WORKSHOP

MONETARY POLICY ISSUES AND INFLATION FORECASTING

CONTENTS

COMPLIMENTARY SPEECH

*Ardian Fullani**

Dear colleagues,

It is a great pleasure to me to share with you some thoughts in this meeting on monetary policy and the inflation forecasting process at central banks, and the Bank of Albania in particular.

In the developed countries low inflation has become a main objective of central banks. They try to maintain price stability through implementing a monetary policy based on various regimes. The monetary policy conduct is thereby a forward looking process, irrespective of their regime. This implies that it takes some time before monetary policy decisions affect the level of prices in the economy. For this reason, inflation forecasting is an important task for central banks in conducting monetary policy.

While a lot of progress has been made in terms of both theoretical and econometric models in the last decade, inflation forecasting still remains a difficult task that requires continuous efforts. We are living in a quickly changing world where many shocks hit our economy. This makes the task of inflation forecasting even more difficult. The ambiguous and changing economic structure of Emerging markets like Albania further even complicates this task.

Our current forecasting methods at the Bank of Albania are based on small non-structural models. Although they do not include all the economy links, due to some serious restrictions and data series being not yet fully reliable, their performance has been rather satisfactory. This has been partially reflected as well in the good results of monetary policy achieved in the recent years. Meanwhile, to gain more time in the process, intense work is in progress to build even more complex structural models on inflation forecasting that would better meet the current developments and expectations of the economy. To this end, the Bank of Albania is being assisted by IMF experts, whom I warmly welcome today here - Prof. David Mayes and Ms. Marga Peeters - together with our colleagues from Turkey, Monte Negro and Kosovo.

As already said, Albania has shown impressive results in terms of price stability. Inflation has been distinguished generally by lower rates in Albania relative to other transition economies, and not too far from inflation rate of the euro area countries. However, there have been cases where inflation has unavoidably diverged from our target due to unforeseen shocks and other factors that generally were beyond the central bank's control.

The Bank of Albania aims at keeping inflation low. Pursuing this goal successfully will require a lot of efforts to overcome the obstacles that may stand in our way, without penalizing the economic growth. Among the issues that require a particular attention I would highlight: the warmth of the economy as a result of the progress of structural reforms, the fluctuations in the emigrants' remittances and their implication on exchange rate volatility, financial system developments, etc.

Concerning these issues, we may emphasize that the whole banking system is now under private management. This is expected to boost banking competition, improve service quality, and deepen the channeling of banking credit in the economy. All these factors will contribute towards a sounder banking system. Meanwhile, the Bank of Albania carefully follows and analyses the implication of these developments in the banking system reaction to monetary policy decisions. Also, these developments require a particular attention

on further improving the Bank of Albania supervisory capacity and regulatory framework.

The Bank of Albania is committed to go ahead with additional structural reforms to enhance banking sector intermediation and financial services provision. In close consultation with commercial banks, governmental institutions, and the private sector, the Bank of Albania just developed a strategy for increasing the use of the banking system in the regular conduct of business in the framework of cash reduction in the economy.

Returning to the topics of this workshop, I want to stress that inflation forecasting is an important condition even for the monetary policy transparency, which helps in improving the effectiveness of transmission mechanism and increasing the accountability of an independent central bank. Given their high importance, I am committed to encourage these kinds of events. Bringing together experts from neighboring countries and broader is essential to improve our professional skills and better conducting the monetary policy.

Let me conclude. Thank you for being here with us. I sincerely hope that the workshop will be a success, both for a closer regional cooperation and for fruitful discussions on sound monetary policies.

I now have the pleasure of declaring this workshop open.

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BANK OF ALBANIA MONETARY POLICY -OBJECTIVES, POLICIES, INSTRUMENTS-

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ABSTRACT

Albania's transformation into a free market economy required the abolition of price and credit control policies and the establishment of a two tiers banking system. It also necessitated the introduction of monetary policy, as one of two demand-management macroeconomic policies. Since its inception, the monetary policy of the Bank of Albania has evolved, gradually maturing into a modern design. This process has been driven by Albania's economic and financial realities and by the desire of the Bank of Albania to be at the forefront of the reform process. This short paper will give a comprehensive overview of the evolution of the monetary policy framework of the Bank of Albania, concentrating on the later part on its current set-up.

1 MONETARY POLICY IN THE LAST DECADE

The actual law on "Bank of Albania" clearly defines the final objective of the Bank of Albania to "…achieve and maintain price stability". The Law charges Bank of Albania with other objectives as well, such as to "…promote the development of banking and financial system, promote the development of the payments system, and provide the necessary conditions in order to achieve a balanced

and sustained growth", but they are clearly subject to the primary objective and thus, do not hamper the monetary policy focus on price stability. We consider this unambiguous legal mandate and working objective to be very much in line with the best practices of central banks. The shared wisdom of the economics profession suggests that keeping inflation under control is the best contribution a central bank can offer to the economic development.

Such an explicit expression of the objectives of the central bank has not been offered at the beginnings of modern central banking activity in Albania. According to the first law on Bank of Albania, approved in 1992, the main objective of the central bank was to maintain the value of the domestic currency, Lek[1].

During the first transition years, the Bank of Albania objective for a stable Lek value was translated into monthly inflation rate targets. This was due to the high inflation rates of 1992 and 1993. Because of tight monetary policies and budget deficit controls, inflation rate came down until it reached single digit figures by end 1995. At this time, it was reasonable to think of longer time horizons for inflation targets. As a result, the inflation target was switched to quarterly rates and, by 1995, into an annual rate.

After the social and political disorders of 1996-1997, during which the economy suffered heavily, the country embarked into yet another stabilization program. Once again, tight monetary policy and a prudent fiscal policy brought down inflation rates and restored a certain level of macroeconomic equilibriums. Starting from 2000, it has been continuously stated publicly that the objective of the Bank of Albania is the annual inflation rate at the end of the year, set as a band between 2-4 per cent.

Nowadays, or maybe even earlier starting since late '80s, the academic and professional opinions are converging to the point that low inflation means higher economic growth and higher employment rate. Many theoretical arguments in favor of or against the presence of inflationary pressures in economy have been brought forth, providing room for different interpretations, such as the one that an expansionary monetary policy can generate higher growth and

higher employment. However, it should be noted that this does not hold true over long time periods, since the empirical evidences show that inflation and economic growth are negatively correlated, i.e. the higher the inflation rate, the lower the economic growth (Barro 1995, De Gregorio 1994, Fischer 1994).

In the Albanian experience, one of the most appreciated achievements during the last eleven years has been the control that the monetary authority of the country has exerted on inflation. The process has been a long and a continuous one, with ups and downs, but in general it can be assessed as a successful attempt. The statistical data for the last 3-4 years indicate low inflation rates which most of the time fluctuate within our target interval (2-4 per cent). Even though during the last years there have been changes in the basket items, as well as important domestic or foreign political events, including armed conflicts in the region, a careful monetary policy combined with a controlled budget deficit have contributed to controlling the aggregate demand and keeping inflation pressures at reasonable levels.

1.1 Monetary policy framework

Monetary policy regime

Bank of Albania was legally mandated to design and implement the monetary policy in Albania. In detail, it was given legal mandate to determine the necessary features of domestic monetary operations, as well as formulate the foreign exchange policy of the country. However, in 1992, the choice of the monetary policy regime was confined by the economic environment and the functioning of the transmission mechanism in early '90s.

Judging by the experience of transition countries, one cannot get a clear and ultimate answer as to which regime performs better. Rather, it seems the choice should be based on a careful evaluation of country-specific features and, more importantly, it should be coordinated with other macroeconomic policies. Now, years after we made this choice, it can be concluded that we took the right

decision. Bank of Albania has targeted its liquidity and interest rate policies towards achieving its inflation objective but, at the same time, by keeping an independent monetary policy, it has had more flexibility to respond to crisis situations, such as the one of deposit withdrawals in 2002.

The choice between the two alternatives, monetary or exchange rate targeting was conditioned by the fact that it was virtually impossible at the time to support a fixed exchange rate regime. Even though the stabilizing effects on inflation and interest rates might have come faster under a fixed exchange rate regime, the international reserves of Bank of Albania were at very low levels at that time. Moreover, the balance of payments deficit was increasing rapidly as a result of uncompetitive domestic production. In these circumstances, priority was given to the monetary targeting regime, where the intermediate objective was (and still remains) the M3 aggregate or broad money.

The design of monetary targeting in Albania, which also sustains the adjustment programs supported by the Fund, is based on the monetary approach to balance of payments. This approach aims at designing sound domestic management policies with respect to generating a sustainable external position of the country. Special attention is paid to the coordination of monetary and fiscal policy. Because of the fiscal domination, this is a crucial issue in countries like Albania. In compliance with the normal set-up of adjustment programs, this framework is complemented with the conditionality on foreign reserves (floor) and domestic assets (ceiling) of Bank of Albania, as well as on the overall domestic financing of the budget deficit. In a way, de facto, these limitations assume the status of operational targets. The economic reasoning behind these targets is the following:

- The change in net foreign assets[2] of Bank of Albania reflects balance of payments developments. These foreign reserves serve to hedge the exchange rate of Lek (Albanian domestic currency) from short-time speculations. International reserves are considered as the last resort to finance expenditures or consumption in an economy, in emergency cases, and for this reason they are measured in months of imports.

- The net domestic assets of Bank of Albania represent part of the liquidity generated by the Bank of Albania in the system. Changes in net domestic assets come mainly from transactions between Bank of Albania with commercial banks and government. The liquidity generated by these transactions accounts for most of the liquidity in the whole economy and thus, has an impact on inflation performance.
- The domestic financing of the budget deficit is meant to control both the budget deficit, thus indirectly the fiscal expenditures and domestic demand pressures, and the money supply. Since this objective relates to the behavior of three actors, Ministry of Finance, Bank of Albania and commercial banks, Bank of Albania cannot have full control over it and therefore, it is not responsible if limitations are not met.

Monetary targeting and monetary program

In compliance with its monetary targeting framework, BoA develops its monetary policy around an annual monetary program. Besides supporting the medium-term orientation of monetary policy, this program is part of a broader, financial programming framework. The financial program supports the NSSED strategy[3] and the PRGF agreement[4] between Albania and IMF. As such, it links the monetary policy of BoA with other macroeconomic policies, and crucially with fiscal policy.

Box 1. What is financial programming?

Financial programming is a comprehensive set of macroeconomic policies designed to achieve the country's growth and development objectives. The financial programming is even more necessary for transition countries, which show considerable macroeconomic disequilibria. Therefore, it is often referred to as a macroeconomic stabilization and adjustment program.

The financial program aims at adjusting balance of payments problems and supporting long-term economic growth through correcting supply and demand disequilibria. The response is usually centered on fiscal and monetary actions, in coordination with structural adjustment policies.

The financial program emphasizes a coordinated response to macroeconomic imbalances, avoiding chaotic or shortsighted solutions. It attempts to lend a medium term perspective to the macroeconomic policy and to coordinate its different aspects. The financial and monetary programming usually covers a three year period, being revised periodically on an annual basis.

The financial and monetary programming is strongly based on the Monetary Theory on Balance of Payments. Partly because it is supported by the international financial institutions, the IMF and WB, the financial program puts a great emphasis on current account sustainability[5]*. It tries to smoothly adjust the domestic imbalances that give rise to current account deficits through demand management policies.*

At the same time, the financial programming relies heavily on structural policies. This is all the more relevant in transition economies, where the internal disequilibria are not entirely due to short term policy problems and require longer term solutions. These policies have an important effect on the supply side of the economy, influencing its long-term growth prospects. This last set of policies frames the cooperation between the IMF and WB programs.

The monetary program is designed to spell out, in the form of a financial plan or a flow of funds, the monetary policy BoA intends to pursue in order to achieve its final objective, price stability as defined in the inflation target. Because of the inherent uncertainties of the transmission mechanism in transition economies - extended and quantitatively uncertain responses to monetary policy action - monetary targeting sets out intermediate and operational targets, which serve to monitor and operationalize monetary policy.

The intermediate target in Albania, in accordance with its monetary targeting framework, is the annual broad money growth. BoA believes inflation is, in the long term, a reflection of monetary expansion in the economy. The intermediate target for M3 is the product of an iterative work that starts with the design of a baseline scenario. This scenario projects development of the main economic sectors based on their recent trends, assuming no change in current policies. The baseline scenario serves to identify potential problems and design corrective actions for achieving the policy targets. Besides evaluating any deviation of projected monetary aggregates from their desired path, this approach requires a careful scrutiny of cross-sectoral links and implications. A particular emphasis is put on the compatibility of monetary projections and policies with the fiscal and external sector of the economy.

Because monetary targeting conceptually seeks to equalize money demand with money supply, the starting point for the baseline is the forecast of money demand. Economic literature suggests several ways to forecast money demand. The two most important ones are the forecast based on the functions money plays in the economy and the one based on the quantity theory of money[6]. Projecting money demand based on the first method would seem the way to go, as it captures the essential drivers of money demand. However, there are several drawbacks to it, such as the fact that it requires reliable data series and is prone to be widely affected by structural changes in the economy (see Box 2). Therefore, money demand projections in Albania follow the second route. Beside the advantages it offers in terms of simplicity, the forecast of money demand based on the velocity offers more flexibility in terms of incorporating judgment in it. It can easily accommodate different velocities, reflecting structural changes in the economy as well as the stance of monetary policy.

Box 2. Forecasting money demand

The forecast of money demand based on money functions would take the form:

$$lnM^d_t = a_1 lnM^d_{t-1} + a_2 lnY_t + a_3 lnP_t$$

Current money demand[7] M^d_t is seen as a function of:

- *Past money demand M^d_{t-1}. The coefficient a_1 captures the inertia of money demand.*
- *Current year output Y_t. The coefficient a_2 captures the elasticity of money demand to the output level.*
- *Actual price level P_t. The coefficient a_3 captures the elasticity of money demand to current prices (inflation).*

The Fisher quantity theory of money projects money demand starting from the following:

$$M^d_t * V = Y_t * P_t$$

Current money demand is a function of current year output Y_t, actual price level P_t and money velocity. Current output is the projected annual GDP while P_t is the GDP deflator.

Effectively, under this approach, monetary policy is targeting nominal GDP, for the right hand side of the equation is the nominal output in the economy. Implicitly, under the assumption that real GDP growth is not affected by monetary policy in the upcoming year, BoA is targeting inflation because GDP deflator (the P_t term) is thought to be reliably linked to CPI inflation, the objective of Bank of Albania. Therefore, with the right hand side of the equation given as exogenous, the projection of money demand is depended

on forecasting money velocity. The velocity is forecasted by simple trend analysis, but it also incorporates expert judgment on:

- Structural change in the economy and the way they affect confidence in the banking system and the demand for credits;
- Developments of the payment system which also increases transactions through the banking system;
- Other factors that affect money demand, expected trajectory of interest rates, the remittances and FDI outlook, etc.

The baseline scenario is followed by the design of a normative one, which incorporates a set of corrective policy measures to bring macroeconomic indicators to their desired level. Under this scenario, BoA details the plans how to control the money supply, by linking it to the operational targets. The mechanism that insures such a linkage is the money multiplier[8], the ratio between broad money and reserve money.

Monetary policy instruments

Given a poor inheritance of institutions, market infrastructure and financial instruments in the country, Bank of Albania could not adopt indirect instruments in its initial phases. Monetary management was carried out through direct instruments. The control of the intermediate target, the M3 broad money, would be achieved through administrative ceilings on credits to the economy and interest rate floors for domestic deposits interest rates[9]. However, with the development of the banking system and the introduction of privately owned banks, controlling the market through administrative interest rates and credit limits became more and more difficult. The restriction put on the Savings Bank withheld it from lending and the high level of risk in the market was followed by a considerable decrease of credit to the economy. Ultimately, these controls were found to distort the competition and the development of the market.

Under such circumstances, a new operational framework was taken into consideration under which the implementation of monetary policy of Bank of Albania was to be based only on indirect market

instruments. Bank of Albania intentionally followed the ECB in modeling its operational framework. The policy rate in the economy would be the interest rate of repurchase agreements (REPO), which would take place in standard weekly auctions[10], held by the Bank of Albania.

The operational framework of Bank of Albania is made up of:

- Open market operations;
- Standing facilities;
- Required reserves.

Open market operations

The main scope of main market operations is to affect the liquidity situation of the banking system, control the interbank interest rates and, at very specific occasions, restore the normal functioning of the FX market. They can be carried out in lek or in foreign exchange. The bulk of the open market operations are carried out in lek. These types of operations are targeted to manage the liquidity of the banking system and control the interbank interest rate. Depending on their effect on the liquidity, they can be used either to temporarily affect the liquidity (the repurchase agreements) or to affect it permanently (the outright transactions).

- The repurchase agreement. This instrument includes the main refinancing operation of the BoA, namely the one week Repo. As noted before, this instrument is used to signal the BoA policy stance and to align all the other interest rates in the economy. Beside the main refinancing operation and in order to support it, BoA carries out repurchase agreements with longer or shorter maturities. In the first case they are used to restructure the maturity of the banking system while on the latter case they are used to fine tune it.
- Outright transactions. They can be used when trying to obtain a constant sterilization of the market. The instruments being now used to perform these transactions are treasury bills whose maturity date does not expire less than 14 days from sale.
- Interventions in the exchange market. Bank of Albania has adopted a totally flexible regime of foreign exchange. Nevertheless,

it can intervene in the FX market to smooth excessive or speculative exchange rate fluctuations. Over the years, BoA has tried to limit this instrument as much as possible and to make it more transparent, in compliance with the international standards. The transactions of foreign exchange can be outright transactions or swaps.

Standing facilities

Starting from 2000, BoA has complemented its main refinancing operation (Repo) with overnight credit and deposit facilities. Together, these two instruments create a corridor for short term interest rates in the interbank market.

- Overnight credit. This facility aims at supplying the banks with overnight liquidity and creating a ceiling for interbank market interest rate. Its interest rate is based on the REPO rate plus a penalty of 1.75 percentage points.
- Overnight deposits. This facility is intended to withdraw short-term liquidity from the market and to establish a floor for interbank market interest rates. The overnight deposit interest rate is based on the Repo rate minus a penalty of 1.75 percentage points.
- Lombard credits. The crediting facility of Lombard has been offered relatively early, but it should be mentioned that it has been used very rarely. It is clear its classic goal is to assist banks in their temporary liquidity problems[11] and it is considered as the last source of credit when all other possibilities have been exploited. Actually, it is the highest rate the Bank of Albania is offering to the system. The price of Lombard is determined adding to the REPO rate a penalty of 6 percentage points.

Required reserves

The required reserve is one of the few instruments of indirect supervision, which has been used since July 1992, maintaining the same rate of 10 percent. The required reserve is calculated on the total of deposits[12] (liabilities of commercial banks) in Lek as well as in foreign currency. This instrument is remunerated (currently at 70 per cent of the last auction 3 month TB rate, 70 per cent of Libor or Euribor respectively) and the averaging provision is allowed.

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[1] However, the final objective of the Bank of Albania has never been the combination of several indicators. Not in any case, have indicators, such as domestic production, employment rate, etc., been part of final objectives pursued by the Bank of Albania.

[2] The notion of net foreign reserves of Bank of Albania used in the monetary program is different from the term used very often "foreign reserves of Bank of Albania" or "foreign assets of Bank of Albania".

[3] The NSSED (National Strategy of Social and Economic Development) is a comprehensive three year strategy designed to link the country's development priorities with its financial resources in a set of consistent macroeconomic and structural policies.

[4] The PRGF (Poverty Reduction and Growth Facility) is an agreement which includes concessional loans on the condition of meeting certain macroeconomic and structural targets. It is done in full compliance with the country's NSSED.

[5] A sustainable current account is defined as a deficit that can be financed in the long run by stable financial inflows.

[6] This theory starts with the assumption that the value of all economic transactions (which can be linked to all nominal income generated in an economy) has to be paid with money. It follows that money in circulation times money velocity must equal nominal income. Because of money neutrality and assuming velocity holds constant over time, changes in the nominal money stock have no effect on changes in real output in the long run but can thus affect inflation.

[7] The variables can be interpreted as logarithmic annual growth rates.

[8] The money multiplier is derived based on the following formula:

$$mm = \frac{M3}{RM} = \frac{CoB + LD + FxD}{CoB + RR + + ER + A} = \frac{c + 1 + b}{c + rr + b*er + a} \quad ,$$

where CoB is cash outside banks, LD and fxD are respectively Lek and foreign currency deposits, RR and ER are respectively required

and excess reserves, and A stands for cash held in bank vaults. The small letters denote their respective ratios to lek deposits.

[9] The floor for the interest rate for time deposits in Lek was valid only for state owned banks.

[10] Depending on the liquidity situation in the market and the policy of Bank of Albania, Repo auctions could be (i) repurchase agreements – to draw liquidity, or (ii) inverse repurchase agreements – to inject liquidity in the market.

[11] It can have a maturity of up to three months and it can be obtained only once in three months.

[12] Except for interbank deposits.

IS INFLATION TOO LOW IN ALBANIA?

*Jan-Peter Olters**

In the public debate, repeated concerns have been voiced regarding the high value of the lek and its impact on Albania's growth potential. While it is true that the Bank of Albania targets inflation (and not the exchange rate), the convergence of the 12-month inflation rate towards the floor of the informal target range could perceivably be interpreted as a reflection of an "overly tight" overall monetary framework. An "excessively" tight monetary policy—if that were indeed the case—would be an undesirable outcome because, in that case, (i) credit to the economy would be insufficient or prohibitively expensive and/or (ii) necessary adjustments in relative prices would not be possible without a nominal exchange rate appreciation (which, in turn, would damage the competitiveness of Albanian-produced goods). In my recent speech to the Bank of Albania's Fifth Conference on "Central Banking in the Time of Integration", I argued that the current 2–4 per cent target range is adequate to maintain macroeconomic stability and required to maintain the current growth dynamics.

INFLATION AND GROWTH

Following decades of economic research on policymakers' ability to exploit an allegedly stable relationship between unemployment and

inflation and, more broadly, on the effects of inflation on economic performance, a broad professional consensus developed on the socio-economic benefits derived from central bank independence and price stability. Achieving and maintaining low inflation is not an objective in itself but a means to encouraging growth and ensuring higher living standards. The key challenge consisted of capturing the "unobservable benefits" of low inflation that explain the small but *permanent* effects on growth, now understood to largely derive from the improved ability of market participants to utilise effectively price signals and, on that basis, allocate efficiently scarce resources. Any policy decision that managed to raise the potential real growth rate, say, from 5 to 6 per cent would ensure that GDP could quadruple (rather than "simply" triple) over a 25-year period.

In addition, low inflation rates were found to (i) reduce the risk of an arbitrary redistribution of income and wealth to the detriment of fixed-income earners and lenders; (ii) help market participants to increase certainty in the expectation about future prices, interest rates, and exchange rates and, consequently, lengthen their planning horizons; (iii) permit firms to utilise their scarce resources to create rather than protect wealth; (iv) minimise additional distortions to the—nominally based—tax system; and (v) signal to (foreign) investors that public institutions function properly and key macroeconomic variables are in a balance. For these reasons, it is not surprising to see that the low inflation environment has proven to be consistent with dynamic growth. In fact, Albania has grown faster in recent years while annual price increases were lower than those observed in any other country in the region.

