (2005) and Hofmann (2001) the VEC approach does not strictly depend on the normality assumption and therefore the violation, hence, of the normality assumption might not be too severe to our analysis.

Table 1: Identification of the LR relationship for money demand with no LR restrictions

	EX	γ	i_r	ρ	c	ECM	Adj R	SSR	AIC	DW
	-0.610	0.184	-0.021	-0.074	3.440	-0.286	0.61	0.03	-3.91	1.94
	[2.0]	[-9.9]	[1.9]	[4.3]		[-5.3]				
	-0.212	0.228	-0.015	-0.008	0.958	-0.205	0.60	0.01	-5.83	1.78
	[2.1]	[-34.0]	[4.0]	[1.5]		[-6.4]				
	0.746	0.345	-0.022	-0.009	-6.358	-0.146	0.69	0.01	-5.68	1.76
	[-8.5]	[-54.8]	[4.2]	[1.8]		[-3.5]				
Based on Newey-West HAC Standard Errors & Covariance (lag truncation=3)										
T-statistics in [ ]										

Source: Authors' calculations

III. THE P* APPROACH

This section provides results on the relationship between inflation, output and money stock in the case of Albania, using data for the period 2001–2012. As explained in previous sections, first, the long-run elasticity (LRE) money demand is based on equation (2) and is estimated by VECM approach. Hence, the real money gap, $\breve{m}_t$, obtained represents the difference between the real money stock and real LRE money balance, $m_t - m_t'$. Second, based on unit root results, the model is estimated in level using GMM approach, with money growth entering the model as first difference. Third, following Gerlach and Svensson (2001), the instrumental variables are based on the lag of RHS variables with four lags. The Hausman test provides supportive evidence on the validity of over-identifying restrictions hypothesis.

As shown in Table 2 the P* model is shown to have considerable empirical support. All estimated coefficient have the expected positive sign and apart from real money growth are statistically significant at conventional levels of confidence. The coefficient on price gap, π_t, is substantial and significant at a 1% level of confidence. Thus, based on the coefficient magnitude, it contains more information about future inflation than other explanatory variables. This indicates a strong inertia in inflation development and substantial predictive power for future inflation. The point estimate of 0.48 is lower than the magnitude found by Themeli (2008). Based on Gerlach and Svensson (2001), this implies that the weight of the inflation objective in expected inflation is around

0.52[53]. There is, hence, a higher credibility of BoA's inflation target regime, with inflation expectations being anchored to the 3% target of the BoA. A preliminary explanation might be the longer time span under current BoA's inflation target regime.

At the same time, m_t has the expected positive sign and is statistically significant at 5% confidence level. This coefficient of around 0.269 percentage point outperforms the remaining variables at explaining inflation rate. By contrast, coefficient related with $\check{\gamma}_t$ and τ_{t+1} indicators are statistically significant, but their magnitude is relatively small. The former is found to have the smallest impact among the explanatory variables. Similar to the findings of Gerlach and Svensson (2001) and Themeli (2008) results suggest that the τ_{t+1} is an inferior indicator for explaining inflationary expectations in the future. On the other hand, the coefficient related with $\Delta(\check{m}_t)$ is still low and statistically non important, in the conventional level of confidence, but, differently from Themeli (2008), has an expected positive sign.

Overall, as in Themeli (2008), the findings reported by the P* model provide some essential results. Most importantly, money stock continues to provide pivotal information on the aspect of inflationary pressures, but based on the magnitude of the coefficients, the target inflation regime represent an improvement compared with the monetary target. However, following findings in the previous sector, this is another suggestion that implies that the second criterion on the ability of the monetary indicators to anticipate the inflationary pressures in the future is fulfilled as well.

[53] Accordingly, measures the weight people attach to past deviations of inflation from the target value in forming their inflation expectations.

Table 2. Results of P model on GMM specification techniques*

Depend Variable: Method: Generalized Methods of Moments Sample (adjusted): 2001 Q12011 Q4 Included observations: 44 after adjustment Convergence achieved after 44 weighted matrices 45 total coefficient iteration				
	Coefficient	Standard Error	t-Statistic	Probability
c	-0.00253	0.002	-1.220	0.230
π_t	0.48204	0.122	3.950	0.000
m_t	0.26861	0.127	2.117	0.041
τ_{t+1}	0.07777	0.018	4.337	0.000
$\check{y}_t$	0.09544	0.029	3.306	0.002
$\Delta(\check{m}_t)$	0.09548	0.136	0.703	0.486
R^2	0.218	J-statistic	0.011	
R^2 i korrektuar	0.116	Coef. OverID	0.004	
SSR	0.001	[Prob.]	0.176	
a – indicators in the RHS are used as instrumental variables with 4 lags.				