The low inflation environment is particularly beneficial to the most disadvantaged segments of society, particularly those relying on fixed incomes (these, incidentally, are the households with the highest propensity to consume domestically produced goods and services, thereby supporting the development of small- and medium-sized businesses). During 1995–98, with an average inflation of 18½ per cent, urban pensions, as a share of per capita GDP, decreased annually by an average 4.8 per cent—from 47.3 in 1995 to 38.2 per cent in 1998. The deterioration of pensioners' relative position within the country's income distribution could be reversed during 2000–03.

With an average 3.2 per cent inflation, urban pensions increased by an average 0.5 per cent of per capita GDP, from 36.5 per cent in 2000 to 37.4 per cent in 2003. In addition, the still very large amounts of cash savings amplify Albanian households' exposure to unanticipated increases in the inflation rate.

INFLATION EXPECTATIONS

Over the course of the previous quinquennium, having moved towards indirect instruments of monetary policy, the BoA demonstrated its ability—and willingness—to take appropriate measures to ensure that inflation rates would stay within, or move back into, the pre-specified band. This instilled confidence into the post-1997/98 disinflation programme and ensured that, as a consequence, Albania's price level changes gradually approached those prevailing in the pre-accession European Union (EU). The consistency in policy outcomes has enhanced the credibility not only of Albania's central bank but also of the chosen policy instrument, as informal inflation targeting helped to increase the overall efficiency and transparency in the implementation—and public assessment—of monetary policy.

But can inflation rates sustainably stay this low—particularly in a country in the midst of an economic transition process? The disaggregation of inflation data reveals that the two most important factors were (i) structural reforms in regulated industries, in the context of which tariff increases were introduced to bring them broadly in line with cost recovery; and (ii) seasonal changes in supply conditions for, particularly, the agricultural sector.

First, in the aftermath of the post-pyramid turmoil in 1998, with overall inflation rates stabilising, price developments in different sectors began to differentiate. Prices of imported commodities—clothing, footwear, household equipment, home entertainment items, etc.—reflected the appreciating lek and declined by an annual average of 2½ per cent during 2001–04. Items with a large share of domestically produced items increased by an annual average of close to 3 per cent, broadly in line with overall price-level changes (3.4 per

cent). By contrast, prices in the traditionally public sectors—partly because of restructuring programmes (electricity) and the provision of private alternatives (health and education)—increased by an annual average of more than 6 per cent during the same period of time. With the exception of (waste) water, Albania has principally concluded the process of price liberalisations. The latest increase in electricity tariffs has resulted in a price structure that, as of 2005, broadly corresponds to production costs. Contrary to recent years, this should preclude further significant, liberalisation-induced price increases in the foreseeable future. Following the—ultimately reversed—hikes in telephone tariffs in December 2003, prices in the telecommunications sector are, if anything, expected to decrease over the medium term—partly due to the scheduled privatisation of the fixed-line company and the potential competition from a third mobile operator.

In addition, the banking sector, in particular, underwent considerable changes in recent years. The combination of (i) low inflation; (ii) gradual fiscal consolidation; (iii) the deepening of financial intermediation; and (iv) the additional liquidity made available by the privatisation of the Savings Bank (which, as a publicly owned bank, did not lend) resulted in increased availability of credits and reduced financing costs for investments. As a result, credit to the economy has increased by more than 30 per cent during the last three years—and that even prior to the largest bank entering the market in about mid-2004—benefiting from the mixture of a large supply of relatively inexpensive foreign-currency-denominated credits and a strong lek. As a result, several of the import-competing industries managed to expand their market shares, as reflected in the improving trade balance, and helped to dampen price increases in these sectors.

Second, prices have traditionally shown a very pronounced—and consistent—pattern of seasonality. The monthly inflation rates observed in September and December (averaging, respectively, 0.8 and 3.6 per cent during 1999–2004) stand in stark contrast to the average 0.2 per cent *de*-flation rate for all the other months. The marked seasonality reflects (i) the importance of agriculture in domestic production (representing an average 27 per cent of

GDP in 1999–2004); (ii) infrastructure bottlenecks in transport and storage; and (iii) market imperfections surrounding the import and distribution of vegetables and turkey. The concentrated inflows of emigrant remittances and tourism receipts—both characterised by bipolar distributions with peaks in summer and December—reinforce this seasonal pattern. None of these features, however, hint at the existence of monetary policy-induced obstacles to growth, except—possibly—the effects of the low-inflation environment on the exchange rate, international competitiveness, and the medium-term growth potential.

WHAT EXPLAINS THE LEK'S APPRECIATION?

In recent years, with inflation being safely within the target range, the lek appreciated vis-à-vis the US dollar and the euro, both in nominal and real terms. The lek's appreciation occurred despite repeated BoA interventions in favour of foreign currencies and a 325-basis-point reduction in the official interest rate since early 2003. From a macroeconomic point of view, there are no indications of an attempt by the monetary authorities to "artificially" raise the lek's external value beyond a sustainable level: given the flexible exchange-rate regime, there is no rationing of foreign currencies, and official foreign reserves have continued to cover a comfortable 4 months of imports of goods and services throughout 2000–04. There appear to be essentially two possible causes that would explain the strength of Albania's currency—viz., (i) a (possibly temporary) surge of remittances and other cash inflows; and (ii) improvements in productivity in the tradable goods sectors that would have caused a real exchange rate appreciation.

With regard to the former hypothesis, the analysis of Albania's balance of payments gives some indications of strong capital inflows in 2004. If expressed as percent of GDP, the balance of payment shows (i) a consistent improvement in the current account (trade and remittances); (ii) a gradual decline in the capital-account surplus (foreign financed investments); and (iii) an increasing net inflow of foreign currency as a result of non-registered economic activities. With remittances having increased moderately and consistently from

about 13 $^{1}/_{3}$ per cent of GDP in 2001 to an estimated 13¾ per cent in 2004, the improvements in the current account therefore largely reflect Albanian enterprises' increased ability to place their products in foreign and domestic markets. As indicated by the trend in "errors and omissions", and given the high prevalence of cash-based transactions even among businesses, there are indications that official data considerably underestimate the speed by which Albanian enterprises have succeeded in gaining market shares and/or the increase in private transfers sent by emigrants to their families. The 2004 Olympic Games have provided Albanians emigrants with important—but strictly temporary—employment opportunities, particularly in the booming construction sector. The one-off remittances, typically cash-based, from this particular source of income would seem to be reflected in the "net errors and omissions" figure for 2004. Therefore, in assessing the sustainability of the increasing net capital inflows—as reflected in the lek appreciation—not only the estimation of the actual size of the Olympics effect but also the longer-term issues of declining levels of foreign-financed public investments and low levels of (foreign) direct investments require further attention.

Regarding the second explanation, the "catch-up" process of transition countries—reflected in growth rates higher than those in more advanced economies—is often based on comparably faster increases in—not levels of—productivity, particularly in the tradable sectors. Preliminary research results show that data are not necessarily incompatible with a productivity-driven interpretation of the recent lek appreciation. The reduction of the trade deficit from almost 26 per cent of GDP in 2002 to a projected 23 per cent in 2004 would fit the interpretation of the productivity-driven real exchange rate appreciation. Albanian exports of goods and services—while still at a very low base—have increased not only in per cent of GDP but also as a share of world exports (from 0.011 per cent in 2000 to an estimated 0.017 per cent in 2004-S1), indicating the improved international competitiveness of Albanian companies and their ability to "catch up" with other economies. In addition, several import-competing industries—such as breweries—have made considerable inroads in expanding their domestic market share, notwithstanding the exchange rate effects and the reduction in customs duties,

including on imported beer. While further research is required, such a result would imply that the lek's appreciation does not hamper international competitiveness but, inversely, that the increase in productivity has caused the lek to appreciate.

IS INFLATION TOO LOW IN ALBANIA?

Even though results are not yet conclusive on the possible existence of a productivity-driven exchange rate appreciation, it provides for a useful hypothesis to be cross-checked with the development of the lek's exchange rate over the next few months and years, as such an interpretation implies a further, gradual strengthening of the lek. By contrast, if primarily the short-term increase in remittances had caused the lek to appreciate, one would expect a softening in the months to come.

More broadly, however, there are no indications why Albania could—and should—not maintain simultaneously a low inflation environment while completing the process of market liberalisation. The central bank—together with the affected commercial banks—has skilfully managed the aftermath of the 2002 bank run, further increasing the credibility of its policy commitment to the 2–4 per cent inflation target range, already 2 percentage points higher than the comparable one used by the European Central Bank. As a result, a sceptical public is being induced to entrust its savings to the banking sector. Thus, against the backdrop of consistently low inflation, the BoA was able to decrease its policy rate, supporting the—now entirely privately owned—commercial banking sector in expanding credit to the economy, stimulating private-sector investment, and maintaining economic growth at its currently high level.

Nonetheless, even in a situation, in which the appreciating lek has been caused by increases in productivity and, as a result, does not forebode an erosion to Albania's international competitiveness, further progress on structural reforms will need to be made to address existing supply-side bottlenecks. Against the backdrop of prudent fiscal and monetary policies, Albania's authorities have been able to support businesses mainly by reducing both the real costs of credits (without curtailing their supply). From a macroeconomic

point of view, there do not appear to be indications of "too tight" a monetary framework. To further support businesses—including exporters and import-competing industries—in their activities, the government needs to more actively engage in what German-speaking economists call *Standortwettbewerb*—i.e., the competition among countries to provide a sufficiently favourable business environment to be able to attract (foreign) direct investments, a precondition for growth, job creation, and poverty reduction. This objective can be realised—however not at the expense of, or by resorting to, higher inflation.

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CURRENCY SUBSTITUTION IN THE ALBANIAN ECONOMY

*Manjola Tase**

ABSTRACT[1]

Residents in the Albanian economy hold about 30% of their deposits and 80% of their credits in foreign currency. These shares have even increased over the recent years. This paper analyses the reasons behind this persistent currency substitution and discusses the pros and cons by looking at the issue from different angles. An interesting finding is that currency substitution in deposits held by households shows a strong increasing trend whereas currency substitution by businesses has decreased. For households, apparently increased savings from private transfers are kept in foreign currency deposits. Puzzling is the finding that an increase in trade seems to go hand in hand with the reduction in currency substitution for businesses. Regarding financial intermediation, currency substitution of deposits is associated with currency substitution of loans and when the holding of net foreign assets is accounted for, no currency mismatch is present.

1 INTRODUCTION

Currency substitution is an important field of interest for the Bank of Albania (BoA) as its main tasks are concerned with monetary policy,

the exchange rate regime, the payment system and the supervision of the banking system. These tasks are subordinated to BoA principal objective: to achieve and maintain price stability[2].

As far as monetary policy is concerned, the monetary policy regime currently adopted by BoA is that of monetary targeting (M3)[3]. One of the criteria to be met by the target is the "controllability" and, as M3 includes foreign currency deposits, development patterns of currency substitution and the underlying reasons are highly relevant.

Regarding supervision, currency substitution of financial intermediation and currency mismatches have emerged as key factors in explaining the vulnerability of emerging markets to financial and currency crises. In the "Declaration on threats of financial sector stability in Albania"[4], the BoA asks banks to pay more attention to their activity in foreign currency and associated risks.

In this paper we try to explore the reasons for currency substitution and investigate potential currency mismatches in the banking sector. We address currency substitution not only for the overall economy, but also for the households and business sector separately. This approach proved to be very useful and yielded interesting results.

The paper is organized as follows: Section 2 provides definitions. Section 3 discusses reasons behind currency substitution of assets. Section 4 discusses currency substitution of financial intermediation. Conclusions and policy recommendations are provided in Section 5.

2 CURRENCY SUBSTITUTION: CONCEPT AND MEASUREMENT

"Partial currency substitution" is defined as the holding of a significant but still partial share of their assets and liabilities in foreign-currency-denominated instruments by residents (Areta, 2002). Currency substitution of assets generally takes two key forms: (1) the use of foreign currency as a means of payment for transactions; and (2) the use of foreign currency denominated assets as a store of value. Currency substitution of liabilities generally refers to the

currency substitution of banking loans. For measurement purposes, we can distinguish three categories of currency substitution: cash, assets, and liability currency substitution. The focus of research on the issue has been more on currency substitution of assets, usually restricted to foreign currency deposits, due to the lack of data on cash currency substitution.

Sojli (2003) provides a detailed analysis and application of currency substitution measurements for Albania, including cash substitution. Due to a lack of data, the calculated data series of the latter have as a starting date year 1998.

In this paper, we measure currency substitution of assets as deposit substitution, and currency substitution of liabilities as loans substitution.

3 CURRENCY SUBSTITUTION OF ASSETS: SOME EXPLANATIONS

There are several reasons that motivate agents to hold their assets in foreign currency, and these usually differ for the cases of means of payment or store of value. Generally, when referring to the first case, currency substitution is usually a reaction to a lack of confidence in the domestic currency due to e.g. high inflation. When it is in the form of demand deposits, it may also be the result of a decreasing informal economy[5], and/or increasing trade volume. From the portfolio management point of view, asset substitution represents the portfolio allocation decisions based on risk and returns of domestic versus foreign currency denominated assets. This form of currency substitution might be either an expression of a "bad" currency substitution - domestic policies are not able to keep the value of domestic currency stable -, or a "good" currency substitution – reflecting an opening of the financial markets and international integration. Havrylyshyn and Beddies (2003) distinguish between institutional and economic factors for the occurrence of currency substitution: (1) from an institutional perspective, currency substitution depends on the openness of the economy, the depth and size of the financial system, and legal obstacles and transaction

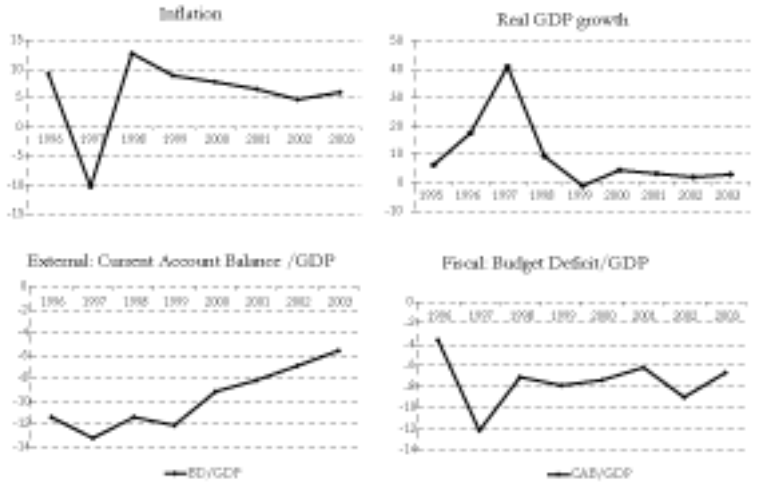
costs associated with the acquisition of foreign currency; (2) from an economic perspective, key determinants of currency substitution are the interest rate spread, inflation differentials, devaluation expectations, and broader macroeconomic factors such as the current account deficit, external debt sustainability, and so forth.

Below we analyze a number of possible reasons for explaining currency substitution in Albania, including hysteresis, portfolio diversification, the soundness and credibility of the banking system, trade openness and currency denomination of income.

Hysteresis

The persistence phenomenon in currency substitution has been discussed extensively in the literature for developing countries. Usually this is attributed to hysteresis effects - the persistence of a previous state. Havrylyshyn and Beddies (2003) identify hysteresis as one of the major explanations of persistent currency substitution (despite macroeconomic stabilization) in Former Soviet Union countries. The explanation is that, once people have adjusted to macroeconomic instability, by switching to foreign currency and

Graph 1 Some macroeconomic indicators

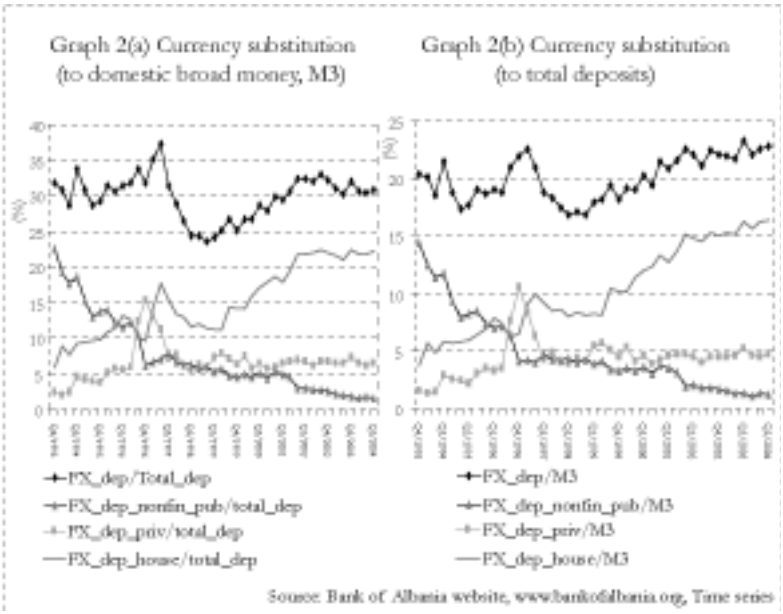


Source: Bank of Albania website, www.bankofalbania.org, Time series

reducing the demand for real domestic money balances, they lack confidence for a long time, even if macroeconomic fundamentals improve.

In a snapshot of Albania's macroeconomic development in Figure 1, there is a trend of improvement in fundamentals after the fall of the pyramid schemes in 1997.

Currency substitution - as the ratio of foreign currency deposits to broad money as given in Graph 2.a or to total deposits as given in Graph 2.b- persisted. According to Graph 2.a the levels in the last years are even higher than those in the first years of transition[6].



Source: Bank of Albania website, www.bankofalbania.org, Time series

While this is the trend for the economy as a whole, as shown by the ratios of foreign currency deposits to broad money or total deposits, there are major differences between households or enterprises, being either public or private. Currency substitution in the enterprise sector is expected to be mainly related with transaction purposes. The development patterns in this sector differ substantially when the private or public component is considered. In the case of public enterprises, currency substitution has decreased. This is most

probably due to their closure, restructuring and/or privatization. In the case of private enterprises, the currency substitution became stable after some increase in the first years. This development is quite symmetric with the decrease in the public enterprises. The privatization of companies through mass privatization method was completed by the end of 1996. The peak at this year is followed by a sharp decline in 1997. The cause of the latter is believed to be the pyramid schemes crisis, during 1997, which led to a severe disruption of the economic activity.

To this point, we can distinguish two components of currency substitution that require further explanation: (1) the private sector with an unchanged pattern, and (2) the household one with its continuous upward trend. It is the second component that has contributed to persistence or even increasing currency substitution.

If only hysteresis were the case, we would expect that even though the macroeconomic fundamentals have clearly improved, households' currency substitution indicators keep the same level. In our case, the household component exhibits an increasing trend. In this regard, if we consider only hysteresis in providing an explanation to the dynamics of currency substitution on the household sector, we notice that this explanation is not complete.

Portfolio diversification

We consider portfolio diversification motives in providing some explanation for the dynamics of currency substitution. The rationale behind is that, the lack of financial instruments, other than local or foreign currency bank deposits and local and foreign currency cash, leads to an important role of foreign currency either deposit or cash, as forms of portfolio diversification and risk reduction. This motive becomes even more important in the case of developing economies, where financial markets are underdeveloped and illiquid. In Albania, the financial system is mainly identified with the banking system as the capital market is –except from the T-bills market-almost inexistent. Within this framework, the share of foreign deposits to total deposits would be determined by the real rate of return[7] from domestic and foreign currency deposits formulated as:

(-) (+) (+)

$$\frac{MH\ dep}{Tot\ dep} = f[(kthimi\ real\ ALL), (kthimi\ real\ EURO), (kthimi\ real\ USD)] \quad (1)$$

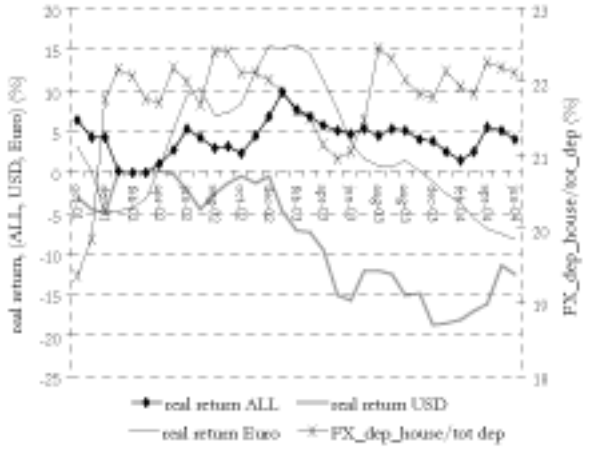
Graph 3 shows the foreign currency deposits from October 2001 onwards. It follows that the currency substitution ratio has been very stable. With a continuous negative real return for deposits in USD throughout this period and an increasing negative return for deposits in Euro starting from December 2003, we would have expected some shifting towards domestic currency deposits.

Along with these results, we emphasize that further analysis is limited by the lack of data and the understanding of formation of expectation in the Albanian market. Any comments on this point should be taken carefully.

Soundness and credibility of the banking system

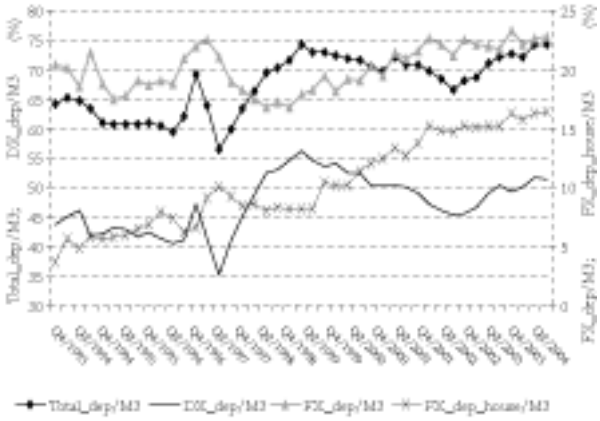
Another issue to be considered is that of soundness of the banking system. A more sound banking system would imply an increase in currency substitution, as measured by deposits ratio measures, reflecting a shift from cash holdings in foreign currency to deposits. This could be seen as an indication of increased confidence in the banking system. If that were the case, then, we would expect an increase in the share of both domestic currency and foreign currency-denominated deposits to broad money. Taking the ratio of deposits to broad money as an

Graph 3 Currency substitution and rates of return on deposits (monthly data)



Source: Bank of Albania website, www.bankofalbania.org, Time series

Graph 4 Shares of Total, foreign currency, domestic currency deposits to broad money



Source: Bank of Albania website, www.bankofalbania.org, Time series

indicator of confidence in the banking system, it follows from Graph 4 that there does not seem to be any important changes in this variable. The ratio of domestic currency deposits to broad money has been relatively stable, around 50 per cent starting from 1998. The increase in the period from end 1997 beginning of 1998 is associated with the recovery following the crises of the pyramid schemes- not a banking crisis, while the gap in 2002 is associated with the confidence crisis-a geographically, time span limited crises. The share of households' foreign currency deposits has in general been in an upward path.

Even if other indicators of banking system confidence are considered, the different dynamics in the domestic currency deposits and foreign currency deposits do not provide evidence for the increased confidence in the banking system explanation.

Trade openness

Trade liberalization might be another factor to be considered in explaining currency substitution in the enterprise sector. With an increase in the trade volume, there is more need to hold foreign currency either in cash or non-term deposits, to meet payment requirements. This reflects the view of Ize and Levy-Yeyati (1998) that currency substitution can also, at least, partly be seen as a consequence of trade liberalization and international integration. We have calculated the widely used trade openness index, the ratio: (Exports+Imports)/GDP. The share of foreign currency deposits of public and private enterprises to total deposits is used as a measure of currency substitution. If trade

openness were to provide some explanation, we would expect the same trend in both the degree of openness and currency substitution. As shown in graph 5, trade openness has increased and starting from 2000, it has been reaching some stable ratio of around 60 per cent.

Graph 5 Currency substitution and trade openness

Source: Bank of Albania website, www.bankofalbania.org, Time series

The currency substitution index for the public enterprises has decreased sharply due to the closure, restructuring and privatization of state-owned enterprises, the privatization of enterprises. The currency substitution index for the private enterprises starting from 1998 has been stable at 6.5 percent.

The rationale presented and the currency substitution indicators used, assume that trade related payments are performed through bank accounts. In view of non bank payments, it is easy to underestimate the role of increased trade in currency substitution.

If a broader indicator, including non bank payments, were considered, the picture might look different. Sojli (2003) shows that the index of currency substitution, including foreign currency cash holdings, has increased. In this case there might be some room for trade openness to explain.

Furthermore, we should consider that the currency substitution indicator presented, includes all enterprises regardless of their activity. A better indicator would include only enterprises involved in international trade. At this point the relevance of trade openness on currency substitution - as the ratio of foreign currency enterprise deposits to total deposits - is vague.

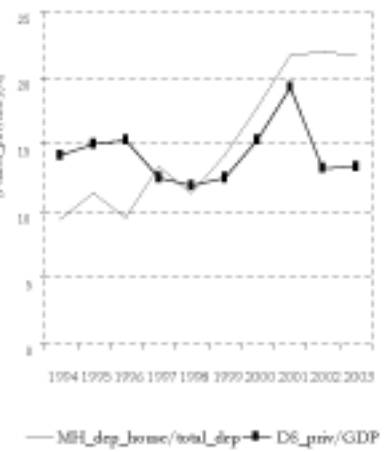
Currency denomination of income

An alternative explanation to the persistence of currency substitution could be the currency denomination of income. We consider private transfers as the major source of households' foreign currency deposits. Considering that currency substitution, as measured by deposit ratios, is more a measure of asset substitution, we would expect a negative relation between currency substitution and financing of imports through private transfers, thus, implying that if less transfers are spent, more will be available for savings. In this case, it would increase deposits.

In Graph 6.a we have plotted two indicators: (1) the currency substitution=the share of households' foreign currency deposits to total deposits and (2) potential savings from private transfers=1-share of private transfers to imports. We see that the household component of currency substitution and potential savings from the private transfers follow similar trends[8]. A closer look at graph 6.a shows that after 2002 there is a relatively steady ratio in both variables.

Graph 6.a Households' foreign currency deposits and Private transfers

Graph 6.b Households' foreign currency deposits and domestic private savings



FX_dep_house/total_dep —— 1-transf_pvt/IMP —— MH_dep_house/total_dep —— D6_priv/GDP

Source: Bank of Albania website, www.bankofalbania.org, Time series, IMF country report

Since the ratio of domestic currency deposits to broad money has been relatively stable at around 50 percent, we would expect the trends of domestic private savings and households' foreign currency deposits to be similar. Graph 6.b corroborates this[9].

Summary of different explanations

Residents in the Albanian economy hold about 30% of their deposits in foreign currency. An interesting finding is that currency substitution in deposits held by households shows an increasing trend whereas that by businesses has decreased. Table 1 summarizes the proposed factors behind asset substitution and their relevance presenting the case of households and businesses separately.

Table 1 Deposits substitution and reasons behind

CS of Assets	General trend	Hysteresis	Portfolio	Confidence	Trade openness	Currency denomination of income
Households	upward	Not complete	Not clear	Not relevant		Possible explanation
Businesses	downward			Not relevant	Opposite trends (!)	

The finding that an increase in trade seems to go hand in hand with the reduction in currency substitution for businesses is probably due to the large amount of non bank payments. A possible reason for currency substitution held by households is that of increased savings from private transfers further kept in foreign currency deposits making the household a passive holder.

4 CURRENCY SUBSTITUTION OF FINANCIAL INTERMEDIATION AND CURRENCY MISMATCHES

Most research in the currency substitution field is focused on currency and assets substitution. But, it is equally important to consider currency substitution of liabilities, both being of equal importance in determining the nature and extent of currency substitution. Currency substitution of liabilities has emerged as a key factor in explaining the vulnerability of emerging markets to financial

and currency crises, especially after the Asian crisis. The degree of currency substitution of liabilities is considered among indicators that signal greater likelihood of banking crises.

Beside "fatalistic" determinants – long history of unsound macroeconomic policies, development and institutional factors - Bajaras and Morales (2003) explore other alternatives including: central bank intervention in the foreign exchange market and relative market power of the borrowers, as important explanations of currency substitution of liabilities. As far as market power of the borrowers is concerned, that may induce banks to favor currency substitution of liabilities, even if interest rate spreads are higher in domestic currency. Central bank intervention might provide for an implicit exchange rate guarantee, influencing that way the level of currency substitution of liabilities. This entails a moral hazard behavior, as it relies on banks and borrowers responding to an exchange rate guarantee. Areta (2002) provides an empirical analysis of the linkage between exchange rate regimes and currency mismatches. His results on developing and transition countries, suggest that floating regimes seem to exacerbate, rather than ameliorate, currency mismatches in domestic financial intermediation, as those regimes seem to encourage deposit currency substitution more strongly than they encourage matching via credit currency substitution. Focusing on bank-related explanations, Levy-Yeyati (1998), and Catao and Terrones (2000) use a bank optimization framework. In the model devised by Ize and Levy-Yeyati (1998), currency substitution depends on the relative volatilities of inflation and real depreciation. Catao and Terrones (2000), show that factors influencing deposits and loan currency substitution include interest rate and exchange rate risk, as well as structural factors and macroeconomic shocks, rather than just the latter.

Given the persistent currency substitution of deposits in Albania, the next question we ask ourselves concerns the association with currency substitution of liabilities.

We are going to assess the degree of currency substitution of financial intermediation and related currency mismatches through some currency substitution indicators of both the deposits and loans.

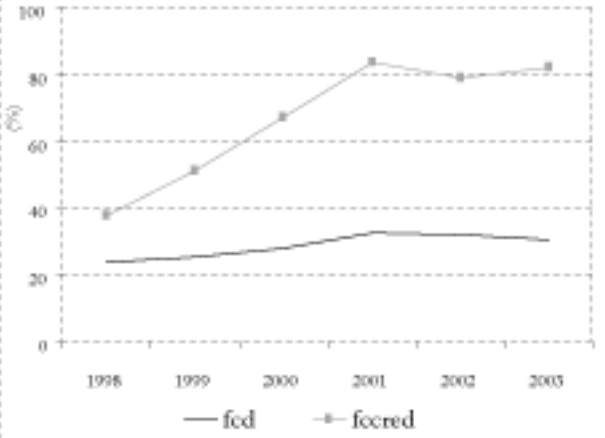
Foreign currency deposits ratio *(fcd)* and foreign currency credit ratio *(fccred)* are defined as follows:

$$fcd = \frac{\textit{foreign currency deposits}}{\textit{total deposits}} \qquad (2)$$

$$fccred = \frac{\textit{foreign currency credit}}{\textit{total credit to private sector}} \qquad (3)$$

The dynamics and trends of these two indicators are shown in graph 7. Currency substitution of liabilities is associated with that of assets with a high contemporaneous correlation coefficient of 0.995. However, it can be clearly seen that there is a mismatch in currency substitution of deposits and loans, as the latter is much higher.

Graph 7 Currency substitution of financial intermediation



Source: Bank of Albania website, www.bankofalbania.org, Time series

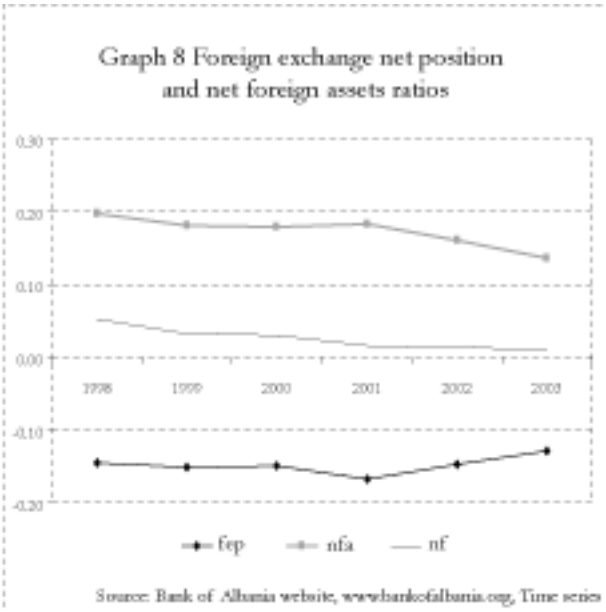
A synthetic indicator of the net results of these two sides is the foreign exchange net lending positions *(fep)*.

$$fep = \frac{\textit{foreign currency credit - foreign currency deposits}}{\textit{Broad money}} \qquad (4)$$

A negative value for *fep* indicates that banks are maintaining a negative net lending position in foreign currency, which would presumably make them vulnerable to unanticipated devaluations. If banks exhibit a positive value for *fep*, the corresponding transfer of the exchange rate risk to their borrowers would impact the quality of the loan portfolio in the event of exchange rate depreciation. Although on the bank-level the net positions may differ, we only consider the macro-level here below.

The case of Albania is that of a negative *fep*. We should further consider the bank's position in terms of foreign assets. The latter might compensate for the former mismatch. We define bank's holdings of net foreign assets *(nfa)*:

$$nfa = \frac{foreign\ assets - foreign\ liabilities}{Broad\ money} \quad (5)$$



When we consider both *fep* and *nfa,* there appears to be an offsetting relationship where a negative position is almost offset by a positive amount of net foreign assets, Graph.8.

An overall net position defined as *np = fep+ nfa* close to zero is generally aimed by banks, because of risk management and/or prudential consideration[10]. Furthermore, *nfa* position overcompensates, that is, it is larger than needed to offset the mismatch in foreign currency loans and deposits. A general observation concerning the degree of compensation is that economies with relevant currency substitution tend to aim at having larger total foreign assets over liabilities, benefiting in the event of exchange rate depreciation (Bajaras and Morales, 2003).

The role of interest rates in currency substitution

The analysis of a survey conducted by the Bank of Albania on the lending activity of commercial banks (Monetary policy annual report, 2003) revealed the high interest rate of domestic currency, as one of the main reasons that favor borrowing in foreign currency[11].

As interest rate indicators, we use the relative intermediation spreads in each currency (*sprddc* and *sprdfc*). These spreads are defined as:

$$sprddc = \left[\frac{1 + il_{dc}}{1 + id_{dc}} \right] - 1$$

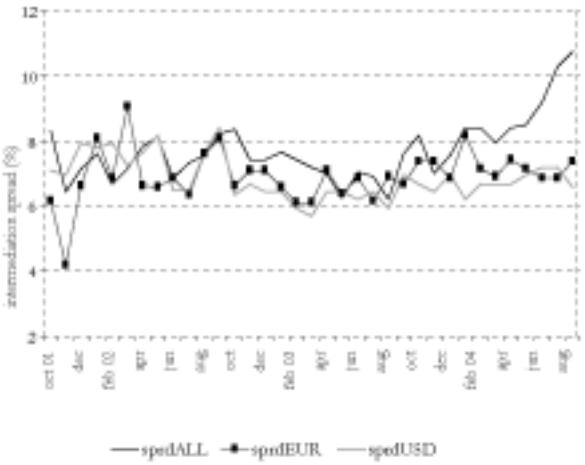
$$sprdfc = \left[\frac{1 + il_{fc}}{1 + id_{fc}} \right] - 1$$

where il_{dc} and il_{fc} are lending interest rates in domestic and foreign currency and id_{dc} and id_{fc} are deposits interest rates in domestic and foreign currency, respectively.

As shown in graph.9 the relative intermediation spread in domestic currency is higher than in foreign currency, on average 0.83 percent[12].

There are several reasons that induce these differences, and Bajaras and Morales, (2003), provide a good starting point. It can be shown that, if competitiveness, credit risk and marginal cost of bank intermediation are the same across currencies, then the relative spread should equal across currencies as well, therefore reasons for the divergence in relative spreads should be one or more of the following: (1) the difference in market power across currencies, (2) the difference in marginal transaction costs, (3) the differential taxes in intermediation, (4) the difference in credit risk and, hence in non-performing loans[13], (5) the difference in

Graph 9 Relative intermediation spreads



Source: Bank of Albania website, www.bankofalbania.org, Time series

maturity – this might provide some explanation for the increase in intermediation spread in domestic currency during the last months as the share of longer maturities loans in domestic currency has increased as well.

While all these factors deserve further investigation, we can tentatively conclude that the difference in the market power might explain a considerable part of the spread difference. The borrowers in foreign currency are mainly mid-large enterprises and important customers of the banks, whereas most of loans in domestic currency are consumer loans. Furthermore, the credit structure according to the sectors of economy implies that there are more valid crediting projects in foreign currency[14].

5 CONCLUSIONS

Residents in the Albanian economy hold about 30% of their deposits and 80% of their credits in foreign currency. These shares have slightly increased over the recent years.

Deposits currency substitution is associated with loans currency substitution. Currency mismatches, apparently, do not present a problem for the Albanian banking system as a whole. Even though there is an obvious mismatch in the currency substitution on deposits and loans side, the difference is offset by the holding of net foreign assets.

An interesting finding is that currency substitution in deposits held by households shows an increasing trend whereas that by businesses has decreased. The finding that an increase in trade seems to go hand in hand with the reduction in currency substitution for businesses is probably due to the large amount of non bank payments. A possible reason for currency substitution held by households is that of increased savings from private transfers further kept in foreign currency deposits making the household a passive holder.

The expected developments on the reasons behind currency substitution in the household sector might result in a different pattern

in the latter. Once the Albanian economy will have reached a more stable macroeconomic path, in the longer run, one may expect a decrease in the share of hysteresis in explaining deposit substitution. The relevance of portfolio diversification motives (lack of domestic financial instruments) in deposit substitution is expected to decrease with broadening the range of financial instruments. The correlation between private transfers and households foreign currency deposits is expected to decrease if Albanian households become more active investors.

While this is of long-term impact, using a tight monetary policy where a reduction in the currency substitution could be expected due to a tilting interest rate differential in favor of home deposits, can turn out to be bound to increase the currency substitution of bank loans.

If currency substitution in the business sector, as measured by deposits ratio, shows an increasing trend that should not be considered as bad phenomenon. We expect it to be a highly probable scenario if informal economy decreases and more transactions are settled though bank accounts. Furthermore, as Ize and Levy-Yeyati (1998) suggest, attempts at slowing down financial currency substitution can be particularly ill-advised when the latter reflects real sector developments, including globalization and trade liberalization.

Apart from specific measures, the soundness of the banking sector is of crucial importance in hedging against risk. Even though the current "problem-free" situation is favored by domestic currency appreciation, the future is not merely a reflection of the past, especially in the exchange rate market. In this regard, there is a need to strengthen two channels: (1) prudential lending and (2) prudential banking supervision.

First, currency mismatches should not be analyzed only in the case of banking or even financial institutions. The balance-sheet of non-financial agents is exposed to currency mismatches risk as well, the latter being even more exacerbated when low financial managerial skills in the private firms, as well as limited availability and access in financial markets, are considered. While their position is favored by

the appreciation of domestic currency against USD and a relatively stable Euro[15], a reversed trend in the exchange rate might undermine its ability to serve the debts. This imposes the necessity of expanding the analysis of currency mismatches to non-financial sector. In the meantime, the precautionary measures are up to the bank lending policies and procedures.

Concerning the second channel, tight and prudent banking supervision, not only assures that banking activity is respecting the law and the regulations, but it also enhances the reputation and credibility of the banking system as a whole. The Bank of Albania has already built a system of sensitivity analysis, in order to analyze different risks and scenarios associated with. A similar system might be encouraged to be applied in second tier banks as well.

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[2] "Law on Bank of Albania", No.8269, dated 23.12.1997, Article 3, paragraph 4.

[3] Throughout this paper "broad money" and "M3" are used as synonyms. M3 equals banknotes and coins in circulation plus domestic currency deposits plus foreign currency deposits.

[4] Supervisory Council/Bank of Albania (2004), "Declaration on threats on financial sector stability in Albania", Website of BoA.

[5] This holds under the assumption that informal economy transactions include foreign currency cash, a very plausible assumption.

[6] Fx_dep_(priv/nonfin_pub/house)= Foreign currency deposits of private enterprises/non financial public enterprises/households); Total_dep=total deposits.

[7] We have defined the real return on deposits as the nominal interest rate on deposit adjusted with the expected inflation (in the case of Albanian Lek deposit) or expected change in the exchange rate (in the case of foreign currency deposit). The current change is used as a *proxy* for the expected change.

[8] We should consider that the quality of balance of payment statistics is highly questionable and it is better to focus only on the trend rather than on the dynamics of the second indicator.

[9] Correlation coefficient: (FX_dep_house/total dep; DS_priv/GDP)=0.528.

[10] According to BoA "Regulation on open foreign exchange positions", no 59, dated 05.05.1999, "to perform banking transaction in foreign currency, all the licensed banks shall monitor the process and not exceed the following rates, in the end of each day: (1) A 10% maximum ratio of net open foreign position in each foreign currency

against bank regulatory capital; (2) A 20% maximum ratio of open foreign position against bank regulatory capital.

[11] Commercial banks lending activity survey (2000) shows other factors as well: the structure of bank equity, currency stability, clients' preferences and structure of deposits, (Çeliku et al, 2000).

[12] Since the series plotted are on monthly data, monthly differences in intermediation spreads are "distorted" by the deviations in interest rate for the loans provided in that month.

[13] The general indicator used by the Banking Supervision (BoA) is "bad loans/credit balance", see the Supervision Report (2003). There is a downward trend in this indicator due to lower growth rate of bad loans versus credit balance. But unfortunately there are no disaggregated data based on currency.

[14] The credit structure (average 2001-2003) in percentage is: trade=38.5, manufacturing=17.8, construction=10.3, real estate=9.5. See Monetary Policy Annual Report 2003.

[15] This refers to the period January 00- June 2004. ALL/USD has decreased from 137 to 103. ALL/EURO has fluctuated in the range 125-139, at an average of 132.

THE BANK LENDING CHANNEL IN ALBANIA: EVIDENCE FROM MICRO-LEVEL DATA

*Erjon Luçi**
*Ilir Vika***

ABSTRACT

This paper contributes to the empirical evidence on the bank lending channel of monetary policy in Albania using individual bank data. Specifically, the objective is to investigate whether the performance of bank deposits and credit to the private sector can be explained by changes in the monetary policy indicator, as measured with the base interest rate or repo rate. Our findings suggest that during the period of 2001:Q1 to 2004:Q3 bank deposits and lending behavior have not been influenced by actions of monetary policy. The coefficients of the monetary policy indicator are insignificant, implying little evidence to empirically support the existence of a bank lending channel in Albania.

1 INTRODUCTION

A vast literature in economics has tried to properly conceive and assess the transmission mechanism through which monetary policy affects the course of the real economy. In the traditional view, also known as the "money view", monetary policy operates through short-term interest rates to influence the cost of borrowing and, consequently, the investment and spending behavior in the economy. However, this

textbook story is incomplete and most empirical analyses on macro-level data have been unsuccessful to show how small changes in interest rates would be able to trigger important responses in the economy. Therefore, researchers have been looking for other channels of the monetary transmission mechanism, which could compliment the traditional money view and magnify the reaction of the economy.

A number of studies in recent decades have tried to explore whether asymmetric information and other "frictions" in financial markets might help explain the potency of monetary policy. According to this alternative view, monetary policy may affect not only the demand for loans – as in the interest rate channel – but also the supply of loans. Because banks are exposed to adverse selection and moral hazard problems, their willingness to lend may have consequences for the transmission of monetary policy. In the literature, this has been referred to as the bank lending channel, which stresses that in an economy where at least some borrowers are bank-dependent, the existence of financial frictions should give banks an important role in the monetary transmission mechanism.

In the case of Albania, the current view of how monetary policy affects the real economy is still built on the traditional interest rate channel theory. However, the potency of this channel has not been truly explored for Albania, usually due to the lack or poor quality of national statistical data. Muço et al (2004) studied this impact of monetary policy on movements in output and inflation rate but their estimates demonstrated a weak transmission link from money supply to the price level.

On the other hand, in our work we have taken a different approach in the transmission mechanism to study the bank lending channel of monetary policy in Albania from 2001 to the third quarter of 2004. Following the empirical literature on bank lending view, we use the model specification of Kashyap and Stein (1994) to capture the reaction of bank deposits and loans to changes in monetary policy. To analyze the cross-sectional differences in the effectiveness of the lending channel, the test is based on a panel data, taking simultaneously into account the bank-specific characteristics of size, liquidity and capitalization.

Indeed, first it was expected that monetary policy should influence movements in local currency deposits, whilst having a much lower impact on loans, since most of them are denominated in foreign currency. Whether or not monetary policy has any impact on deposits and loans, is an empirical question. Hence, answering this question is the main goal of this paper.

Nevertheless, the initial results indicate that monetary tightening does not lead to any contraction on bank deposits – which is the basic premise of the credit channel existence – so one can expect no effects on bank loans either. There is a lack of significance of almost all the estimated coefficients and of the sums of interaction coefficients between the monetary policy indicator and bank characteristics – except for capitalization, whose interaction coefficient is significant but has a negative sign (which is contrary to what should be expected). Therefore, for the period under investigation there is little empirical evidence to support the existence of a lending channel in Albania.

The remaining of the paper is structured as follows. Section 2 gives an overview of the existing literature on the interest rate and bank lending channel, while Section 3 describes the banking development and institutional characteristics of the Albanian economy during the transition period. Section 4 introduces the econometric model, and then presents the evidence on the response of banks' loans and deposits to monetary policy changes.

2 THE NATURE OF THE BANK LENDING CHANNEL

In the textbook *IS-LM* and *AD-AS* models, the interest rate channel is the key monetary transmission mechanism through which monetary policy can affect aggregate demand. In a monetary contraction, the central bank drains reserves from the banking system, thereby causing a rise in real interest rates in the credit markets. Households must then, increase their bonds holding and reduce the amount of money held in their portfolios. If prices are sticky and do not adjust to changes in money supply, a fall in household money holdings represents a decline in real money balances. With a higher cost of borrowing, firms and households will have to reduce their

spending, thereby leading to a decrease in aggregate demand and a fall in output.

Changes in real interest rates would equally apply to both businesses' decisions on new fixed investment and consumer spending on residential housing and durable goods. Higher interest rates increase the rate of return required by investors and causes businesses to cut down on investment. Additionally, they have a negative impact on consumption as households substitute future for present purchases of more expensive houses and other long-lasting assets.

Another way movements in interest rates can affect prices and gross domestic product is by influencing the domestic currency value. An increase in interest rates could lead to real exchange rate appreciation, thereby making domestic goods less competitive in local and foreign markets and worsening the trade balance position. If goods were priced in local currency, movements in exchange rates would be absorbed in firms' profit margins, which might then induce them to switch from domestic to foreign goods.