Source: Author's calculation

IV. THE REFERENCE VALUE

In light of the supportive findings from the previous sections, this section provides the results on the trend in money circulation velocity based on a simple linear model. The equation is expressed by including the vector of the broad money circulation, M3, and the reasons are threefold. First, the ECB's reference value is based on aggregate money supply. Second, under the current approach, the broad money M3 growth rate serves as an intermediate target of BoA's monetary policy. Third, as Themeli (2008) notes, the M3 aggregate is more stable than the M2 aggregate since the former is a comprehensive indicator of the monetary developments of the domestic economy.

The standard ADF and PP unit root tests are employed to test equation 5 in Section 3.C by taking into consideration the entire sample period (2001 Q1-2012 Q1)[54]. The results of these tests are provided in Table 4 in Appendix. They demonstrate that the log level of income velocity of M3 is non-stationary. These findings are also confirmed by PP test. Hence, as is explained in the Section 3.C. as well, the analysis is focused entirely on the evaluation of equation 6 according to VECM linear approach. Results are provided in Table 3 and they give data about the developments related to the circulation money velocity vector, M3, for different periods. This selection was done with the justification that the period 2000 Q2 – 2012 Q2 mirrors the implementation of the monetary policy of the Bank of Albania through indirect instruments, while within that period the expected target of the inflation has been different. Thus, in the period 2001 Q1 – 2005 Q1 the expected target of the inflation rate was within 2-4%. Later, from 2006 Q1, the Bank of Albania presented a new mechanism, that of the numeric target of 3% with a fluctuation possibility of ±1 percentage point around this central value. Finally, the results report the findings of the period 2008 Q4 – 2012 Q2, which closely related with the GFC. The table also contains the standard equation diagnostics test results, such as the p-values for the LM tests for serial correlation and the Jarque-Bera test for normal distribution and the CUSUM and CUSUM SQ test for stability of the model overall.

In analysing the results we notice that the trend parameter vector related with the study sample for longer time spans (samples a, b and c) lie relatively close to -3%, while in the case of sample d, its value reaches around -3.5%. For the more recent sub-sample d the point estimate is closer to -3.5% That said, while in appearance similar, these values may be treated as the lower and the upper limit, which implies that the money circulation velocity rate decreased with an expectation which value oscillates in a range between 3% to 3.5%. Against these results, the findings can be used to calculate the reference value for the annual growth rate of money stock in the case of Albania, based on equation 4. Thus, in implementing this equation and taking into consideration that the potential GDP and the expected inflation rate target are at 3%, than the RV for

[54] Unit root test are carried out also for different sample period as outline in Table 3.

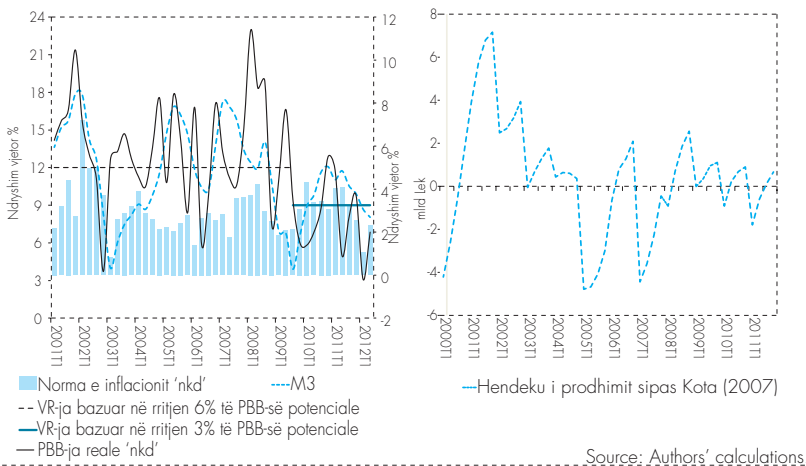
the annual growth of the M3 is expected to be at 9%. However, as Band. et. al., (2001) and Themeli (2008) have suggested, the calculated RV does not serve as a parallel target for the Bank of Albania along with the target inflation regime. On the contrary, its value should serve as an alternative instrument for measuring in time the inflationary pressures in the medium term period and/or long term, which will serve to achieve better the final objective of the central bank, achieving and maintaining price stability.

Table 3: Results of the trend income velocity for broad money

Sample		Koefic.	DW	SSR	AIC	LM-test	Normality	C	CSQ
a.	2000 Q1 – 2012 Q2	-2.8%	2.04	.230	-2.48	.97	.75	S	S
b.	2001 Q1 – 2012 Q2	-2.9%	2.01	.220	-2.44	.99	.73	S	S
c.	2006 Q1 – 2012 Q2	-3.0%	1.96	.107	-2.63	.82	.57	S	S
d.	2008 Q4 – 2012 Q2	-3.4%	1.96	.044	-2.74	.82	.51	S	S

Source: Authors' calculations

Graph 1 the estimated reference value for annual money growth in the case of Albania



Source: Authors' calculations.

5. CONCLUDING REMARKS

The main focus of this paper is the analysis of the monetary developments keeping in mind the role of the money as a second important pillar for the monetary policy of the Bank of Albania, in accordance with its primary objective, that of price stability. For this reason, the material analyses the money demand function and the relation between the monetary developments and the inflationary ones in the medium and long term, which than are used to estimate the RV for the expected broad money annual growth rate, M3, in the period 2000 Q2 – 2012 Q2. The former is analysed according to the VECM approach, while the stability of the function is based on the implementation of the stability tests procedures, like the Cumulative Sum and the Cumulative Sum Squared. The latter, is supported on the estimations of the P* model according to the GMM approach. Finally, the RV calculation is based on the standard Fisher equation.

On the individual aspect, the results support the monetarist argument that the interest rate does not play an important role in the determination of the money demand, which, if we refer to the income elasticity results as well, it is not noticed in the case of the Keynesian approach to this function. Secondly, the exchange rate channel is rather important, while the inflationary pressure play a modest role. In any case, the results suggest that in the long term money is closely related with developments in income, exchange rate, inflation rate and the interest one. We notice that there exists an error correction mechanism that returns the monetary market in a balanced level. This process is relatively faster for the liquidity money indicators, which implies that the effect of shocks in the other cases is more persistent, especially in the case of broad money, M3. Finally, the money demand function is stable, despite the influence of the global financial crisis.

It is important to highlight that the results of the P* model support the role of money as an important instrument in the Bank of Albania's strategy for anchoring the inflationary expectations within the accepted target. Its explanatory ability is stronger that those found for the indicators related with output and import prices. Also, we

notice that there exists a strong inertia in the inflationary pressures' behaviour, while the credibility of the inflation target regime is estimated to have grown, since the inflationary expectations has been more oriented toward the target of the central bank. In any case, in the operational point of view and in function of the fulfilment of the legal obligations, the inflation target regime constitutes an improvement against the monetary target regime.

Finally, it is estimated that the money circulation velocity, M3, decreases with an expectation whose magnitude is within 3% - 3.5% in annual terms. Hence, in these conditions, it is calculated that the RV annual growth rate of the money stock should be 9%. This is estimated to be the optimal level in accordance with the primary objective, that of price stability and production stimulation. It should serve as an alternative instrument throughout the decision-making process, according to the principle of the two-pillar system of the ECB, that of identifying in time medium and long term inflationary pressures.

In these conditions, it is important to highlight that the monetary aggregate are not and cannot be the only element used during the decision-making process. Thus, deviation from the calculated RV should be interpreted as an important indicator, but not conclusive, of the possible inflationary/deflationary pressures in the future. Development related with the broad money stock, provide a more cohesive structure of the monetary developments, which is estimated as more stable in time compared with other indicators, but it should not be interpreted narrowly. At the same time, changes in the growth rate should be cause for automatic changes in the course of the monetary policy in the country.

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APPENDIX

Table 4. Unit Root Testa [Prob.].