In the traditional interest-rate view, money and credit are treated asymmetrically. The LM curve treats money as a special asset, while loans, bonds, and other debt instruments are lumped together in a "bond market" assuming that there are no capital market imperfections (Bernanke & Blinder, 1988). In other words, borrowers and lenders can perfectly substitute loans for bonds as if there are no adverse selection or moral hazard problems in the financial markets. One implication of this assumption is that banks play a passive role in the transmission of monetary policy, because they can offer no special services on the asset side of their balance sheet, except that of issuing deposits on the liabilities side. In this view, monetary policy actions only influence the cost of borrowing, so aggregate demand components and prices would be responsive solely to changes in policy controlled interest rates (Angeloni et al., 2003).

While the traditional interest rate channel is widely used in textbook models for analyzing monetary policy effects on economic activity, this view is incomplete in several important ways because it focuses mainly on *aggregate* outcomes of monetary policy shocks. As such, it

offers no *distributional*, or cross-sectional, responses to policy actions, nor of aggregate implications of this heterogeneity (Hubbard, 1994). Furthermore, as Bernanke and Gertler (1995) argue, changes in real interest rates appear relatively small to be able to explain the much larger cyclical movements in housing, business fixed investment and inventories. Therefore, it is difficult to identify a quantitatively important relationship between the neoclassical cost-of-borrowing variable and movements in these "interest-sensitive" components of aggregate demand. On the other hand, there is a presumption that monetary policy has its strongest influence on the short- rather than long-term interest rates. For instance, central banks in many European countries, including Albania, use the one-week repo (repurchase agreement) rate as the most closely controlled interest rate. Therefore, the effects of monetary policy should be weaker on purchases of long-lasting assets, such as residential housing and durable goods, which are likely to be more sensitive to real, long-term rates.

The search for a monetary transmission mechanism broader than the interest rate channel has pushed many economists to identify whether credit market imperfections and other "frictions" in financial markets might help explain the potency of monetary policy. This alternative view – known as the bank lending channel – stresses that financial intermediaries do have an active role in the transmission of monetary policy, due to the problems of asymmetric information in lending to the economy. In this view, a reduction in bank reserves by the central bank would possibly reduce banks' loanable funds more than what is conceived in the traditional money view.

The model of Bernanke and Blinder (1988) extends the conventional *IS-LM* framework by taking into account the bank credit as a separate asset when analyzing the impact of monetary policy. They argue that if some borrowers are bank dependent and have limited access to capital markets for external financing, bonds and loans are imperfect substitutes so that changes in the composition of bank assets will also affect investment. Due to asymmetric information and high monitoring costs, banks will curtail their lending to certain (small) companies when monetary policy tightens. Hence, the more limited companies are to enter the credit markets for raising new funds,

the more affected they are going to be. Thus, any changes in bank willingness to lend will put pressure on certain borrowers directly, generating a bank lending channel in the monetary transmission. In this way, monetary policy can influence not only the general level of interest rates as in the traditional money view, but also the costs associated with the principal-agent problem between lenders and borrowers. Because some agents cannot easily switch to alternative forms of external borrowing, changes in bank lending will be different than those in bond purchases, thereby changing the spread between loans and securities rate. The magnitude of this spread, however, depends on the elasticities of demand for bank loans and supply of bonds.

A number of studies over the last decade have attempted to test for the existence of the bank lending channel, thus the empirical evidence is mixed. While many authors are quite confident that the credit channel exists, they are much less certain about its overall quantitative significance. Bernanke and Blinder (1990) examine the impulse responses of money, loans, and various measures of economic activity in the U.S. to changes in Federal funds rate. Their results show that when the Fed raises interest rates, the money stock falls almost immediately. Bank loans fall also, but with a significant lag – they show up approximately six to nine months later. Production goes down with a lag also, and indeed seems to move roughly at the same time with loans.

However, the concurrence of both output and loans decline in the results of Bernanke and Blinder does not necessarily mean that the former was caused by the latter. Kashyap, Stein and Wilcox (KSW, 1992) argue that the fall in production following a monetary contraction might have been due to the traditional money channel, while the reduction in credit granted by banks simply reflects a decrease in loan demand (due to the fall in production). In an effort to resolve this ambiguity, KSW (1992) use micro data to test some of the cross-sectional implications of the credit view. They find that, apart from the loan supply effects on output, inventory and investment declines in response to a monetary tightening are disproportionately affected among bank-dependent firms (which have scarce cash reserves and limited access to non-bank sources of finance.

In another study on the effects of bank lending channel across U.S. banks between 1976-93, Kashyap and Stein (1997) find that effects of monetary policies appear more pronounced in banks with less liquid balance sheets. This finding lends some credibility to the bank lending view of monetary transmission. This also points to a need for central banks to balance their goals of price stability and financial stability. Focusing on price stability alone might have adverse effects on financial stability through credit channel effects. Therefore, while exploring the monetary transmission mechanism, the bank lending channel should be a priority for central banks where price stability is the major goal.

Apart from the test to U.S. banks, Kashyap and Stein (1997b) study the implications of the lending channel for monetary transmission mechanism for a number of countries that initially joined the European Monetary Union. Given the noisy nature of their data, the authors could not make strong claims about the potency of lending channel in different countries. However, based on a subjective weighting of the factors that determine the importance of the credit channel, they expect banks in Italy and Portugal to play an important role in the transmission of monetary policy, while evidence on U.K. (not yet in the EMU), Belgium and the Netherlands suggest a relatively weak lending channel. The overall picture for the remaining countries was less clear.

Similarly, Favero et al (1999) find less support for any bank lending channels in France, Germany, Spain, and Italy (the results for the latter are in contrast to the findings of Kashyap and Stein). Their results show that bank credit did not change significantly during the monetary tightening episode of 1992.

However, in their study on bank balance sheets in the euro area, Ehrmann et al (2001) show that bank loans shrink significantly after a monetary contraction both on the aggregate euro area as well as on the country level. Using micro data, they find that the size of liquid assets is an important factor that characterizes the response of banks to changes in monetary policy: in general, the less liquid banks appear to react more strongly than more liquid banks. In contrast to findings in the U.S., effects of size and the degree of capitalization of a bank appear to be less important on the way

European banks adjust their lending to interest rate changes. This can be partly explained by a lower degree of informational frictions in euro area, where the government role, bank networks, and very few bank failures altogether contribute to a reduction in problems of asymmetric information.

In the case of Albania, studies on the transmission of monetary policy have been scarce and have usually focused on the impact of monetary policy actions on movements in output and inflation rate. For the first decade of transition up to mid-2000, Muço et al (2004) estimates from a VAR model demonstrate a weak relationship between money supply and the price level. However, this relationship appears to have somehow improved after the change from direct to indirect instruments of monetary policy in late 2000. One drawback in analyzing the link between monetary and real variables in Albania is the poor quality of data. GDP measures are viewed with skepticism, while other statistical data on new, emerging private sector are still inadequate. Therefore, the authors find little evidence on the Albanian transmission mechanism. Albania still remains a largely cash economy – the informal sector accounts for about one-third of economic activity – which considerably constrains the effectiveness of conventional monetary policies.

In this work, we shall try to empirically assess the distributional effects of monetary policy actions on bank deposits and loans in Albania, at microeconomic level during the period of 2001:Q1–2004: Q3. Also, it will be interesting to see whether bank characteristics like bank size, degree of liquidity and capitalization generate differences in the ability of banks to acquire deposits or increase their credit as monetary policy eases.

3 THE ROLE OF BANKS IN THE TRANSMISSION MECHANISM IN ALBANIA

3.1 Developments in the Albanian banking system

Since its transition to market economy, Albania has gone through a continuous process of establishing and strengthening its banking

system. In the past decade, this process was relatively slow due to the outspread "virus" of pyramid schemes, which had infected the domestic economic and financial development. The much higher interest rates offered by these illegal renter firms had almost substituted the income from bank deposit interest rates, hence holding in abeyance the effectiveness of monetary policy in managing interest rates. Likewise, the reforms in the banking sector had been stalled by a number of other problems, like the high concentration of deposits and loans in the three state-owned banks, their operational losses resulting from an increasing portfolio of non-performing loans, which were favored by a wide and inadequate regulatory framework.

The consolidation of the banking system apparently accelerated after the collapse of pyramid firms, a period that is characterized by a reduction in state-owned banks' domination, their gradual privatization and a rapid increase in the number of private banks (including branches of foreign banks) from six that operated in 1997, to fourteen banks in the beginning of 2004. This rather shows that authorities have been very prudent in selecting and granting licenses to private banks, where only two recently licensed banks are fully owned by local residents.

Despite the increased number of commercial banks in Albania, the banking activity has expanded at a relatively modest pace. During the period of 1998-2003, total assets of the banking system have shown a growth rate of about 13 percent annually, while GDP growth rate has averaged

Chart 1 Number of banks in Albania

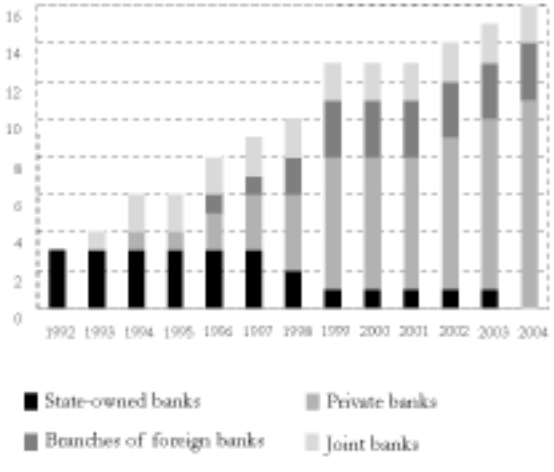
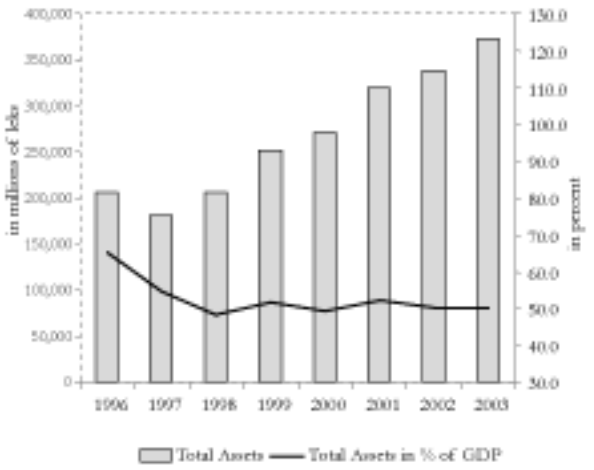


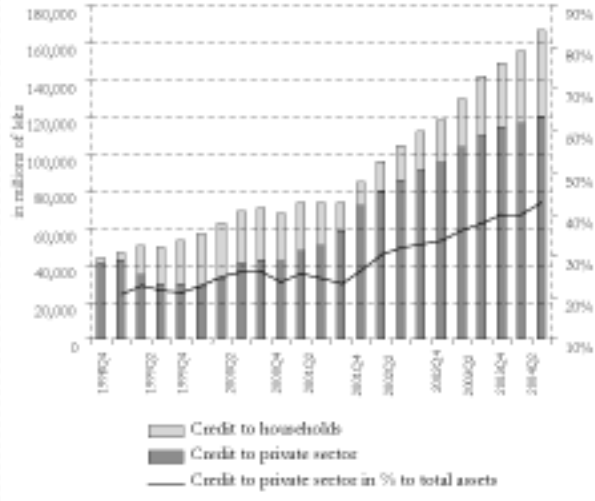
Chart 2 The Size of Banking Sector



14.5 percent in nominal terms. The ratio of bank assets to nominal GDP in Albania has been about 50 percent over the whole period, which is the lowest level as compared with other countries in South-east Europe.

The growth of bank lending to private sector and individuals has continuously shown a better performance than banks' total assets. This indicator has significantly improved during the period of 1998-2003 by having an annual growth rate of 28 percent on average. At the same time, non-performing loans of private banks and branches of foreign banks have fluctuated within the 2–2.4 percent range of gross loans during 2003, which speaks for a relatively limited exposure of banks to the risk of default on payments. Despite the satisfactory improvement on the quality of assets and financial performance in recent years, banking services still evidence a relatively small penetration in the Albanian economy; the ratio of credit to private sector and individuals to GDP is very low – about

Chart 3 Credit to private sector



6.8 percent in 2003 as compared to 20-40 percent in Eastern Europe. Another shortcoming that characterizes bank credit to the private sector is that nearly four-fifth of total loans are made in dollar or euro currency; because interest rates on foreign currency-denominated loans are determined by interest changes in the international markets and do not respond to the domestic monetary policy actions, it reduces the central bank's ability to influence economic activity toward desired levels.

3.2 Institutional characteristics during the years of transition

Recent researches on whether banks play an important role in the transmission of monetary policy in the economy have focused on two necessary *issues*: first, whether firms and households are dependent on bank loans to finance their activities, and second, whether central banks are able to shift the bank loans' supply curve.

Regarding the *first issue*, commercial banks dominate the Albanian financial system with the largest share as compared to all other European countries. In 2002, assets of other financial institutions, like insurance companies, pension funds, credit institutions, etc, constituted less than two percent of total assets in the financial system (Cottarelli et al., 2003). Because of the large scarcity of these economic agents as well as the inexistence of proper capital and money markets in Albania, it has been difficult to develop and use other financial instruments like bonds or equities to raise new capital. In these conditions, almost all companies and households should depend on bank lending as the only alternative for external funds. Also, the experience in the developed economies notes that small and medium enterprises (SME) are more bank-dependent and suffer more during monetary tightening because it is harder for them to access the capital markets to raise new funds. In 2002, SME constituted over 96 percent of non-financial firms in Albania, realizing nearly 45 percent of the total business turnover[1]. Therefore, one should expect these firms rely more on banks and their activity be sensitive to monetary policy shocks.

However, the latest survey from the Bank of Albania on business confidence reveals that domestic private enterprises are not too dependent on bank loans. Nearly 70 percent of 238 firms that have

responded to the questionnaire claim that they rely mainly on their internal and other informal sources of finance. Yet a large number of private companies acknowledge bank credit as the most important channel of external finance, while approximately 60 percent of them blame to some extent the numerous requirements that banks ask when providing loans.

Indeed, there are many problems that hinder a faster penetration of banking services in the economy, for example a weak functioning of the legal system, "window dressing" of firms' balance sheets, adverse selection and moral hazard problems, and so on. Because the costs of monitoring and evaluating the position of small firms' balance sheets is very high, we can sense why commercial banks hesitate to expand their credit very rapidly.

Nevertheless, as long as firms of any size are unable to access the securities markets for raising new capital and bank loans are considered as the only alternative for external finance, commercial banks may play an important role in the transmission of monetary policy. Most of the private banks operating in Albania are relatively small and would prefer to lend to small and medium enterprises rather than exposing themselves too much by lending high amounts of money to large companies. The greater the dependence of small and medium firms on bank financing, suggests that they should be more affected than larger enterprises to reductions in credit availability. Kashyap & Stein (1997b) argue that smaller firms – which in Albania realize nearly half of the domestic economic activity – are more likely to rely on small banks, hence more subject to monetary policy shocks. From this point of view, restrictions in the availability of bank loans could have macroeconomic consequences by affecting the investment and spending behavior of bank-dependent borrowers.

The *second condition* for monetary policy to work through a bank lending channel is that monetary authority should be able to shift the supply of bank loans. To determine whether changes in monetary policy affect bank lending behavior, a number of studies in the U.S. and Europe have looked at how banks adjust their loans and securities on the assets side and deposit and non-deposit liabilities during periods of monetary tightening.

During the 1990s, the Bank of Albania tried to exercise its monetary policy by using two main direct instruments: 1) it had put a ceiling on bank credit to ensure an effective control of credit growth (and hence aggregate demand), and 2) it had also set a minimum interest rate on lek-denominated time deposits. The effects of these two instruments, however, gradually waned by the end of 1990s. After the economy collapsed in '97, the Savings Bank and National Commercial Bank that dominated the banking system went bankrupt due to a large portfolio of bad loans[2], therefore their credit activity was prohibited while their excess reserves were afterwards used to finance government spending. On the other hand, private banks were relatively small and they could satisfy a very limited portion of the demand for loans.

The enormous growth of the informal credit markets in mid-1990s, and the investment of huge reserves of the two state-owned banks in Treasury bills later on gradually lessened the importance of credit ceilings on banks, which were eventually abandoned in 1999. Similarly, the drastic fall in inflation rate during the period of 1999-2000 caused bank interest rates not to respond to the continual reductions in managed interest rates by the central bank. In these circumstances, the Bank of Albania was forced to reconsider once again its entire operational framework, by shifting its attention to other indirect instruments.

Since September 2000, the central bank has conducted its monetary policy via repurchase agreements (repo) as its main instrument, which aims at managing liquidity level in the banking system as well as determining the course of interest rates in the economy. In this regard, repos with different terms to maturity have played an important role in mopping up or injecting liquidity in the system, hence affecting interest rates on bank loans and consequently the spread between loans and T-bills rates.

Nonetheless, the large share of liquid assets in bank balance sheets might have restrained the ability of the Bank of Albania to influence banks' willingness to lend. Because of financial frictions, commercial banks keep a high level of liquid assets in the form of cash, interbank transactions, T-bills and other securities. In 2003, the ratio of liquid

assets to total assets in private banks (G3)[3] averaged 70.3 percent, whilst for the whole banking system this ratio was over 84 percent. Therefore, the large volume of liquid assets can help banks shield their credit portfolio and not react during times of monetary policy shocks.

Other important factors that have influenced not only the spread between loans and T-bills rates, but also the inconsistent responses of T-bills rates to monetary policy actions, are the banking system imperfections – e.g. the high degree of domination by two large banks, low competition, etc. – and also the government budget which has continuously been the biggest "consumer" in the money market, as reflected in the high government debt indicators in the banking sector. The domination of the Savings Bank (today Raiffeisen Bank) has persistently influenced the domestic debt management, T-bills interest rates, and open market operations, hence hindering the conduct of BoA' s monetary policy via indirect instruments (Baleta et al., 2000). Similarly, shocks on demand for money from the government have lowered or raised the yield on Treasury bills, thus putting pressure on the central bank to change its interest base rate in the money market (Cani & Hadëri, 2002).

In conclusion, although changes in monetary policy have generally been reflected on interest rate movements in credit and securities markets, the effectiveness of a bank lending channel in the Albanian economy remains at modest levels, hampered by a large cash economy, an underdeveloped interbank market, a relatively high level of currency substitution, banks' preference to lend in foreign currencies, a trivial infiltration of bank services in the economy as indicated by a low ratio of bank loans to GDP, and so on.

4 MEASURING MONETARY POLICY

4.1 The model specifications

When analyzing the bank lending channel, most papers usually follow and enhance the econometric models introduced by Bernanke and Blinder (1988) and Kashyap and Stein (1994). Both models

aim at measuring how informational frictions at the bank level can generate a credit channel in the transmission of monetary policy and also investigate whether banks react differently to changes in monetary policy. Assuming that we can capture the relevant time effect by including output and prices, the regression model would take the following form:

$$\Delta \ln x_{it} = a_i + \sum_{j=1}^{l} b_j \Delta \ln x_{it-j} + \sum_{j=1}^{l} c_j \Delta r_{t-j} + \sum_{j=1}^{l} d_j Z_{it-1} \Delta r_{t-j} + \sum_{j=1}^{l} e_j Z_{it-1} + \sum_{j=1}^{l} f_j \pi_{t-j} + \sum_{j=1}^{l} g_j \Delta \ln y_{t-j} + \varepsilon_t$$

where

i = an individual bank (i=1,…N)
t = quarter (t =1,…T)
l = number of lags (4 lags)
x_{it} = deposits or loans of bank i at time t (in Albanian leks)
r_t = monetary policy indicator as measured by the base interest rate or one-week repo rate
y_t = real GDP
π_t = inflation rate
Z_{it} = bank characteristic (size, liquidity, capitalization)
a, b, c, d, e, f, g = parameters to be estimated
ε = error term

The intercept a_i in the equation indicates fixed effects for each individual bank. The direct overall effects of monetary policy actions on bank credit growth is captured by parameter c in front of the monetary policy indicator, r. Another coefficient of interest is d in front of the interaction terms, which indicates how significant bank specific characteristics are in the response of each bank to monetary policy changes. Hypothetically, parameter d is expected to be significantly positive, the smaller, less liquid or less capitalized banks are. On the other hand, parameter e illustrates whether there is a linear relationship between bank characteristics and loans, deposits, or liquidity of banks.

In order to control demand effects, there have been added two macroeconomic variables, the inflation rate and real GDP growth. The inclusion of these two variables intends to capture the cyclical movements of bank loans and deposits independently from changes in monetary policy.

The regression model above assumes that individual banks face a homogeneous reaction of the demand for loans, therefore the effects of monetary policy on bank loans should be more obvious. Given that bank credit is the main source of external finance for all types of firms in Albania, the aforementioned model could serve as a reasonable benchmark in identifying the loan supply effects.

As a monetary policy indicator, we have used the change in the rate of both base interest and one-week repurchase agreements from the Bank of Albania. The three bank characteristics, size (S), liquidity (Lq), and capitalization (Ca) are intended to test for the existence of distributional effects across banks. They are measured as follows:

$$S_{it} = \log A_{it} - \frac{\sum \log A_{it}}{N_t}$$

$$Lq_{it} = \frac{L_{it}}{A_{it}} - \left[\sum \frac{\sum L_{it}/A_{it}}{N_t}\right]/T$$

$$Ca_{it} = \frac{C_{it}}{A_{it}} - \left[\sum \frac{\sum C_{it}/A_{it}}{N_t}\right]/T$$

where A_{it} denotes total assets, L_{it} indicates liquid assets (cash, interbank lending and securities), and C_{it} represents capital and reserves of bank i at time t. Therefore, in the above equations size is expressed by the log of total assets, liquidity is measured by the ratio of liquid assets to total assets, while capitalization is given by the ratio of capital and reserves to total assets (please see Appendix 1 for a more detailed data description).

4.2 Results

In this model, the existence of a bank lending channel can be judged based on the sign and significance of the interaction coefficients measuring the differential impact of monetary policy on bank lending, in line with banks' size, liquidity, and capitalization. The smaller, more illiquid and less capitalized banks would face more difficulties in finding external funds, following a monetary policy tightening. Hence, they would reduce their loans by more than large, liquid and better capitalized banks. Bearing in mind the negative impact of an increase in interest rate on bank lending, this implies that the interaction estimate coefficients between monetary policy and banks' characteristics should be positive and significant.

As mentioned earlier, we have used three banks' characteristics: size, liquidity and capitalization. Since these characteristics are not independent from each other, we have included them separately. We first estimated the model including four lags of the two macroeconomic variables. However, this led to unsatisfactory results. Indeed, we faced a strong multicollinearity problem. For this reason we decided to keep only two lags of macroeconomic variables. In running models for loans, we have excluded RZB (former Savings Bank) due to restrictions on its lending activity during the period under observation, which could bias the results.

The estimations, being referred to as models 1 to 3, were aimed at checking for the differential response of banks to monetary policy changes measured by the interaction of base interest rate with banks' characteristics. The results show that there is a lack of significance of almost all the estimated coefficients and of the sum coefficients for interaction terms and monetary policy indicator. In model 3, the sum of interaction coefficients between capital and base interest rate is significant but has a negative sign. This means that undercapitalized banks are affected less by the stance of monetary policy compared to high capitalized banks.

In another set of regressions 4 to 6, base interest rate was substituted with REPO rate. The results obtained from these models are very similar to those of models 1-3. Again only the interactions between capital and monetary policy stance turn out to be significant but with a negative sign.

These initial results imply that there is little evidence to empirically support the existence of a lending channel in Albania. In other words, it seems that one can accept the assumption that loan supply elasticities with respect to monetary policy stance are homogeneous across banks and close to nought.