Indicators	Level	First difference				
	Intercept	Intercept and trend	None	Intercept	Intercept and trend	None
	Augmented Dickey-Fuller (ADF) test					
M_1	[0.440]	[0.114]	[0.897]	[0.052]	[0.143]	[0.007]
M_2	[0.011]	[0.939]	[0.966]	[0.189]	[0.003]	[0.046]
M_3	[0.980]	[0.257]	[0.980]	[0.236]	[0.459]	[0.310]
EX	[0.509]	[0.712]	[0.770]	[0.000]	[0.000]	[0.000]
i_r	[0.071]	[0.137]	[0.342]	[0.001]	[0.005]	[0.000]
ρ	[0.016]	[0.066]	[0.261]	[0.000]	[0.000]	[0.000]
γ	[0.051]	[0.997]	[0.997]	[0.043]	[0.000]	[0.241]
π	[0.012]	[0.054]	[0.571]	[0.000]	[0.000]	[0.000]
m	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
τ	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]
$\check{\gamma}$	[0.045]	[0.068]	[0.004]	[0.000]	[0.000]	[0.000]
$\check{m}_t$	[0.176]	[0.304]	[0.255]	[0.000]	[0.000]	[0.000]
v	[0.927]	[0.508]	[0.007]	[0.000]	[0.000]	[0.000]
	Phillips-Perron (PP) test					
M_1	[0.517]	[0.771]	[0.955]	[0.002]	[0.010]	[0.000]
M_2	[0.016]	[0.629]	[1.000]	[0.000]	[0.000]	[0.000]
M_3	[0.291]	[0.396]	[1.000]	[0.000]	[0.000]	[0.000]
EX	[0.517]	[0.705]	[0.779]	[0.000]	[0.000]	[0.000]
i_r	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
ρ	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
γ	[0.305]	[0.607]	[1.000]	[0.000]	[0.000]	[0.000]
π	[0.002]	[0.006]	[0.610]	[0.000]	[0.000]	[0.000]
m	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
τ	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]
$\check{\gamma}$	[0.139]	[0.212]	[0.021]	[0.000]	[0.000]	[0.000]
$\check{m}_t$	[0.211]	[0.400]	[0.255]	[0.000]	[0.000]	[0.000]
v	[0.927]	[0.417]	[0.008]	[0.000]	[0.000]	[0.000]
a automatic lag selection based on Schwarz Info Criterion						

Source: Authors' calculations

Table 5. VAR Lag Order Selection Criteria for monetary aggregate.

Sample: 2001Q1 2012Q4, Included observations: 45						
Lag	LogL	LR	FPE	AIC	SIC	HQ
Narrow Money (M1)						
0	57.66631	NA	6.62e-08	-2.340725	-2.139985	-2.265891
1	123.9553	114.9010	1.07e-08	-4.175793	-2.971352*	-3.726790*
2	149.5564	38.68601	1.08e-08	-4.202506	-1.994363	-3.379332
3	189.9692	52.08768*	6.10e-09	-4.887522	-1.675677	-3.690179
4	223.3595	35.61631	5.28e-09*	-5.260424*	-1.044878	-3.688911
Intermediate money (M2)						
0	111.1521	NA	6.15e-09	-4.717873	-4.517133	-4.643039
1	181.7253	122.3268	8.18e-10	-6.743346	-5.538904*	-6.294342*
2	206.5949	37.58073	8.58e-10	-6.737550	-4.529407	-5.914377
3	237.9816	40.45401*	7.22e-10	-7.021405	-3.809561	-5.824062
4	270.1035	34.26336	6.62e-10*	-7.337934*	-3.122388	-5.766421
Broad money (M3)						
0	102.4033	NA	9.07e-09	-4.329036	-4.128295	-4.254202
1	167.0198	112.0019	1.57e-09	-6.089769	-4.885328*	-5.640766*
2	189.0372	33.27075	1.87e-09	-5.957210	-3.749067	-5.134036
3	221.1630	41.40657*	1.53e-09	-6.273911	-3.062067	-5.076568
4	254.1505	35.18661	1.34e-09*	-6.628909*	-2.413363	-5.057396
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Source: Authors' calculations.

Table 6. Unrestricted Cointegration Rank Test (Trace) for monetary aggregate.

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
Narrow Money (M1)				
None *	0.598857	93.42422	69.81889	0.0002
At most 1 *	0.488457	52.31955	47.85613	0.0180
At most 2	0.260431	22.15502	29.79707	0.2900
At most 3	0.160606	8.579097	15.49471	0.4057
At most 4	0.015451	0.700730	3.841466	0.4025
Intermediate money (M2)				
None *	0.513754	86.03205	69.81889	0.0015
At most 1 *	0.446171	53.58526	47.85613	0.0132
At most 2	0.347526	26.99480	29.79707	0.1017
At most 3	0.127501	7.780487	15.49471	0.4892
At most 4	0.035848	1.642776	3.841466	0.1999
Broad money (M3)				
None *	0.686713	90.20953	69.81889	0.0005
At most 1 *	0.417231	48.98098	47.85613	0.3028
At most 2	0.189743	13.68259	29.79707	0.8580
At most 3	0.089139	4.214433	15.49471	0.8855
At most 4	0.000289	0.013006	3.841466	0.9090
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Authors' calculations

Table 7. Testing restrictions in a VECM: Is D(p) stationary [I(0)]?.