Repeating the same exercise but now using deposits instead of loans, models 7 to 12, neither the sums of interaction terms nor the sums of monetary policy indicator seem to be significant. To check whether these results are robust we drop the interaction terms and banks' characteristics assuming the impact of monetary policy on

banks' deposit is independent of bank characteristics. The results (model 13-14) show that the sums coefficients of monetary policy stance are insignificant. This reassures us that for the period under investigation there is no possibility of a bank lending channel, as far as monetary policy tightening does not lead to any contraction on bank deposits, which is the basic premise of the credit channel existence (Kashyap and Stein, 1994).

APPENDIX 1: DATA DESCRIPTION

The data are taken from the consolidated balance sheets of individual bank statistics at the Bank of Albania. All data are quarterly and are not seasonally adjusted. *Deposits* include time and demand deposits in Albanian leks and not deposits in foreign currency. *Loans* are those to the non-bank private sector and include only lek-denominated bank credit; non-performing loans have been excluded; also, the Savings Bank (today Raiffeisen Bank) was excluded from models 1 to 6 (please see Appendix 2) because its lending activity was not allowed during the period under investigation. *Liquidity* is calculated by dividing liquid to total assets; according to the Bank of Albania's definition, liquid assets equal the sum of reserves, repurchase agreements, foreign assets, government securities and treasury bills. The *size* of a bank is measured by the logarithm of the total balance sheet; this variable is centered with respect to each period's mean. *Capitalization* is defined as the sum of capital, general reserves, retained profit, and the revaluation of reserves in the capital account.

Model 1 Loans and Size (interest base)

Fixed-effects (within) regression	Number of obs = 89
Group variable (i): bank	Number of groups = 11
R-sq: within = 0.3199	Obs per group: min = 1
between = 0.0104	avg = 8.1
overall = 0.0143	max = 10
	F(20,58) = 1.36
corr(u_i, Xb) = -0.9384	Prob > F = 0.1786

dlloans	Coef.	Std. Err.	t*	P>|t*|	[95% Conf.	Interval]
dlloans_1	0.067	0.172	0.39	0.696	-0.277	0.412
dlloans_2	0.158	0.153	1.03	0.306	-0.148	0.463
dlloans_3	0.040	0.128	0.31	0.757	-0.216	0.295
dlloans_4	-0.062	0.065	-0.95	0.344	-0.191	0.068
Sum: dlloans	0.203					
dint_base_1	-0.346	0.281	-1.23	0.224	-0.908	0.217
dint_base_2	0.502	0.279	1.80	0.077	-0.055	1.060
dint_base_3	0.132	0.215	0.62	0.540	-0.298	0.563
dint_base_4	0.052	0.199	0.26	0.793	-0.346	0.451
Sum: dint_base	0.341		0.91	0.344		
size_dint_1	0.135	0.214	0.63	0.532	-0.294	0.564
size_dint_2	0.140	0.179	0.78	0.438	-0.219	0.499
size_dint_3	0.014	0.191	0.07	0.943	-0.369	0.396
size_dint_4	-0.129	0.192	-0.68	0.502	-0.513	0.254
Sum: size_dint	0.159		0.35	0.555		
size_1	0.922	1.310	0.70	0.484	-1.700	3.544
size_2	-0.327	2.035	-0.16	0.873	-4.402	3.747
size_3	3.648	1.938	1.88	0.065	-0.232	7.528
size_4	-2.992	1.394	-2.15	0.036	-5.783	-0.201
Sum: size	1.250					
inf2_1	-0.443	10.001	-0.04	0.965	-20.462	19.576
inf2_2	8.988	14.126	0.64	0.527	-19.288	37.263
Sum: inf2	8.545					
gdp_gr_1	-6.828	21.560	-0.32	0.753	-49.984	36.328
gdp_gr_2	1.537	33.691	0.05	0.964	-65.903	68.977
Sum: GDP_gr	-5.291					
_cons	-0.184	0.835	-0.22	0.826	-1.857	1.488

* Tests for the Sum of coefficients are done with the F test, F(1, 58)

sigma_u .73134298
sigma_e .33542754
rho .82620309 (fraction of variance due to u_i)
F test that all u_i=0: F(10, 58) = 0.74 Prob > F = 0.6813

Model 2 Loans and liquidity (interest base)

Fixed-effects (within) regression	Number of obs = 89
Group variable (i): bank	Number of groups = 11
R-sq: within = 0.3250	Obs per group: min = 1
between = 0.1825	avg = 8.1
overall = 0.0057	max = 10
	F(20,58) = 1.40
corr(u_i, Xb) = -0.8929	Prob > F = 0.1619

dlloans	Coef.	Std. Err.	t*	P>|t*|	[95% Conf.	Interval]
dlloans_1	0.087	0.162	0.53	0.595	-0.238	0.411
dlloans_2	0.206	0.167	1.24	0.221	-0.127	0.539
dlloans_3	0.203	0.135	1.50	0.139	-0.068	0.473
dlloans_4	-0.084	0.067	-1.26	0.214	-0.217	0.050
Sum: dlloans	0.411					
dint_base_1	-0.119	0.176	-0.68	0.501	-0.471	0.233
dint_base_2	0.545	0.201	2.70	0.009	0.142	0.948
dint_base_3	-0.231	0.154	-1.49	0.141	-0.540	0.079
dint_base_4	-0.082	0.134	-0.61	0.544	-0.351	0.187
Sum: dint_base	0.113		0.54	0.467		
liq_dint_1	0.311	0.608	0.51	0.611	-0.906	1.528
liq_dint_2	-0.027	0.477	-0.06	0.955	-0.983	0.929
liq_dint_3	-0.364	0.466	-0.78	0.439	-1.297	0.570
liq_dint_4	-0.374	0.475	-0.79	0.434	-1.325	0.576
Sum: liq_dint	-0.454		0.29	0.590		
liq2_1	0.157	1.480	0.11	0.916	-2.806	3.120
liq2_2	-2.422	1.680	-1.44	0.155	-5.785	0.941
liq2_3	0.475	1.516	0.31	0.755	-2.559	3.510
liq2_4	-0.483	1.081	-0.45	0.657	-2.646	1.680
Sum: liq2	-2.273					
inf2_1	8.946	7.012	1.28	0.207	-5.091	22.982
inf2_2	20.337	8.343	2.44	0.018	3.637	37.037
Sum: inf2	29.283					
gdp_gr_1	18.266	12.654	1.44	0.154	-7.063	43.595
gdp_gr_2	40.994	18.922	2.17	0.034	3.117	78.871
Sum: GDP_gr	59.260					
_cons	-1.166	0.507	-2.30	0.025	-2.182	-0.151

* Tests for the Sum of coefficients are done with the F test, F(1, 58)

sigma_u |	.49844338
sigma_e |	.33417282
rho |	.68990248 (fraction of variance due to u_i)

F test that all u_i=0: F(10, 58) = 0.73 Prob > F = 0.6934

Model 3 Loans and capital (interest base)

Fixed-effects (within) regression	Number of obs = 89
Group variable (i): bank	Number of groups = 11
R-sq: within = 0.4014	Obs per group: min = 1
between = 0.0073	avg = 8.1
overall = 0.0070	max = 0
	F(20,58) = 1.94
corr(u_i, Xb) = -0.9945	Prob > F = 0.0258

dlloans	Coef.	Std. Err.	t*	P>|t*|	[95% Conf.	Interval]
dlloans_1	0.151	0.153	0.99	0.328	-0.155	0.458
dlloans_2	0.236	0.144	1.64	0.106	-0.051	0.523
dlloans_3	0.199	0.126	1.58	0.121	-0.054	0.451
dlloans_4	-0.049	0.059	-0.83	0.409	-0.168	0.070
Sum: dlloans	0.536					
dint_base_1	-0.694	0.193	-3.59	0.001	-1.080	-0.307
dint_base_2	-0.066	0.243	-0.27	0.785	-0.552	0.419
dint_base_3	-0.279	0.148	-1.88	0.065	-0.576	0.017
dint_base_4	0.045	0.122	0.37	0.712	-0.198	0.289
Sum: dint_base	-0.994		9.17	0.004		
cap_dint_1	-1.725	0.664	-2.60	0.012	-3.055	-0.396
cap_dint_2	-1.388	0.592	-2.35	0.022	-2.572	-0.204
cap_dint_3	-1.010	0.526	-1.92	0.060	-2.064	0.043
cap_dint_4	0.077	0.456	0.17	0.866	-0.836	0.991
Sum: cap_dint	-4.046		9.04	0.004		
cap2_1	1.001	2.303	0.43	0.665	-3.609	5.610
cap2_2	5.689	2.355	2.42	0.019	0.974	10.403
cap2_3	-1.170	1.983	-0.59	0.558	-5.139	2.799
cap2_4	5.503	1.740	3.16	0.002	2.021	8.985
Sum: cap2	11.023					
inf2_1	-5.956	7.228	-0.82	0.413	-20.425	8.513
inf2_2	6.877	8.255	0.83	0.408	-9.647	23.400
Sum: inf2	0.921					
gdp_gr_1	-5.637	12.688	-0.44	0.658	-31.035	19.760
gdp_gr_2	8.823	19.042	0.46	0.645	-29.294	46.940
Sum: GDP_gr	3.186					
_cons	0.662	0.630	1.05	0.297	-0.598	1.923

* Tests for the Sum of coefficients are done with the F-test, F(1, 58)

sigma_u |	4.027487
sigma_e |	.31470106
rho |	.99393146 (fraction of variance due to u_i)

F test that all u_i=0: F(10, 58) = 1.77 Prob > F = 0.0860

Model 4 Loans and size (REPO rate)

Fixed-effects (within) regression	Number of obs = 89
Group variable (i): bank	Number of groups = 11
R-sq: within = 0.3164	Obs per group: min = 1
between = 0.0111	avg = 8.1
overall = 0.0116	max = 10
	F(20,58) = 1.34
corr(u_i, Xb) = -0.9459	Prob > F = 0.1908

dlloans	Coef.	Std. Err.	t*	P>|t*|	[95% Conf.	Interval]
dlloans_1	0.077	0.172	0.45	0.658	-0.268	0.422
dlloans_2	0.143	0.154	0.93	0.357	-0.165	0.451
dlloans_3	0.039	0.128	0.30	0.764	-0.218	0.295
dlloans_4	-0.059	0.064	-0.93	0.357	-0.188	0.069
Sum: dlloans	0.199					
drepo_1	-0.377	0.296	-1.27	0.208	-0.970	0.215
drepo_2	0.409	0.328	1.24	0.218	-0.248	1.066
drepo_3	0.218	0.231	0.94	0.351	-0.246	0.681
drepo_4	0.129	0.235	0.55	0.585	-0.342	0.600
Sum: drepo	0.378		1.12	0.295		
size_drepo_1	0.113	0.213	0.53	0.597	-0.313	0.539
size_drepo_2	0.158	0.178	0.89	0.379	-0.198	0.513
size_drepo_3	-0.006	0.187	-0.03	0.976	-0.380	0.369
size_drepo_4	-0.077	0.185	-0.42	0.678	-0.448	0.294
Sum: size_drepo	0.188		0.51	0.479		
size_1	0.681	1.219	0.56	0.579	-1.760	3.122
size_2	0.184	1.934	0.10	0.925	-3.688	4.056
size_3	3.628	1.951	1.86	0.068	-0.277	7.533
size_4	-3.159	1.388	-2.28	0.027	-5.938	-0.380
Sum: size	1.334					
inf2_1	-5.379	13.230	-0.41	0.686	-31.861	21.104
inf2_2	5.059	17.147	0.30	0.769	-29.264	39.383
Sum: inf2	-0.320					
gdp_gr_1	-16.018	26.080	-0.61	0.541	-68.223	36.186
gdp_gr_2	-8.987	39.286	-0.23	0.820	-87.626	69.653
Sum: GDP_gr	-25.005					
_cons	0.103	0.992	0.10	0.918	-1.883	2.089

* Tests for the Sum of coefficients are done with the F- test, F(1, 58)

sigma_u | .76988456
sigma_e | .33629059
rho | .83977163 (fraction of variance due to u_i)
F test that all u_i=0: F(10, 58) = 0.76 Prob > F = 0.6627

Model 5 Loans and liquidity (REPO rate)

Fixed-effects (within) regression	Number of obs = 89
Group variable (i): bank	Number of groups = 11
R-sq: within = 0.3251	Obs per group: min = 1
between = 0.1769	avg = 8.1
overall = 0.0077	max = 10
	F(20,58) = 1.40
corr(u_i, Xb) = -0.8832	Prob > F = 0.1616

dlloans	Coef.	Std. Err.	t*	P>|t*|	[95% Conf.	Interval]
dlloans_1	0.084	0.163	0.52	0.608	-0.242	0.411
dlloans_2	0.218	0.166	1.31	0.195	-0.115	0.551
dlloans_3	0.214	0.137	1.56	0.124	-0.061	0.490
dlloans_4	-0.083	0.064	-1.29	0.201	-0.212	0.046
Sum: dlloans	0.433					
drepo_1	-0.152	0.179	-0.85	0.401	-0.511	0.207
drepo_2	0.572	0.247	2.31	0.024	0.077	1.068
drepo_3	-0.206	0.160	-1.29	0.203	-0.525	0.114
drepo_4	-0.108	0.174	-0.62	0.536	-0.456	0.240
Sum: drepo	0.107		0.48	0.492		
liq_drepo_1	0.323	0.603	0.53	0.595	-0.883	1.531
liq_drepo_2	-0.012	0.466	-0.03	0.979	-0.946	0.921
liq_drepo_3	-0.372	0.457	-0.81	0.419	-1.288	0.543
liq_drepo_4	-0.439	0.472	-0.93	0.356	-1.384	0.505
Sum: liq_drepo	-0.502		0.37	0.545		
liq2_1	0.242	1.489	0.16	0.871	-2.738	3.222
liq2_2	-2.476	1.696	-1.46	0.150	-5.871	0.919
liq2_3	0.553	1.532	0.36	0.719	-2.514	3.620
liq2_4	-0.465	1.086	-0.43	0.670	-2.639	1.708
Sum: liq2	-2.147					
inf2_1	9.546	9.354	1.02	0.312	-9.177	28.269
inf2_2	22.421	10.646	2.11	0.040	1.112	43.731
Sum: inf2	31.967					
gdp_gr_1	19.037	15.641	1.22	0.228	-12.271	50.345
gdp_gr_2	44.168	23.836	1.85	0.069	-3.546	91.882
Sum: GDP_gr	63.205					
_cons	-1.231	0.640	-1.92	0.059	-2.511	0.049

* Tests for the Sum of coefficients are done with the F-test, F(1, 58)

sigma_u |	.47391146
sigma_e |	.33414635
rho |	.66794005 (fraction of variance due to u_i)

F test that all u_i=0: F(10, 58) = 0.69 Prob > F = 0.7263

Model 6 Loans and capital (REPO rate)

Fixed-effects (within) regression	Number of obs = 89
Group variable (i): bank	Number of groups = 11
R-sq: within = 0.3991	Obs per group: min = 1
between = 0.0072	avg = 8.1
overall = 0.0062	max = 10
	F(20,58) = 1.93
corr(u_i, Xb) = -0.9955	Prob > F = 0.0274

dlloans	Coef.	Std. Err.	t*	P>|t*|	[95% Conf.	Interval]
dlloans_1	0.161	0.154	1.04	0.301	-0.148	0.470
dlloans_2	0.240	0.143	1.68	0.098	-0.046	0.527
dlloans_3	0.212	0.127	1.67	0.100	-0.042	0.466
dlloans_4	-0.045	0.059	-0.76	0.452	-0.162	0.073
Sum: dlloans	0.569					
drepo_1	-0.733	0.197	-3.73	0.000	-1.126	-0.339
drepo_2	-0.198	0.296	-0.67	0.506	-0.792	0.395
drepo_3	-0.235	0.152	-1.54	0.129	-0.540	0.070
drepo_4	0.074	0.158	0.47	0.642	-0.242	0.389
Sum: drepo	-1.092		9.59	0.003		
cap_drepo_1	-1.730	0.658	-2.63	0.011	-3.046	-0.413
cap_drepo_2	-1.522	0.596	-2.55	0.013	-2.716	-0.329
cap_drepo_3	-1.048	0.529	-1.98	0.053	-2.108	0.012
cap_drepo_4	-0.225	0.479	-0.47	0.640	-1.183	0.734
Sum: cap_drepo	-4.524		9.68	0.003		
cap2_1	1.617	2.346	0.69	0.493	-3.079	6.314
cap2_2	5.635	2.376	2.37	0.021	0.880	10.390
cap2_3	-0.603	2.043	-0.30	0.769	-4.692	3.486
cap2_4	5.510	1.739	3.17	0.002	2.029	8.991
Sum: cap2	12.159					
inf2_1	-10.435	9.578	-1.09	0.280	-29.607	8.736
inf2_2	3.243	10.623	0.31	0.761	-18.021	24.507
Sum: inf2	-7.192					
gdp_gr_1	-12.767	15.803	-0.81	0.422	-44.400	18.867
gdp_gr_2	-0.082	24.087	0.00	0.997	-48.297	48.133
Sum: GDP_gr	-12.849					
_cons	0.995	0.779	1.28	0.207	-0.564	2.553

* Tests for the Sum of coefficients are done with the F-test, F(1, 58)

sigma_u	4.4360748
sigma_e	.31528456
rho	.99497404 (fraction of variance due to u_i)

F test that all u_i=0: F(10, 58) = 1.82 Prob > F = 0.0776

Model 7 Deposits and size (interest base)

Fixed-effects (within) regression	Number of obs = 133
Group variable (i): bank	Number of groups = 15
R-sq: within = 0.3745	Obs per group: min = 1
between = 0.3150	avg = 8.9
overall = 0.1132	max = 10
	F(20,98) = 2.93
corr(u_i, Xb) = -0.5919	Prob > F = 0.0002

dldep	Coef.	Std. Err.	t*	P>|t*|	[95% Conf.	Interval]
dldep_1	-0.449	0.121	-3.71	0.000	-0.690	-0.209
dldep_2	0.090	0.132	0.68	0.497	-0.172	0.352
dldep_3	-0.401	0.122	-3.29	0.001	-0.643	-0.159
dldep_4	0.010	0.122	0.09	0.932	-0.232	0.253
Sum: dldep	-0.750					
dint_base_1	-0.059	0.086	-0.68	0.495	-0.231	0.112
dint_base_2	0.028	0.072	0.38	0.702	-0.115	0.170
dint_base_3	0.079	0.073	1.05	0.295	-0.070	0.229
dint_base_4	0.048	0.072	0.67	0.505	-0.095	0.191
Sum: dint_base	0.096		1.27	0.263		
size_dint_1	0.052	0.061	0.85	0.399	-0.069	0.172
size_dint_2	-0.187	0.058	-3.22	0.002	-0.303	-0.072
size_dint_3	0.043	0.063	0.67	0.503	-0.083	0.168
size_dint_4	0.039	0.063	0.62	0.537	-0.086	0.165
Sum: size_dint	-0.054		0.50	0.479		
size_1	-0.828	0.527	-1.57	0.119	-1.874	0.218
size_2	0.913	0.538	1.70	0.093	-0.154	1.981
size_3	0.227	0.452	0.50	0.617	-0.671	1.125
size_4	-0.516	0.366	-1.41	0.162	-1.242	0.210
Sum: size	-0.204					
inf2_1	-4.335	2.768	-1.57	0.121	-9.828	1.159
inf2_2	-3.515	3.923	-0.90	0.372	-11.299	4.269
Sum: inf2	-7.850					
gdp_gr_1	-13.181	6.026	-2.19	0.031	-25.139	-1.223
gdp_gr_2	-11.292	9.851	-1.15	0.254	-30.840	8.257
Sum: GDP_gr	-24.473					
_cons	0.516	0.230	2.24	0.027	0.059	0.972

* Tests for the Sum of coefficients are done with the F-test, F(1, 98)

sigma_u	.2209199
sigma_e	.18155482
rho	.5968808 (fraction of variance due to u_i)

F test that all u_i=0: F(14, 98) = 1.35 Prob > F = 0.1910

Model 8 Deposits and liquidity (interest base)

Fixed-effects (within) regression	Number of obs = 133
Group variable (i): bank	Number of groups = 15
R-sq: within = 0.3615	Obs per group: min = 1
between = 0.8427	avg = 8.9
overall = 0.0505	max = 10
	F(20,98) = 2.77
corr(u_i, Xb) =-0.6333	Prob > F = 0.0 005

dldep	Coef.	Std. Err.	t*	P>|t*|	[95% Conf.	Interval]
dldep_1	-0.527	0.112	-4.72	0.000	-0.748	-0.305
dldep_2	0.074	0.130	0.57	0.568	-0.183	0.332
dldep_3	-0.331	0.121	-2.75	0.007	-0.571	-0.092
dldep_4	-0.039	0.117	-0.34	0.737	-0.272	0.193
Sum: dldep	-0.823					
dint_base_1	0.014	0.068	0.21	0.831	-0.120	0.149
dint_base_2	0.068	0.068	1.00	0.320	-0.067	0.202
dint_base_3	-0.006	0.062	-0.10	0.922	-0.128	0.116
dint_base_4	-0.032	0.053	-0.61	0.541	-0.137	0.072
Sum: dint_base	0.044		0.67	0.416		
liq_dint_1	-0.030	0.182	-0.16	0.870	-0.392	0.332
liq_dint_2	0.154	0.182	0.84	0.400	-0.208	0.515
liq_dint_3	0.045	0.192	0.24	0.814	-0.337	0.427
liq_dint_4	-0.264	0.196	-1.35	0.180	-0.653	0.124
Sum: liq_dint	-0.095		0.14	0.706		
liq2_1	1.992	0.630	3.16	0.002	0.741	3.242
liq2_2	-1.394	0.783	-1.78	0.078	-2.948	0.160
liq2_3	-0.998	0.664	-1.50	0.136	-2.315	0.319
liq2_4	0.603	0.469	1.29	0.202	-0.328	1.535
Sum: liq2	0.204					
inf2_1	-0.369	2.353	-0.16	0.876	-5.039	4.301
inf2_2	-0.315	3.270	-0.10	0.923	-6.805	6.174
Sum: inf2	-0.684					
gdp_gr_1	-2.845	4.797	-0.59	0.554	-12.364	6.674
gdp_gr_2	0.653	7.420	0.09	0.930	-14.070	15.377
Sum: GDP_gr	-2.192					
_cons	0.212	0.176	1.20	0.232	-0.138	0.562

* Tests for the Sum of coefficients are done with the F-test, F(1, 98)

sigma_u	.30463445
sigma_e	.18343374
rho	.7339034 (fraction of variance due to u_i)

F test that all u_i=0: F(14, 98) = 1.79 Prob > F = 0.0509

Model 9 Deposits and capital (interest base)