Null Hypothesis: $\Delta(\rho)$ is stationary around a constant			
LR test for binding restrictions (rank = 1):	(M1)	(M2)	(M3)
Chi-square(4)	32.64347	20.89874	35.72653
Probability	0.000001	0.000332	0.000000
Cointegration Restrictions: B(1,1)=0, B(1,2)=0, B(1,3)=0, B(1,4)=0, B(1,5)=1			
Convergence achieved after 1 iterations.			
Restrictions identify all cointegrating vectors			

Source: Authors' calculations.

Table 8. Testing restrictions on weakly exogenous variables.

Hipoteza zero: A(r,i)=0 wshtw ekzogjen i dobët					
Convergence achieved after 28 iterations.					
LR test for binding restrictions (rank = 1):					
	EX	γ	i_r	ρ	Joint
M1					
Chi-square(4)	2.847134	6.439066	4.675852	5.854839	16.79763
Prob.	0.091537	0.011164	0.030590	0.015534	0.002116
M2					
Chi-square(4)	0.497265	3.346930	0.386687	0.895275	5.202652
Prob.	0.480704	0.067330	0.534046	0.344052	0.267129
M3					
Chi-square(4)	16.20040	4.549445	0.000482	0.085041	37.70502
Prob.	0.000057	0.032929	0.982483	0.770579	0.000000

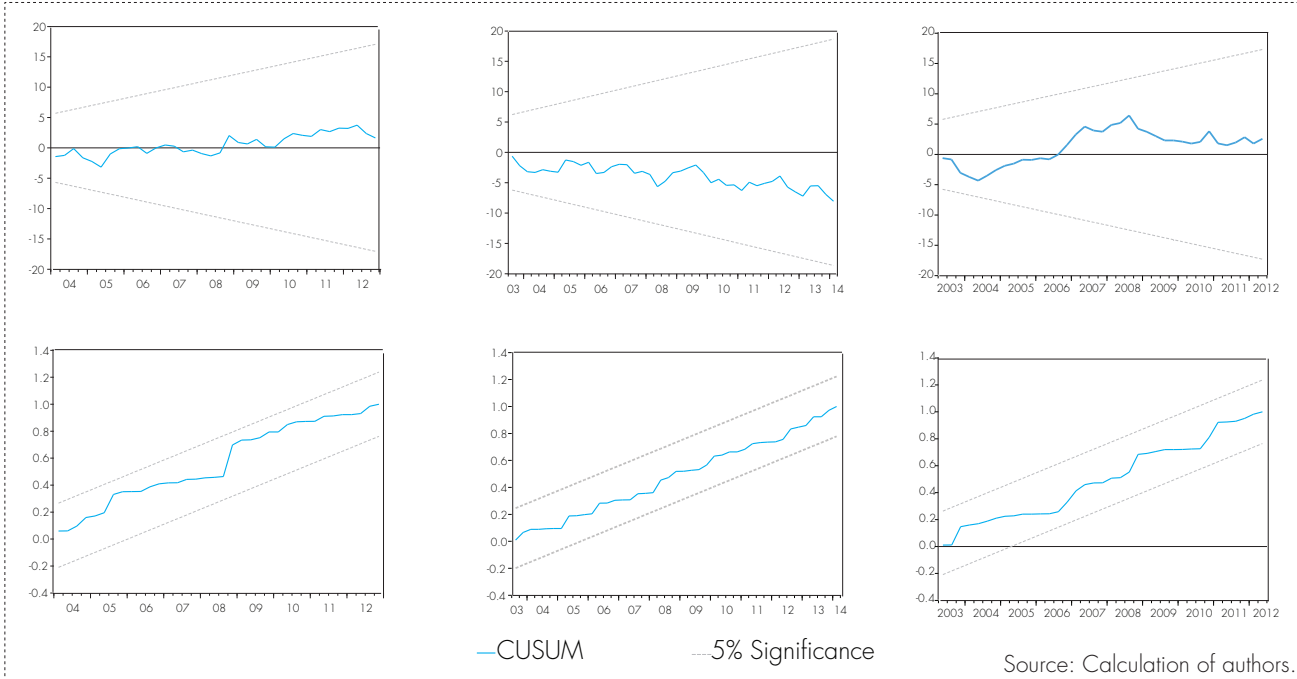
Source: Authors' calculations.