Fixed-effects (within) regression	Number of obs = 133
Group variable (i): bank	Number of groups = 15
R-sq: within = 0.5716	Obs per group: min = 1
between = 0.0015	avg = 8.9
overall = 0.1652	max = 10
	F(20,98) = 6.54
corr(u_i, Xb) = -0.7129	Prob > F = 0.0000

dldep	Coef.	Std. Err.	t*	P>|t*|	[95% Conf.	Interval]
dldep_1	-0.521	0.111	-4.71	0.000	-0.741	-0.302
dldep_2	0.237	0.120	1.97	0.051	-0.001	0.475
dldep_3	-0.560	0.105	-5.33	0.000	-0.768	-0.351
dldep_4	-0.155	0.112	-1.38	0.172	-0.378	0.068
Sum: dldep	-0.999					
dint_base_1	-0.015	0.055	-0.28	0.778	-0.124	0.093
dint_base_2	0.077	0.055	1.41	0.161	-0.031	0.186
dint_base_3	0.024	0.050	0.47	0.640	-0.076	0.124
dint_base_4	-0.047	0.043	-1.08	0.283	-0.132	0.039
Sum: dint_base	0.039		0.78	0.380		
cap_dint_1	-0.252	0.139	-1.82	0.072	-0.527	0.023
cap_dint_2	0.651	0.137	4.74	0.000	0.378	0.923
cap_dint_3	0.051	0.156	0.33	0.746	-0.259	0.360
cap_dint_4	-0.265	0.156	-1.70	0.093	-0.575	0.045
Sum: cap_dint	0.184		1.02	0.315		
cap2_1	2.038	0.607	3.36	0.001	0.834	3.243
cap2_2	-1.600	0.453	-3.53	0.001	-2.498	-0.701
cap2_3	-0.305	0.405	-0.75	0.453	-1.109	0.499
cap2_4	0.797	0.229	3.49	0.001	0.344	1.251
Sum: cap2	0.931					
inf2_1	-0.778	1.945	-0.40	0.690	-4.637	3.082
inf2_2	-0.098	2.656	-0.04	0.971	-5.368	5.172
Sum: inf2	-0.875					
gdp_gr_1	-2.497	3.923	-0.64	0.526	-10.283	5.289
gdp_gr_2	1.097	6.026	0.18	0.856	-10.861	13.055
Sum: GDP_gr	-1.400					
_cons	0.225	0.146	1.53	0.128	-0.066	0.515

* Tests for the Sum of coefficients are done with the F-test, F(1, 98)

sigma_u |	.25453266
sigma_e |	.15024807
rho |	.74159647 (fraction of variance due to u_i)

F test that all u_i=0: F(14, 98) = 2.68 Prob > F = 0.0024

Model 10 Deposits and size (REPO rate)

Fixed-effects (within) regression	Number of obs = 133
Group variable (i): bank	Number of groups = 15
R-sq: within = 0.3664	Obs per group: min = 1
between = 0.2646	avg = 8.9
overall = 0.0978	max = 10
	F(20,98) = 2.83
corr(u_i, Xb) = -0.6389	Prob > F = 0.0003

dldep	Coef.	Std. Err.	t*	P>|t*|	[95% Conf.	Interval]
dldep_1	-0.457	0.120	-3.80	0.000	-0.695	-0.218
dldep_2	0.083	0.133	0.63	0.532	-0.180	0.346
dldep_3	-0.397	0.122	-3.24	0.002	-0.640	-0.154
dldep_4	0.004	0.123	0.03	0.974	-0.240	0.248
Sum: dldep	-0.767					
drepo_1	-0.067	0.092	-0.72	0.471	-0.249	0.116
drepo_2	0.024	0.094	0.25	0.801	-0.163	0.210
drepo_3	0.080	0.081	0.99	0.326	-0.081	0.241
drepo_4	0.041	0.086	0.48	0.634	-0.130	0.212
Sum: drepo	0.078		0.90	0.344		
size_drepo_1	0.052	0.060	0.86	0.393	-0.068	0.171
size_drepo_2	-0.175	0.058	-2.99	0.004	-0.291	-0.059
size_drepo_3	0.025	0.062	0.41	0.684	-0.098	0.149
size_drepo_4	0.031	0.059	0.52	0.606	-0.087	0.149
Sum: size_drepo	-0.067		0.83	0.365		
size_1	-0.748	0.493	-1.51	0.134	-1.725	0.234
size_2	0.793	0.512	1.55	0.124	-0.222	1.808
size_3	0.210	0.447	0.47	0.639	-0.678	1.098
size_4	-0.485	0.363	-1.34	0.185	-1.205	0.236
Sum: size	-0.227					
inf2_1	-4.882	3.986	-1.22	0.224	-12.791	3.028
inf2_2	-3.284	4.961	-0.66	0.510	-13.130	6.561
Sum: inf2	-8.166					
gdp_gr_1	-13.620	7.578	-1.80	0.075	-28.657	1.418
gdp_gr_2	-10.415	11.929	-0.87	0.385	-34.088	13.259
Sum: GDP_gr	-24.034					
_cons	0.514	0.291	1.77	0.080	-0.063	1.090

* Tests for the Sum of coefficients are done with the F-test, F(1, 98)

sigma_u | .22753916
sigma_e | .182717
rho | .60796535 (fraction of variance due to u_i)

F test that all u_i=0: F(14, 98) = 1.36 Prob > F = 0.1878

Model 11 Deposits and liquidity (REPO rate)

Fixed-effects (within) regression	Number of obs = 133
Group variable (i): bank	Number of groups = 15
R-sq: within = 0.3558	Obs per group: min = 1
between = 0.8495	avg = 8.9
overall = 0.0423	max = 10
	F(20,98) = 2.71
corr(u_i, Xb) = -0.6512	Prob > F = 0.0006

dldep	Coef.	Std. Err.	t*	P>|t*|	[95% Conf.	Interval]
dldep_1	-0.523	0.112	-4.67	0.000	-0.745	-0.300
dldep_2	0.063	0.130	0.49	0.627	-0.194	0.321
dldep_3	-0.343	0.121	-2.84	0.005	-0.583	-0.103
dldep_4	-0.051	0.117	-0.44	0.661	-0.283	0.180
Sum: dldep	-0.854					
drepo_1	0.018	0.069	0.26	0.794	-0.118	0.154
drepo_2	0.088	0.088	1.01	0.316	-0.086	0.263
drepo_3	-0.014	0.064	-0.22	0.830	-0.141	0.113
drepo_4	-0.043	0.069	-0.62	0.535	-0.181	0.095
Sum: drepo	0.049		0.89	0.349		
liq_drepo_1	-0.035	0.180	-0.19	0.847	-0.392	0.322
liq_drepo_2	0.127	0.181	0.70	0.487	-0.233	0.487
liq_drepo_3	0.076	0.190	0.40	0.689	-0.300	0.452
liq_drepo_4	-0.194	0.188	-1.03	0.305	-0.567	0.179
Sum: liq_drepo	-0.026		0.01	0.916		
liq2_1	1.974	0.633	3.12	0.002	0.719	3.229
liq2_2	-1.422	0.791	-1.80	0.075	-2.992	0.148
liq2_3	-0.959	0.674	-1.42	0.158	-2.297	0.378
liq2_4	0.570	0.472	1.21	0.230	-0.367	1.506
Sum: liq2	0.162					
inf2_1	0.739	3.203	0.23	0.818	-5.618	7.095
inf2_2	0.617	4.183	0.15	0.883	-7.685	8.918
Sum: inf2	1.355					
gdp_gr_1	-1.157	5.777	-0.20	0.842	-12.621	10.306
gdp_gr_2	2.650	9.412	0.28	0.779	-16.027	21.327
Sum: GDP_gr	1.492					
_cons	0.155	0.229	0.68	0.499	-0.298	0.609

* Tests for the Sum of coefficients are done with the F-test, F(1, 98)

sigma_u |	.31516583
sigma_e |	.18424711
rho |	.74528894 (fraction of variance due to u_i)

F test that all u_i=0 F(14, 98) = 1.84 Prob > F = 0.0429

Model 12 Deposits and capital (REPO rate)

Fixed-effects (within) regression	Number of obs = 133
Group variable (i): bank	Number of groups = 15
R-sq: within = 0.5661	Obs per group: min = 1
between = 0.0015	avg = 8.9
overall = 0.1462	max = 10
	F(20,98) = 6.39
corr(u_i, Xb) = -0.7424	Prob > F = 0.0000

dldep	Coef.	Std. Err.	t*	P>|t*|	[95% Conf.	Interval]
dldep_1	-0.504	0.109	-4.64	0.000	-0.720	-0.289
dldep_2	0.241	0.121	1.99	0.050	0.000	0.482
dldep_3	-0.588	0.107	-5.51	0.000	-0.800	-0.376
dldep_4	-0.148	0.113	-1.31	0.193	-0.373	0.076
Sum: dldep	-0.999					
drepo_1	-0.011	0.056	-0.20	0.841	-0.122	0.099
drepo_2	0.093	0.071	1.31	0.194	-0.048	0.235
drepo_3	0.014	0.053	0.27	0.787	-0.090	0.119
drepo_4	-0.056	0.057	-0.99	0.325	-0.169	0.057
Sum: drepo	0.040		0.85	0.359		
cap_drepo_1	-0.246	0.137	-1.79	0.076	-0.517	0.026
cap_drepo_2	0.630	0.138	4.56	0.000	0.356	0.904
cap_drepo_3	0.086	0.152	0.56	0.574	-0.216	0.388
cap_drepo_4	-0.246	0.146	-1.69	0.094	-0.536	0.043
Sum: cap_drepo	0.224		1.61	0.208		
cap2_1	2.203	0.614	3.59	0.001	0.984	3.422
cap2_2	-1.644	0.458	-3.59	0.001	-2.553	-0.735
cap2_3	-0.349	0.406	-0.86	0.393	-1.155	0.457
cap2_4	0.790	0.225	3.50	0.001	0.343	1.238
Sum: cap2	1.000					
inf2_1	0.241	2.647	0.09	0.928	-5.013	5.494
inf2_2	0.708	3.411	0.21	0.836	-6.062	7.477
Sum: inf2	0.949					
gdp_gr_1	-0.808	4.758	-0.17	0.865	-10.249	8.633
gdp_gr_2	2.982	7.674	0.39	0.698	-12.246	18.210
Sum: GDP_gr	2.174					
_cons	0.172	0.189	0.91	0.367	-0.204	0.548

* Tests for the Sum of coefficients are done with the F-test, F(1, 98)

sigma_u	.26831111
sigma_e	.15121016
rho	.75895394 (fraction of variance due to u_i)

F test that all u_i=0: F(14, 98) = 2.77 Prob > F = 0.0017

Model 13 Deposits (interest base)

Fixed-effects (within) regression	Number of obs = 133
Group variable (i): bank	Number of groups = 15
R-sq: within = 0.2689	Obs per group: min = 1
between = 0.8512	avg = 8.9
overall = 0.0351	max = 10
	F(12,106) = 3.25
corr(u_i, Xb) = -0.5967	Prob > F = 0.0005

dldep	Coef.	Std. Err.	t*	P>|t*|	[95% Conf.	Interval]
dldep_1	-0.501	0.112	-4.47	0.000	-0.724	-0.279
dldep_2	0.042	0.129	0.33	0.744	-0.214	0.298
dldep_3	-0.283	0.121	-2.33	0.022	-0.523	-0.042
dldep_4	-0.008	0.116	-0.06	0.949	-0.238	0.223
Sum: dldep	-0.749					
dint_base_1	-0.018	0.068	-0.27	0.786	-0.152	0.116
dint_base_2	0.088	0.066	1.32	0.189	-0.044	0.219
dint_base_3	0.018	0.063	0.29	0.774	-0.106	0.142
dint_base_4	-0.039	0.053	-0.73	0.468	-0.144	0.067
Sum: dint_base	0.048		0.84	0.363		
inf2_1	-1.098	2.363	-0.46	0.643	-5.783	3.587
inf2_2	0.484	3.276	0.15	0.883	-6.011	6.978
Sum: inf2	-0.615					
gdp_gr_1	-5.305	4.802	-1.10	0.272	-14.824	4.215
gdp_gr_2	1.551	7.453	0.21	0.836	-13.226	16.328
Sum: GDP_gr	-3.754					
_cons	0.207	0.178	1.16	0.248	-0.146	0.560

* Tests for the Sum of coefficients are done with the F-test, F(1, 106)

sigma_u | .2707162
sigma_e | .18872779
rho | .67294399 (fraction of variance due to u_i)

F test that all u_i=0: F(14, 106) = 1.42 Prob > F = 0.1550

Model 14 Deposits (REPO rate)

Fixed-effects (within) regression	Number of obs = 133
Group variable (i): bank	Number of groups = 15
R-sq: within = 0.2681	Obs per group: min = 1
between = 0.8519	avg = 8.9
overall = 0.0346	max = 10
	F(12,106) = 3.24
corr(u_i, Xb) = -0.5978	Prob > F = 0.0005

dldep	Coef.	Std. Err.	t*	P>|t*|	[95% Conf.	Interval]
dldep_1	-0.501	0.112	-4.46	0.000	-0.724	-0.278
dldep_2	0.042	0.129	0.33	0.744	-0.214	0.299
dldep_3	-0.286	0.121	-2.35	0.020	-0.526	-0.045
dldep_4	-0.006	0.116	-0.05	0.959	-0.237	0.225
Sum: dldep	-0.750					
drepo_1	-0.014	0.068	-0.20	0.840	-0.149	0.122
drepo_2	0.102	0.086	1.18	0.242	-0.070	0.273
drepo_3	0.011	0.065	0.17	0.866	-0.118	0.140
drepo_4	-0.046	0.070	-0.66	0.510	-0.185	0.093
Sum: drepo	0.052		1.04	0.310		
inf2_1	-0.132	3.213	-0.04	0.967	-6.502	6.238
inf2_2	1.207	4.188	0.29	0.774	-7.097	9.511
Sum: inf2	1.075					
gdp_gr_1	-3.812	5.786	-0.66	0.511	-15.282	7.659
gdp_gr_2	3.090	9.444	0.33	0.744	-15.634	21.815
Sum: GDP_gr	-0.722					
_cons	0.158	0.230	0.69	0.493	-0.298	0.614

* Tests for the Sum of coefficients are done with the F-test, F(1, 106)

sigma_u	.27097693
sigma_e	.18883114
rho	.67312672 (fraction of variance due to u_i)

F test that all u_i=0: F(14, 106) = 1.42 Prob > F = 0.1549

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[2] In the third quarter of 1997, non-performing loans constituted more than 39 percent of total credit (IMF Staff Country Report No. 98/62, August 1998).

[3] The figure refers to G3 according to the previous criteria. After the privatization of the largest Savings Bank (today Raiffeisen Bank) in April 2004, commercial banks have been regrouped based on the share of their assets in the banking system.

FORECASTING THE EXCHANGE RATE DURING 2004

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ABSTRACT

In this study we have tried to model and forecast the Lek/USD exchange rate using structural and non-structural models. By using these models we have estimated the Lek/USD exchange rate for December 2004.

1 INTRODUCTION

Often individuals and businesses for different reasons are faced with the question: what will the exchange rate be tomorrow, in a week, in a month or even in a year. A central bank is interested in forecasting the exchange rate; to the extent that exchange rate is related to the central bank's objectives. Since 1992, Albania has adopted a free-floating exchange rate regime and the Bank of Albania is not responsible for maintaining the exchange rate.

Nonetheless, knowing the tendency, not the exact level, of the future exchange rate it is important for the fulfilment of the central bank's main objective of price level stability. In order to forecast the exchange rate, first we need to determine what kind of information and models we ought to use for a good forecast.

An overview of the equilibrium mechanisms operating in the exchange rate market as well as new information absorption in the price level is necessary. The exchange rate represents the supply and demand equilibrium for a foreign currency for given information set, which is homogeneous across all trades and costless. The information set includes not only past information but future expectations as well. The exchange rate generating process can be represented as:

$$St = E [S (t + 1) \mid \Omega t] \quad (1)$$

where:

St – is the exchange rate at time "t";
S (t + 1) – is the expected exchange rate at time "t+1";
Ω t – the information set at time "t".

2 WHY IS FORECASTING NEEDED AND WHAT ARE THE DIFFERENT FORECASTING MODELS[1]?

The main users of exchange rate forecasts are businesses, which use forecasting for several reasons: hedge the exchange rate risk, make decisions on short-term finance and investment, calculate profits from international branches, etc. Central banks forecast the exchange rate as well, as a variable used to forecast inflation and other macroeconomic factors that the exchange rate affects. Four different forecasting methods are widely used: structural, technical, market based and mixed.

1) Structural forecasting is based on the relationship between economic fundamentals like inflation, GDP growth, etc., and the exchange rate. In these models, forecasting the fundamentals is paramount in forecasting the exchange rate, adding another element of uncertainty to the forecast. In order to account for fluctuations in the other factors, scenario analysis is used. Structural forecasting is limited in the case of Albania, because several economic fundamentals are estimated rather than measured and it is available at low frequency.

2) Technical forecasting uses past information to forecast what will happen in the future through ARIMA models. Market arbitrageurs that try to close their daily positions profitably, mainly use this forecasting. In an efficient market, technical models have limited time applicability, until the new information is impounded in prices and no more profits can be made by using the information. Good forecasting results using these models, might not be systematic.

3) Market based forecasting uses the difference between the spot and forward rate to estimate the future values of the exchange rate. Forward trading in Albania is rarely encountered, thus, this method is not applicable.

4) Since none of the forecasting techniques has proven to be superior to the others, the use of a combination of their results is preferred for more accurate forecasts. The estimates obtained from each forecasting method are pulled together by the use of a weighted average, where the weights are determined by the reliability of each forecast.

3 IS THE EXCHANGE RATE MARKET EFFICIENT?

An efficient market implies that every bit of information available to the market is impounded in the price.

$$St = \varepsilon St - 1 \qquad \varepsilon>0 \qquad (2)$$

$$st = st\text{-}1 + ut \qquad E[ut]=0 \qquad (3)$$

where:

s – is the log exchange rate

u – is the disturbance term, caused by the new information ξt. u_t is IID $(0, \sigma^2)$.

Equations 2 and 3 imply that the best forecast for the exchange rate today is yesterday's exchange rate. Equation 3 is a random walk model. The random walk hypothesis for a variable encompasses the market efficiency hypothesis. It is implied that the residuals from equation 3 should be non-forecastable.

4 IS THE EXCHANGE RATE STATIONARY?

Nelson and Plosser (1982) noticed that almost all economic variables are non-stationary and follow random walk models. Furthermore, they noticed that the first difference of these series exhibits constant means but the variance is still time dependent. Variance increases towards infinity with time, and if this tendency is not corrected, problems in modelling and forecasting will be encountered.

In order to be able to analyse the forecast ability of the exchange rate, it is important to check whether the exchange rate is stationary. Stationarity can be tested by using unit root tests or ARMA models.

4.1 UNIT ROOT TESTS

Starting from the 1980s, the Dickey-Fuller (1979, 1981) augmented test (ADF) has been extensively used to test the existence of the unit roots. The ADF test exhibits several problems, especially when the series is short and includes structural breaks. In these instances, the test is biased towards non-rejecting the null hypothesis of non-stationarity. For robustness purposes, the Philipp-Perron (PP) unit root test results are presented, as well.

From the results presented in Table 1, we notice that the daily and weekly exchange rates are non-stationary. The ADF and PP test statistics are lower than the 1% critical values; therefore, the null hypothesis of non-stationarity cannot be rejected at the 1% level.

Table 1 – Unit root test results for the exchange rates

	Lek/USD		Lek/EUR	
	Daily	Monthly	Daily	Monthly
ADF Test	-0.169	-1.742	-3.028	-2.955
1% McKinnon Critical Values	-2.566	-3.482	-3.968	-4.116
Philipp-Perron	-0.169	-1.520	-3.028	-2.834
1% McKinnon Critical Values	-2.566	-3.481	-3.968	-4.116

Source: Bank of Albania

2.2 AUTOREGRESSIVE MODELS

Another method to test the random walk hypothesis and non-stationarity is modelling the variable by using an autoregressive model. If the autoregressive coefficient is around 1, then we can conclude that the variable follows a random walk.

Table 2 – ARMA modelling results

Variable	AR Coefficient	Adjusted R^2
Lek/USD Daily	0.999	0.999
Lek/USD Monthly	0.969	0.971
Lek/EUR Daily	0.995	0.998
Lek/EUR Monthly	0.878	0.955

Source: Bank of Albania

From the results presented in Table 2, we notice that the autoregressive coefficient for all the investigated variables is approximately 1. Furthermore, the autocorrelation factor decay is very slow and the partial autocorrelation has only one spike at the first lags, which are traits of series that follow a unit root process. Looking at the available test results, we can conclude that the main nominal exchange rates in Albania are non-stationary.

5 EXCHANGE RATE ANALYSES AND FORECASTING

Since the exchange rate series are non-stationary, we ought to use the first difference of the variable for modelling purposes. Transforming the variable in logarithmic first difference eliminates the non-stationary problem and allows us to identify the explanatory factors for a variable.

A combination of results from the structural and non-structural modelling will be used to forecast the exchange rate Lek/USD for 2004. The non-stationarity of the exchange rates requires that the other explanatory variables in a structural model be non-stationary as well. If these variables are cointegrated, one would build an error-correction model. The analysis of economic fundamental variables shows that they are all I (1) but the cointegration tests reject the hypothesis of cointegration existing between the exchange rate and

the other fundamentals. Hence, we would have to rely on an ad-hoc fundamentals model.

For modelling and forecasting purposes we will use the monthly average exchange rates, which will provide us with information on the main tendencies of the exchange rate during 2004.

If we used the exchange rate on a particular day of the month (first, middle or last day), we could be incorporating daily-related effects, which are not relevant to the long-term monthly characteristics.

5.1 Structural Modelling

It is widely accepted that macroeconomic models for exchange rates have low forecasting power. Generally models with an R^2 higher than ten percent are difficult to be found (Evans and Lyons 2001). Furthermore, Flood and Rose (1995) conclude that the main factors determining exchange rate volatility are not macroeconomic factors. Despite this, fundamental based models are still used.

In theory, there is a myriad of macroeconomic factors that potentially affect the interest rate. For Albania, only a few of these factors can be used to the problems related to the data collection process and the length the series available. For our modelling purposes, we have considered the following factors:

- Monetary base;
- Imports, exports, trade balance;
- Net monetary assets of the banking system;
- Private transfers;
- Yearly treasury bills *yield*, US and Albanian yearly treasury bill yield's difference;
- Consumer price index (CPI).

Initially the expected exchange rate was used as an explanatory variable, assuming that economic agents have rational expectations, as represented by equation 1. The use of the expectation variable brings several difficulties in the econometric analysis and makes forecasting impossible, hence, this model is not used.

Box 1 The determinants of the exchange rate

We assume the exchange rate is expressed by the following equation:

$$s_t = \sum_{i=0}^{n} \beta_i X_t + \beta_{i+1} E[s_{t+1} | \Phi_t] + e_t \qquad (B1)$$

where:

X_t – explanatory variables for the exchange rate,

$E[s_{t+1} | \Phi_t]$ – exchange rate expectations in the t+1 period and e_t – error term.

If we use $E[s_{t+1}/\Phi_t] = s_{t+1} + u_{t+1}$, then we can rewrite the equation (B1) in such a form:

$$s_t = \sum \beta_i X_t + \beta_{i+1} * (s_{t+1} + u_{t+1}) + e_t$$
$$s_t = \sum \beta_i X_t + \beta_{i+1} * s_{t+1} + (\beta_{i+1} * u_{t+1} + e_t) \qquad (B2)$$

bur the variable s_{t+1} is linked with the error term u_{t+1} because

$$u_{t+1} = E[s_{t+1} | \Phi_t] - s_{t+1}$$

and this means there is a violence of one of Gauss-Markov assumptions, the one about the correlation between explanatory variables and error terms, $E[e_i | X]=0$. The violence of this assumtion means the estimations taken from the equation will be biased.

Table B1 - Lek/USD exchange rate and its determinants

Dependent variable: DLUSD			
Sample(adjusted): 1995:11 2003:11			
List of instruments: C D LUSD(-1) DLCPI(-1) DLNFA(-1) DLMB(-1)			
DLMB DLCPI DLREM(2) INTDIFF			
Variable	coefficient	Standard deviation	Prob.
DLUSD(-1)	0.299108	0.085435	0.0007
DLUSD(1)	0.612934	0.157046	0.0002
DLMB(-1)	0.214572	0.087739	0.0163
DLREM(-2)	-0.018838	0.007130	0.0097
R-squared	0.384375	Mean dependent var	0.002442
Adjusted R-squared	0.364516	F-statistic	23.63724
Durbin-Watson stat	2.873809	Prob(F-statistic)	0.000000

Source: Bank of Albania

To estimate the equation in such cases, variable instuments come in handy. This means we have to find variables that are both (1) correlated with explanatory variables and (2) uncorrelated with the error term. The method used to estimate the parameters is Two-stage least squares (TSLS). Table B1 below shows the results of TSLS, where as variable instruments, we have used some of the explanatory variables that affect $E[s_{t+1} \mid \Phi_t]$.

Past and expected values of the exchange rate have resulted significant factors for explaining Lek/USD exchange rate behaviour. As other significant factors are monetary base (MB(-1))and private transfers (REM(-2)).

Other studies also have supported the idea that exchange rate developments are affected by past values of exchange rate (Mancellari, Mytkolli, Kola (1999. In our case, expected values of exchange rate proved to be significant, as well. According to our equation, the Lek/USD exchange rate is negatively affected by private transfers with two months lag. In fact, incoming transfer are treated as a factor for lek appreciation in the period of inflow. This time lag probably has to do with public expectations. For example, the public knows that lek will tend to appreciate during summer time and the foreign currency they hold will lose its value. Thus, based on their past experience, they start to sell the currency at the moment they judge the currency has reached the highest level of the season.

The increase of monetary base leads to a deppreciation of lek. Actually, there is a time lag of one month that exchange rate responds to the growth of the monetary base. The increase in money circulation, being a significant component of monetary base, increases the supply for the domestic currency, leading to the deppreciation of the domestic currency.

Although only the above-mentioned factors resulted statisticly significant, we believe these are not the only ones which determine the Lek/USD exchange rate. Thus, the behavior of the exchange rate in Albania is not a function of changes in fundamentals only. There are a lot of other factors dealing with foreign exchange market structures, political and psychological factors that affect the exchange rate.

The model above cannot be used to forecast the exchange rate, due to exchange rate expectations included in the model.

If we do not include the expected exchange rate as an explanatory variable, and given the lack of cointegration between the variables, we can model the exchange rate using the standard OLS procedure. The relevant identified factors, as presented in Table 3, are: the lagged value of the dependent variable, USD (-1); interest rate differential, Intdiff (-1); and the lagged monetary base, MB (-1). An increase of the interest differential results in the appreciation of the domestic currency.

Table 3 – Lek/USD explanatory variables

Dependent variable DLUSD			
Method: Least Squares			
Sample (adjusted): 1998:02 2003:12			
Variable	Coefficient	Standard Error	Prob
DLUSD(-1)	0.273462	0.118715	0.0243
DLMB(-1)	0.225724	0.114839	0.0534
INTDIFF(-1)	-0.000391	0.000181	0.0339
R-squared	0.141701	Schëarz criterion	-4.923693
Adjusted R-squared	0.116457	F-statistic	5.613248
Durbin-Ëatson stat	1.871776	Prob(F-statistic)	0.005543

Source: Bank of Albania

5.1.1 Forecasting

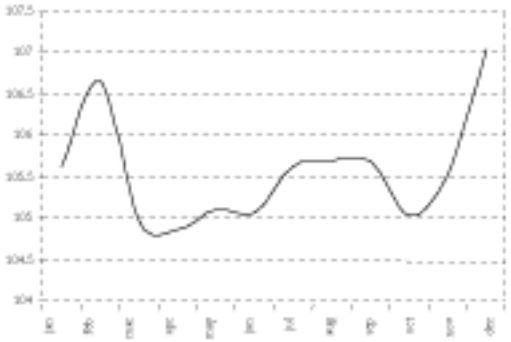
We use the model presented in Table 3 to forecast the Lek/USD exchange rate during 2004. The expected values for the monetary base have been taken from the estimations in the 2004 Monetary Program, while the interest differential is assumed to remain unchanged throughout the year. The Lek/USD tendency for 2004 is presented in Table 4 and Figure 1. We notice that the domestic currency will appreciate against the USD, compared to the end of 2003 value of 108.34.

Table 4 – Lek/USD forecast during 2004 using thstructural model

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
usdF	105.61	106.68	104.99	104.85	105.10	106.07	105.63	105.69	105.68	105.03	105.54	107.06

Source: Bank of Albania

Figure 1 The forecasted Lek/USD exchange rate during 2004



Source: Bank of Albania

5.2 Non-structural Model

For the non-structural model we use the residual value ut from equation 3, obtained after taking the first difference of the exchange rate (dx=log(xt/x(t-1)). This variable is stationary and distributed normally; hence, it can be used in the modelling process. If the market is efficient, modelling ut will have very low fitting. In order to account for conditional variance heteroscedasticity we use a GARCH model to model the exchange rate. The Chow test for structural breaks shows that the 1997 pyramidal scheme crisis causes a structural break in the data, leading us to exclude the period prior 1997 from our estimation. The model with the best fit and the highest AIC and SIC criteria is presented in Table 5.

The main identified factors that affect the exchange rate are: the lagged exchange rate, seasonal factors, as well as the cross and lagged cross exchange rate USD/EUR. The high statistical significance of the elements in the non-structural model and the high-adjusted R^2 implies that the market is not using efficiently all the available information on exchange rates. Furthermore, the significance of the seasonal factors indicates that the exchange rate market in Albania is not significant. The high significance of the cross exchange rate confirms the importance of the foreign exchange markets in determining the domestic exchange rates. The cross rate coefficient is negative, which means that dollar depreciation in the international markets induces the domestic currency to appreciate against the usd. The negative coefficient for the lagged cross rate implies that

the market overreacts to international exchange rate changes and corrects for the overreaction with a period delay.

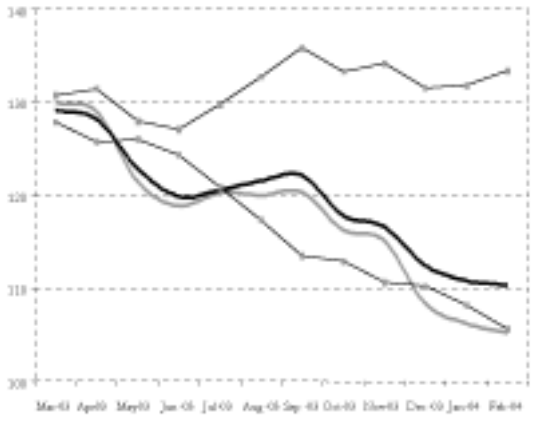
Table 5 – The Lek/USD reorstructural model

Dependent Variable: DUSD				
Method: ML - ARCH				
Sample: 1998:01 2003:02				
Included observations: 62				
	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.001418	0.001778	-0.797525	0.4251
DUSD(-1)	0.430769	0.125458	3.433571	0.0006
DCROSS	-0.610959	0.060005	-10.18180	0.0000
DCROSS(-1)	0.180015	0.098851	1.821445	0.0685
JAN	0.008638	0.004330	1.995190	0.0460
JUN	-0.011045	0.003554	-3.107915	0.0019
SEPT	0.012139	0.006746	1.799484	0.0719
OCT	-0.014909	0.005741	-2.597056	0.0094
Variance Equation				
C	7.90E-06	8.46E-06	0.933417	0.3506
ARCH(1)	0.187712	0.161069	1.165416	0.2439
GARCH(1)	0.717634	0.154440	4.646671	0.0000
R-squared	0.658507	Mean dependent var		-0.002215
Adjusted R-squared	0.591548	S.D. dependent var		0.018088
S.E. of regression	0.011560	Akaike info criterion		-6.055345
Sum squared resid	0.006815	Schwarz criterion		-5.677951
Log likelihood	198.7157	F-statistic		9.834428
Durbin-Watson stat	1.911939	Prob(F-statistic)		0.000000

Source: Bank of Albania

The model has a very good fit to the data; it does not exhibit any autocorrelation of residuals or squared residuals, and it is homoscedastic. As we can observe from Figure 2 out of sample forecasting is good. The minimal and maximal borders are the 95% confidence intervals.

Figure 2 Comparison of the forecasted monthly average exchange rate against the exchange rate for the period March '03 – February '04



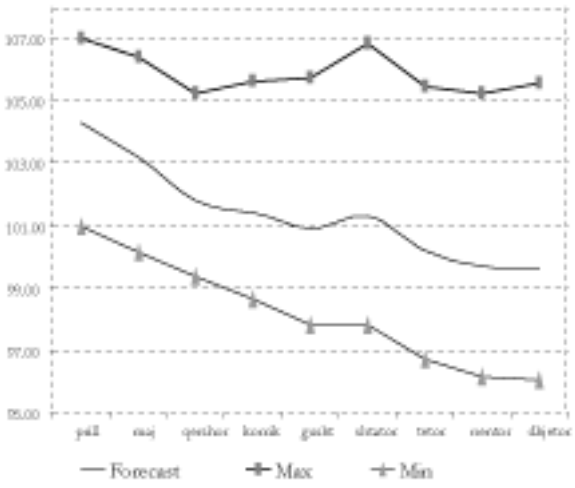
Source: Bank of Albania

This model, using the coefficients estimated for a sample extending until March 2004, has been used to forecast Lek/USD during the remaining of 2004. Forecasting problems are bound to arise due to the use of the cross rate as one of the determinants of the exchange rate. For this reason, we will use scenario forecasting depending on the expected values (minimal and maximal) for the cross rate, taken from the major investment banks.

5.2.1 Forecasting

From the implementation of the above model for forecasting, we obtain the Lek/USD values presented in Table 6. As above, the boundaries represent the 95% confidence interval for the forecast, using the expected cross rate (1.29). The minimal and maximal values represent the exchange rate that is expected to occur when the cross rate reaches a maximum of 1.4 or a minimum of 1.15 in the end of the year. The Albanian Lek is expected to appreciate against the major foreign currencies during 2004. The forecasted Lek/USD path is presented in Figure 3.

Figure 3 The forecasted Lek/USD path for 2004

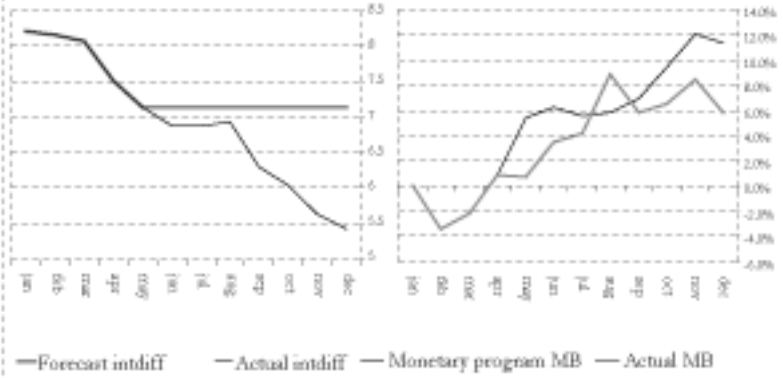


Burimi: Bank of Albania

5.2.2 Forecasting performance

Many of the indicators we used to forecast the exchange rate changed their course from that we had assumed until the end of the year. In fact, the monetary base growth at the end of the year was lower than assumed in the monetary programme. The assumed growth on monetary base was in favor of a deppreciated lek. Actual growth of monetary base was in favor of the appreciation of the lek. The interest diferential was supposed to remain constant from May to December.

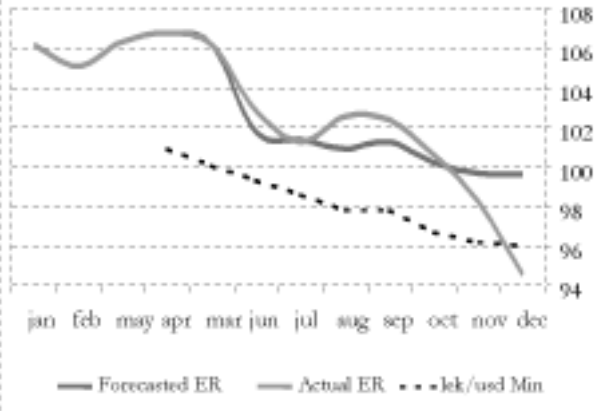
Graph 4 Interest rate differential and monetary base
(forecasted & actual values)



Source: Bank of Albania

In fact, the interest diferential decreased. Interest rates in lek, affected by BoA monetary policy, continued their declining trend even throughout the second part of the 2004. On the other hand, interest rates in US dollar increased, narrowing further the interest rate differential in lek and US dollar. The performance of interest rate differential has supported the deppreciation of lek. At the end of 2004, the cross rate between euro and US dollar was 1.39 EUR/USD.

Graph 5 Forecasted and actual values of
Lek/USD during 2004



Source: Bank of Albania

6 CONCLUSIONS

The analysis conducted in this paper has determined that the Lek/USD and LEK/EUR exchange rates are non-stationary variables. The lack of stationarity supports the market efficiency hypothesis. On the other hand, the high significance and good forecasting performance of the non-structural model, leads us to conclude that the foreign exchange market in Albania is not efficient. In this study we have forecasted Lek/USD using both structural and non-structural models. The structural model shows the behaviour of the exchange rate, if it were determined only by economic fundamental. The low fit of the model leads us not to be very confident in the forecasting power of this model. The non-structural model, conversely from the efficient market and random walk expectations, has a very high fit and explains 60% exchange rate returns and performs well in forecasting out of sample. The high fit of the non-structural model could be the result of coincidence and the stability of the Albanian economy in the last years.

We combine the forecasts from the two models in order to obtain a more robust forecast of the exchange rate. The weights given to the structural and non-structural forecasts are 40% and 60% respectively. The non-structural forecast has been given a higher weight due to its better performance in and out of sample. In all cases we forecast that the Albanian currency will appreciate against the US dollar until the end of 2004. Actually, this proved to be real.

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[1] Adapted from Madura (1998).

MONETARY TRANSMISSION CHANNELS: INTEREST RATE PARITY

*Bledar Hoda**

ABSTRACT

This paper addresses the efficiency of transmission mechanism channels in Albania. A detailed analysis of the exchange rate channel has been attempted in the case of Albania by focusing on the validity of (covered) interest rate parity between Albania and US (Lek and USD currencies). I am grateful to Mr. Erich Spitaeller who provided his consultations during the preparation of this first paper.

INTRODUCTION

The objective of monetary policy conducted by the Bank of Albania is to attain and maintain price stability. Central Bank has adopted the monetary targeting regime as a framework for signaling and explaining the policy measures aimed at achieving the final objective of price stability. This regime suggests that the price level in economy is directly determined by the amount of money supply. The main underlying assumption for this postulate is that the velocity of money in the economy is stable and that changes in money supply are transmitted into a change in the same direction of price level when the economy is operating at potential output level.

Although Central Bank (CB) does not have full control over the broad money supply, it can affect it through base money (reserve money), which consists of assets of the central bank's balance sheets. In the short run the money multiplier, that is the broad money to reserve money ratio, is expected to remain constant and as a result any changes in the asset side of the CB balance sheet shall have an effect on the broad money as well. Reserve money is easily controlled through monetary policy instruments that central bank has in its regulatory framework.

However, in the long run, money multiplier may not be constant as it is affected by many factors, such as credibility in the financial system, macroeconomic stability, inflation and interest rate. The latter is an indirect instrument of central bank with long term effects on the economic activity and level of prices through different transmission mechanism channels. Also, central bank has available a set of instruments which allow it to influence on the market interest rate and on the implementation of the monetary policy. These instruments include: open market operations, standing facilities and minimum reserves that commercial banks hold in their accounts at central bank.

1 TRANSMISSION MECHANISM

Not all the transmission channels are fully functional in the case of Albania, though their effects increase as the financial and banking sector consolidate with time. The main channels include the interest rate channel, the credit channel and the exchange rate channel.

1.1 Interest Rate Channel

The central bank is entitled to determine a specific interest rate in the wholesale money markets from the fact that it is the monopoly supplier of 'high-powered' money, which is also known as "base money" or "reserve money". The operating procedure of the Bank of Albania is similar to that of many other central banks, though institutional details differ slightly. The key point is that the central

bank chooses the price at which it will lend high-powered money to private sector institutions. In Albania, the central bank lends predominantly through outright sale and repurchase agreements (repo) at the one-week and one-month maturity. This repo rate is the 'official rate' used as the main indirect instrument.

The quantitative effect of a change in the official rate on other interest rates, and on financial markets, depends on the extent to which the policy change was anticipated and how the change affects expectations of future policy. It should be kept in mind that some of the effects may occur when market expectations about policy change and the policy meets the expectations, rather than when the official rate itself changes. Yet, in Albania, financial market is not well developed and as a result expectations, as a leading concept for deciding the stance of monetary policy of the central bank, have not evolved yet. The dominance of one (lately privatized) bank makes the effectiveness of interest rate instrument depend partially on the cooperative actions of the biggest bank in country.

In general, banks do adjust interest rate on liability side quicker. A change in the official rate is immediately transmitted to other short-term wholesale money-market rates, both to money-market instruments of different maturity and to other short-term rates, such as interbank deposits. Also, banks are expected to adjust their standard lending rates (base rates), usually by the exact amount of the policy change. The interest rate spread between liability items and loans of commercial banks is very high when compared even to other transitional countries. It is believed to be a result of different factors like the perception of a high country risk by the banks and absence of competition by the largest bank in country[1].

1.2 Credit Channel

The credit channel is not actually an alternative view to the traditional monetary transmission mechanism. It is a set of factors that amplify and propagate the conventional interest rate effects. The credit channel is not a truly independent or parallel channel. In the past it has had only a marginal effect on the pace of the economic activity in country[2].

In the credit channel, a financial premium, which is the difference between the cost of funds raised externally and the opportunity cost of funds raised internally (by retaining earnings), has an important role in economic activities. The size of an external finance premium reflects imperfections in the credit market that drive the difference between the expected return received by lenders and the costs faced by potential borrowers. Monetary policy, which alters interest rate, tends to affect the external finance premium in the same direction. Thus, the direct effects of the monetary policy on interest rate are amplified by changes in the financial premium through changes in the cost of liabilities of the banks, rather than on the changes in return rates of bank assets.

1.3 Exchange Rate Channel

This channel examines the relationship between net private capital inflows and monetary policy after financial liberalization in an open economy; (in Albania the central bank controls capital outflows). This transmission channel of monetary policy involves interest rate effects, under a regime of flexible exchange rate. Specifically, when domestic real interest rates rise, it leads to currency appreciation. (One way may be that domestic currency deposits become more attractive vis-à-vis deposits denominated in foreign currencies). The high value of the domestic currency makes domestic goods more expensive than foreign ones, and causes a fall in net exports and aggregate output. However, the central bank still maintains its monetary independence and can take actions to reduce the volatility of real GDP and inflation although the exchange rate is volatile.

In theory, policy-induced changes in interest rates do affect the exchange rate. The exchange rate is the relative price of domestic to foreign money, so it depends on both domestic and foreign monetary conditions. The precise impact on exchange rates of the official rate change is uncertain, as it will depend on expectations about domestic and foreign interest rates and inflation, which may themselves be affected by a policy change. However, other things being equal, an unexpected rise in the official rate is probably expected to lead to an immediate appreciation of the domestic currency in foreign exchange markets, and *vice versa* for a similar rate fall. The exchange

rate appreciation follows from the fact that higher domestic interest rates, relative to interest rates on equivalent foreign-currency assets, make local currency denominated assets more attractive[3]. The exchange rate should move to a level where investors expect a future depreciation, just large enough to make them indifferent between holding local currency and foreign-currency assets. (At this point, the corresponding interest differential at any maturity is approximately equal to the expected rate of change of the exchange rate up to the same time-horizon.) Exchange rate changes lead to changes in the relative prices of domestic and foreign goods and services, at least for a while, though some of these price changes may take many months to work their way through to the domestic economy, and even longer to affect the pattern of spending.

2 FLOATING EXCHANGE RATE: INTEREST RATE PARITY

Central Bank has been conducting its monetary policy with the main focus on current inflation rate and inflation expectations. Although its official regime has been that of monetary targeting, the applied policy has been moving from time to time to a more discretionary one. The use of base interest rate to affect market interest rates on the liability and asset side of the banking sector, when inflation concerns have aroused, has been a common practice. Whether this instrument has worked its effects out through one transmission channel or another, not being mutually exclusive, is of interest for understanding its (interest rate) role in exchange rate.

Albania applies capital movement control policy, only for outflows. This prevents the capital from moving in and out in response to differences in rates of returns between Albania and any other country. From the theoretical point of view, as long as capital outflows controls are in place, differences between interest rates of the local currency and a foreign currency, Euro or USD, are not expected to be priced into the exchange rate. That is the asset approach of determining exchange rate should not work. Since Albania is an open market economy, from a theoretical point of view,

the monetary approach might be expected as a better approach for explaining the changes in the relative value of local currency.

Although the interest rate parity may not hold in the short run, as it is the case of other markets where capital moves freely, in the long term it is believed that the interest rate differentials do have a say in the determination of the exchange rate. Both approaches, the Assets and Purchasing Power Parity Approach have been analyzed in this paper in the case of Albania.

2.1 Data Overview and Observations

The interest rate data that have been used are Treasury bill interest rates of USA and Albania for a time period of almost 10 years, that is from 1995 till 2004[4]. Rates used in this study are of 12-month, 6-month and 3-month maturity. Interest rates of 1-month maturity have not been available. Exchange rates are Albanian Lek versus US dollar and are monthly averages of the rates published by the Central Bank of Albania. Unless otherwise shown, the data for the three different maturities have been used at the same time for comparison.

2.1.1 Asset Approach

In the first stage, a series of the difference of the logs of interest rates (log (1+r)) have been generated for each 3-, 6- and 12-month maturity and also for the log of lek/usd exchange rate.

$$\log (1+r) - \log (1+r^*) \quad [=] \quad \log NER$$

where,

r nominal Albanian TB interest rate for each 12-, 6- and 3-month maturity

r nominal US TB interest rate for each 12-, 6- and 3-month maturity*

NExR is the Nominal Exchange Rate *(lek/usd) which has been converted into an index NER with base 1 in December 2001. That is:*

$$NER = NExR_t / NExR_{December\ 2001}$$

In Appendix, graph G-1 shows the graph of the two series for the period 1995-2004/9. It is illustrative to mention that during the

period 1995-2002, the focus of interest rate use as an instrument in Albania has been to fight inflation that mostly has been caused by developments in domestic economy. The effect of shocks from abroad has been limited in the Albanian economy. While in 2004, interest rate policy has been reactive to shocks from abroad as the domestic economy has become more open through years.