Table 9. VEC Residual Serial Correlation LM Tests for monetary aggregates.

Null Hypothesis: no serial correlation at lag order h						
Sample: 2001Q1 2012Q4, Included observations: 45						
	(M1)		(M2)		(M3)	
Lags	LM-Stat	Prob	LM-Stat	Prob	LM-Stat	Prob
1	35.01506	0.0879	31.07336	0.1866	34.75428	0.0927
2	24.19423	0.5082	31.30295	0.1792	31.70975	0.1666
3	24.41567	0.4955	27.68485	0.3226	22.19657	0.6244
4	33.66330	0.1153	29.67451	0.2367	42.60828	0.0154
Probs from chi-square with 25 df.						

Source: Authors' calculations.

Diagram 1. Money demand stability test analysis based on CUSUM and CUSUMSQ test without LR restrictirons.



Source: Calculation of authors.

A comparison of Friedman's and ECB's Principle and Bank of Albania's Policies		
Friedman	ECB	Bank of Albania
Policy objective: price stability (not precisely defined)	Policy objective: Price Stability, defined as an inflation rate below, but close to, 2 percent in the medium term.	Policy objective: Price stability, defined as a year-on-year increase in the CPI for Albania of 3.0% with a tolerance band of ± 1 percentage point around this central numerical figure.
Policy implementation: increase the money supply (M2) by 3 to 5 percent annually.	Policy implementation: "Two pillar" – "economic analysis" and "monetary analysis" – are used to assess the risks to price stability.	Policy implementation: a comprehensive analysis of economic and financial indicators is used to assess the risks to price stability.
	At inception of the ECB, a 4.5 percent reference value for money supply (M3) growth was set. The reference value was a norm, not an objective.	The quantitative adequacy levels of money growth are revised over the course of the year, consistent with the performance of monetary developments and the corrective measures proposed by the BoA in the monetary programme
An advantage of a money growth rule is that it is easy to understand.	Policy objective (price stability in the medium term) is transparent and easy to understand.	Policy objective (price stability in the medium term) is transparent and easy to understand.
An objective of money growth rule is to eliminate policy uncertainty.	Policy is tailored to reduce uncertainties related to the current state of the economy, the behavior of economic agents (parameter uncertainty), and the nature of the true economic model (model uncertainty).	
Long-run money demand is stable.	Money demand was found to be stable through early 2000s and unstable thereafter. The role of a reference value was, therefore, diminished.	Money demand was found to be stable after 1998.
Real money demand subject to autonomous shocks	Medium-term orientation allows policy to respond flexibly to temporary shocks.	Medium-term orientation allows policy to respond flexibly to temporary shocks, given Albania is a small, open and emerging economy.
The central bank can control is often destabilizing	Policy focuses on controlling the price level, a nominal magnitude.	Policy focuses on controlling the price level, a nominal magnitude.
Monetary policy actions have long and variable lags.	Medium-term orientation aims to account for long and variable lags of monetary policy actions.	Medium-term orientation allows to account for transmission lags and the inability of monetary policy to offset unanticipated shocks to the price level.
Countercyclical policy is often destabilizing.	Medium-term orientation recognizes that countercyclical policy can increase instability.	Medium-term orientation recognizes that countercyclical policy can increase instability.
It is important to maintain a clear separation of monetary policy from fiscal policy.	Article 123 of the Treaty on the Functioning of the EU (the Treaty) prohibits the monetary financing of fiscal actions.	Pursuant to Article 30, paragraph 1of the Law No. 8269, (1997), "On the Bank of Albania", prohibits the monetary financing of fiscal actions, except as otherwise specifically authorized by this Law.
Expectations-augmented Phillips curve: Price expectations are a key determinant of present inflation.	The definition of price stability provides an anchor for the formation of price expectations, under the presumption that price expectations are key determinants of present inflation.	The definition of price stability provides anchor for the formation of price expectations in the economy and augment certainty in the economic decision-making process, under the assumption that expectations of inflation are a key determinant of actual inflation.

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