In the second stage, a proxy for real lek/usd exchange rate (RER) series has been used by multiplying the (NExR) nominal exchange rate with the ratio of local CPI to US CPI indices of the same month. CPI indices for both countries, Albania and USA, have been matched for the same base year, which is December 2001. Also, real interest rates series for the two countries have been generated by using the yearly changes of CPI indices. Two log series have been generated, one for the RER and one for the difference of real interest rates.

$$\log (1+R) - \log (1+R^*) \quad [=] \quad \log RER$$

where,

$R = (1+r)/ (CPI_t/CPI_{t-1})^{alb} - 1$

$R^* = (1+r^*)/ (CPI_t/CPI_{t-1})^{US} - 1$

$RExR = NExR \times (CPI^{US}_t / CPI^{alb}_t)$

RExR has been converted into an index RER with base 1 in December 2001. That is:

$RER = RExR_t / RExR_{December\ 2001}$

Graph G-2 shows how the proxy for RER has changed with the increase in the interest rate differential.

One drawback of the RER proxy might be that it only uses the CPI index levels, which although have been adjusted to match the same base year, do not represent any arbitrage opportunity with their difference as US is not a major trading partner of Albania.

In order to take into account (third stage) the dynamics of changes in the conditions of two countries, another RER proxy has been generated by multiplying the NER with the ratio of the "*unit plus inflation*" (the ratio of $CPI_t/CPI_{t-1\ year}$) of Albania and US. This eliminates any differences in the two indices that are not subject to

arbitrage for different reasons (transaction costs, mistakes in CPI measurements, different basket compositions etc.). At the same time, expected real interest rate (RIR) series have been generated by discounting the nominal interest rate with the one period forward inflation rate (*inflation rate plus unit*). In the absence of a better proxy, the one year forward inflation has been used as a proxy for expected inflation. The log series of RER and series of the difference the logged (expected) real interest rate have been generated for comparison. (For the last 12, 6 and 3 months RER there is no value in the respective series as a proxy of the expected inflation for the moment).

$$\log (1+R) - \log (1+R^*) \quad [=] \quad \log RER$$

where,

$$R = (1+r)/ (CPI_{t+1} /CPI_t)^{alb} - 1$$

$$R^* = (1+r^*) / (CPI_{t+1} /CPI_t)^{US} - 1$$

$$RExR = NExR \times (CPI^{US}_t / CPI^{US}_{t-1}) / (CPI^{alb}_t / CPI^{alb}_{t-1})$$

RExR is the Real Exchange Rate, which has been converted into an index RER with base 1 in December 2001. That is:

$$RER = RExR_t / RExR_{December\ 2001}$$

*** the period t+1 in the case of real interest rate calculation refers to the annual inflation at the time 12-, 6-, or 3- months after time t.*

From graph G-3 in the Appendix, it is quite clear how the real (forward=expected) interest rate is correlated to the RER. Also following the three graphs G-3/a-b-c, (although latest values in the difference in the logs of RIR are absent) it can be seen how two indicators RIR and RER diverge during 2003 and the beginning of 2004, the 3 month RIR graph giving a better picture as less values are absent.

In the last two years, the Bank of Albania has pursued an expansionary monetary policy in order to accommodate the increasing demand for money and alleviate the appreciating tendency of the local currency. During 2003 the central bank has been very aggressive in reducing its base interest rate by 2 basis points in four rounds, from 8.50 percent to 6.50 percent. Also, during the first half of 2004 the central bank has reduced four times its base rate by 0.25

basis points to 5.50 percent. The interest rate has been reduced to record levels.

One possible explanation is that the depreciation of the US dollar in the international markets carries the burden of the debt that the United States has been accumulating in the last two years through current account deficits. The cause-effect relationship has not been accounted for in this paper.

2.1.2. Monetary Approach

Two main series have been generated for this approach. One is the log of lek/usd nominal exchange rate (NER). The second one is a proxy series for the change in prices that result from the monetary pressures.

First the GDP numbers in current and constant (*chained usd*) prices for the US and the nominal and real GDP for Albania, and the three different aggregates M1, M2, M3 of nominal money supply have been brought together for both countries[5]. Nominal values of GDP have been used to derive an indicator for velocity for each aggregate. The log values of each indicator, money supply, constant dollar GDP (RGDP for Albania) and velocity have been used.

$$\{m-(y-v)\}-\{m^*-(y^*-v^*)\} \quad [=] \log NER$$

where,

m = is the log value of the monetary aggregate in the three cases a,b,c for M3, M2, M1respectively,

y = log value of real GDP, v = log value of velocity for respective aggregate

** = US variable*

NExR is the Nominal Exchange Rate*, which has been converted into an index NER with base 1 in December 2001. That is:*

$$NER = NExR_t / NExR_{December\ 2001}$$

$\{m-(y-v)\}$; $\{m^*-(y^*-v^*)\}$ are the ratios of money supply to money demand for Albania and US respectively. The difference between the above expressions presents a ratio.

Log value of respective M aggregate is used for money supply, while the log value of velocity is subtracted from real logGDP to get an estimate of changes in real demand balances for money. Purchasing Power Parity hardly holds for any two markets that are intensely integrated. There are many obstacles for that. In the simple form of PPP the real exchange rate between the two countries is assumed unity. Unless that is the case, the PPP in its simple form will not hold. So, a proxy variable for RER should be added to the difference between the money supply-money demand ratios of the two countries for the PPP to hold.

$\{ M^s/M^d_{alb} \} / \{ M^s/M^d_{us} \} + \log RER \quad [=] \log NER$

RExR is the Real Exchange Rate, which has been converted into an index RER with base 1 in December 2001. That is: $RER = RExR_t / RExR_{December\ 2001}$

In this case, the RER used in the asset approach has been used, generated by multiplying the NER with the ratio of the "*unit plus inflation*" (the ratio of $CPI_t/CPI_{t-1\ year}$) of Albania and US respectively.

The use of different aggregates does not produce different result. In Appendix, Graph-4 shows the relationship between the price change difference and the log of NER. The space between the two graphs might be explained by the differences between the CPI measured inflation and GDP deflator.

One drawback of this method is that in calculating the RER, there have been used the same CPI indices, that should result from the ratio of money supply to money demand in respective countries. This gives an almost perfect correlation between the two final series. Using this approach it can only be inferred that the differences between nominal and real exchange rates are completely explained by the relative changes in ratios of money supply to real money demand, without any clue about the real exchange rate.

Appreciation of nominal exchange rate in the last couple of years has been accommodated by the central bank. This is consistent with the policy of the central bank. Indeed, in the last two years Albania

has lived with a relatively stable inflation while central bank policy has been careful to only meet the real demand for money without putting pressures on preventing the appreciation of currency.

3 CONCLUSIONS AND POLICY IMPLICATIONS

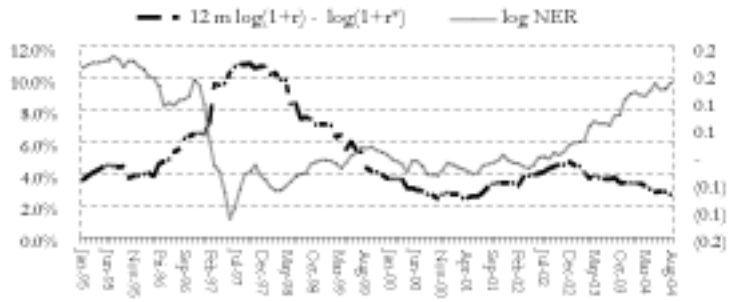
When the two approaches are put together, they have some explanatory power concerning the behavior of the variables studied in the paper.

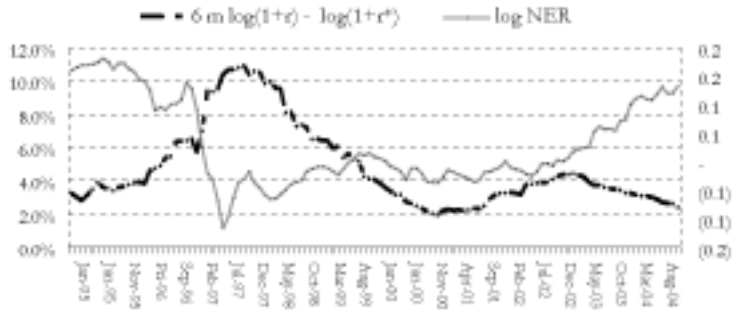
- Real Exchange Rate is closely related to interest rate differentials in the long run. Nevertheless, determination of the cause effect relationship and the size of the effect in more empirical terms are not clear.
- Forecasting of future interest rates and expected inflation rates may help to make a forecasting of the real exchange rate as long as certain macroeconomic variables (debt ratios, etc.) do not raise concerns about the financial stability of a country.
- The difference between the ratios of MS to MD of two countries accounts for the difference in real and nominal exchange rate, increasing the utilization of the exchange rate as a transmission channel.

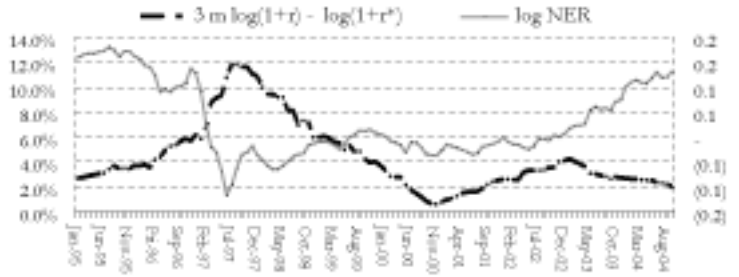
APPENDIX

Graph 1

Graph 1/a-b-c. Difference of the logs of Nominal interest rates (log(1+r)) and log of NER in Albania and US for 12-, 6- and 3-month maturity respectively



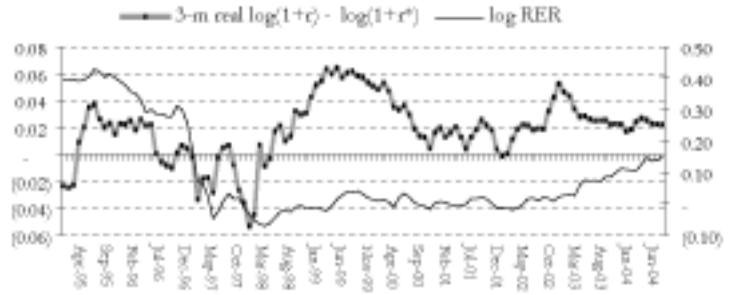




Source: Bank of Albania, www.federalreserve.gov, www.bea.gov

Graph 2

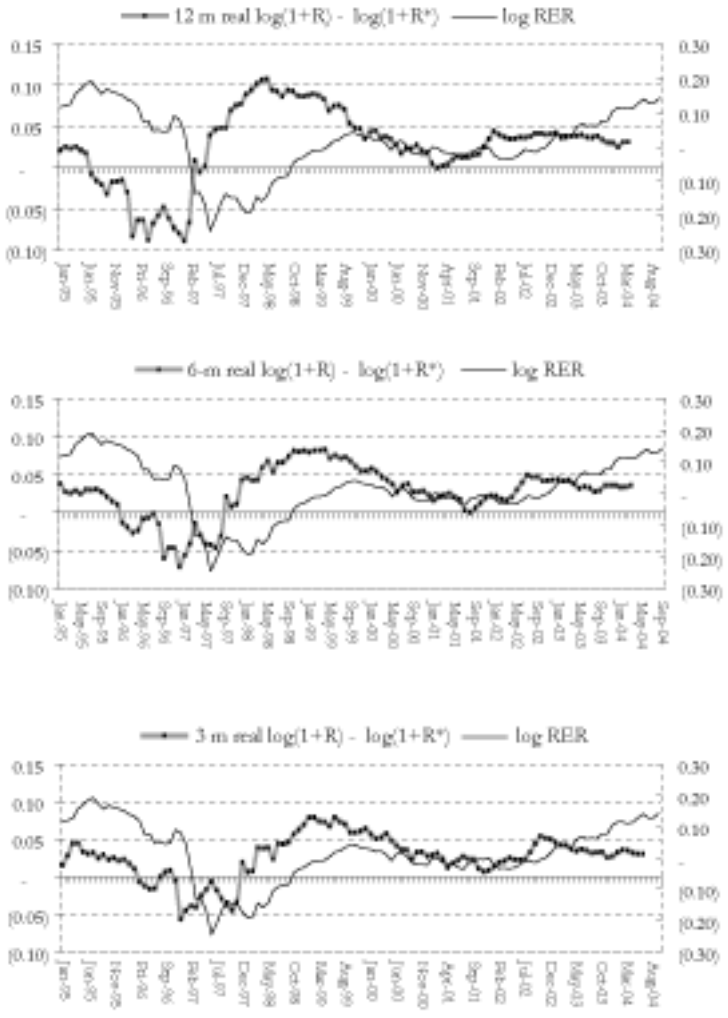
Graph 2/a-b-c. Difference of the logs of REAL interest rates (log(1+r) discounted by CURRENT inflation) and log of RER (discounted by current CPI LEVEL ratio) in Albania and US for 12-, 6- and 3- month maturity respectively



Source: Bank of Albania, www.federalreserve.gov, www.bea.gov

Graph 3

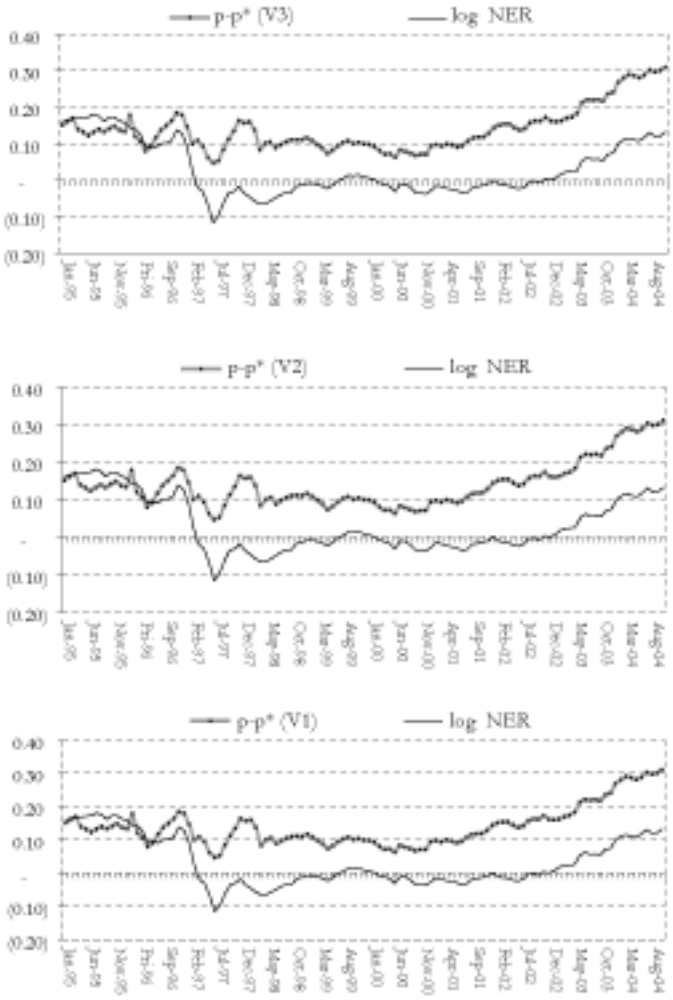
Graph 3/a-b-c. Difference of the logs of REAL interest rates (log(1+r) discounted by 12-m, 6-m, 3-m FORWARD inflation) and log of RER (discounted by current INFLATION ratio) in Albania and US for 12-, 6- and 3- month maturity respectively



Source: Bank of Albania, www.federalreserve.gov, www.bea.gov

Graph 4

Graph 4/a-b-c. Relative Money Supply over Money Demand ratio adjusted for RER for the three different monetary aggregates and log of NER. (where p-p* = {m-(y-v)}- {m*-(y*-v*)}+logRER) -small letters are log values



Source: Bank of Albania, www.federalreserve.gov, www.bea.gov

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NOTES

* Bledar Hoda: Specialist, Monetary Policy Department.

[1] Until the beginning of year 2004, the largest bank with more than 50 percent of banking system assets was forbidden by the BoA to loan the private sector.

[2] The outstanding credit to GDP ratio is around 8 percent.

[3] Around one third of total savings in the banking sector are held in foreign currency, mainly USD and EUR.

[4] For 2004 the latest data of September have been used.

[5] In the case of Albania, M1 includes currency outside the banks and demand deposits; M2 includes M1 plus time deposits, while M3 adds foreign exchange deposits. The M1 aggregate in US includes extra checkable deposits and travelers' checks; M2 is almost the same while M3 includes M2 plus large time RPS, EURO-Dollars and some institutional deposits with similar liquidity degree.

FORECASTING THE AUTONOMOUS FACTORS OF LIQUIDITY

*Denalda Duro**

INTRODUCTION

The main purpose to producing short-term liquidity forecast is to create an information set which serves as the basis for monetary operations with the aim to smooth liquidity conditions. It consolidates information on the expected liquidity conditions and helps the central bank to avoid unwarranted excessive volatility.

The liquidity forecasting exercise involves an analysis of the projected changes in the main items of the central bank's balance sheet. This study aims at producing a forecast of the autonomous supply of liquidity, i.e. all reserve supply factors which are in short run beyond the control of the central bank. The autonomous factors of liquidity supply comprise (i) net foreign assets, (ii) net positions of the government with the central bank, (iii) currency in circulation, and (iv) other net items.

1 NET FOREIGN ASSETS

A change in the net foreign assets caused by the intervention in the foreign exchange market directly affects the liquidity of the banking system. The foreign exchange interventions are done against the

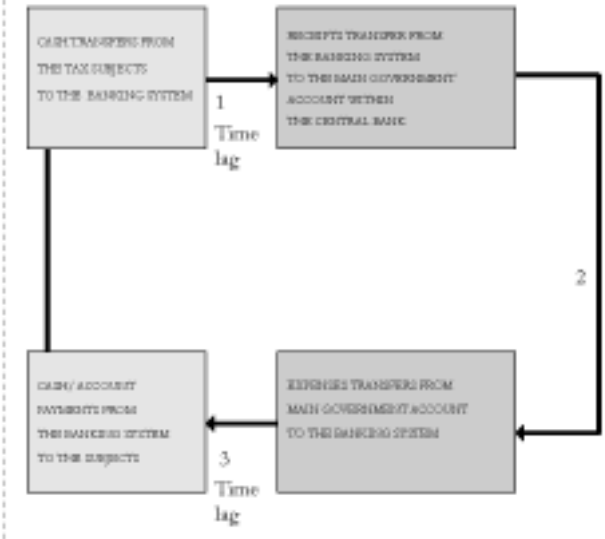
domestic currency. The interventions are supposed to be on a rare schedule since the foreign exchange rate regime applied in Albania is a floating one.

The value date of the foreign exchange transactions is t+2, where t is the deal date (the intervention date). Actually, we don't run any forecast on the intervention amount and/or its effect on the liquidity level. The effect of the foreign exchange transactions is calculated based on the already settled transactions that will affect the liquidity in the next forecasting period.

2 NET POSITION OF THE GOVERNMENT

The net position of the government is the very factor with the highest volatility. This item is broken into three categories, namely:

- The budgetary revenues and expenditures
- The primary auction transactions
- Other transfers to/from the government account



2.1 Government budgetary receipts and expensses

Government receipts and expenditures remain the most difficult item to be forecasted. Ministry of Finance runs a forecast for each item, which still remains quite deviated from the actual value.

The budgetary transfers to/from the government account:

In addition, there is another problem that grounds deviations in their forecast. There exists a time lag between the time in which the receipts are deposited by the taxed subjects in the banking system and the time that they are transferred to the main government account within the central bank. The same phenomenon happens with the government expenditures, which are transferred to the banking system after the cash payments are completed.

Theoretically, the transfers in phases 1 and 3 must happen within the same working day. Actually, there is a time lag, which is sometimes difficult to be forecasted or taken into account in the forecasts because it is not a constant time lag. We tried to run a model in our own to minimize the forecasting deviation.

The available data at the Bank of Albania are based on the banks' transfer orders, which actually might be different form the data kept in the database of the tax offices, based on which the Ministry of Finance runs its forecasting models.

We were faced with three options in using the available data to build the models:

- Model the budgetary deficit /surplus (revenues -expenditures);
- Model the receipts and expenditures separately;
- Model each receipts and expenditures component separately.

The first option was not considered since it was realized that the series of the receipts and expenditure data do exhibit different seasonality which will not be very well traced in case we examine another series produced as the difference of the two (deficit or surplus series). One more reason that drove us to this decision was the potential ability of the Ministry of Finance to provide the central bank with accurate data on its planned expenditures, thus, theoretically we are left with the necessity of forecasting only the government receipts.

As to the choice between one of the two remaining options, it will depend on the forecasting abilities of each of the constructed models.

2.1A Modelling the Government Receipts

The government receipts data can be broken down into four categories:

1. Income tax receipts (28%).
2. Customs tax receipts (47%).
3. VAT tax receipts (12%).
4. Non-tax revenues (13%).

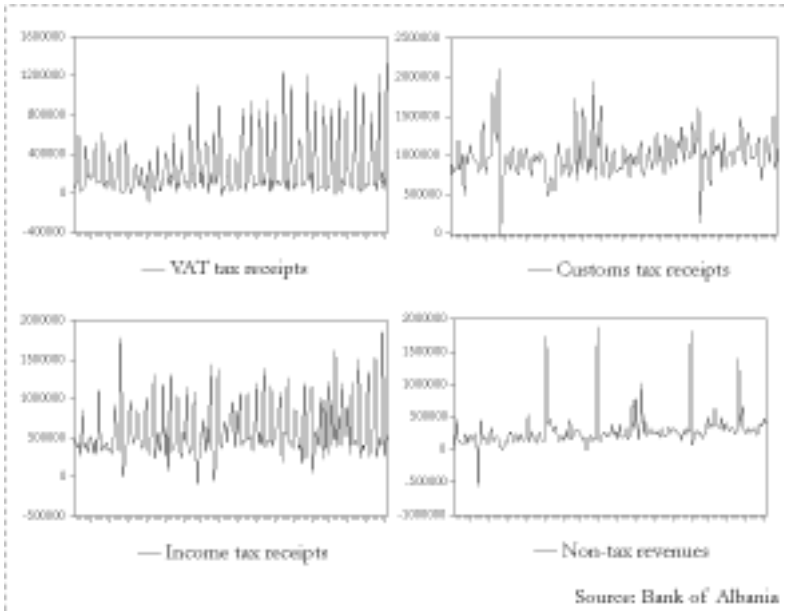
The data have weekly frequency and they cover period July 2000 – October 2003. In order to evaluate the out of sample forecasting quality, the October 2003 data are left out of the model estimation.

Source: Bank of Albania

The time series were first order differentiated since they exhibited non-stationary behaviour and then, they were modelled using the Boxing-Jenkins methodology. Some dummy variables were also incorporated to capture the seasonal effects.

The graphical presentation reveals a repetitive behaviour each December, when the government revenue peak because the government is eager to achieve the planned revenues level according to the approved budget plan. The only exception is noticed in the VAT-tax revenue, which does not reveal any peak in December.

Nevertheless, this series reveals a peak each second week of the month, since according to the law, the VAT tax is paid on 15th day of each month.



Source: Bank of Albania

The final results are presented in Table 2. The decision on the best model was based on the model forecasting ability. The models were built to be as parsimonious as possible.

The results show a six-month cycle of the income tax revenue and a yearly cycle of the non-tax revenues. The customs revenues show a peak in the last week of the month because this is the period when most of the customs agents transferred the revenues to the banking system.[1]

Some of the equations have a relatively small coefficient of determination, but still they are considered good enough according to the forecasting evaluation criteria.

For comparison purposes, another forecasting model was built. This model uses as input data, the sum of the separate components, thus, the total government revenues transferred to the government account by the banking system. The central bank profit is excluded from the calculation since it is transferred directly to the government account within the central bank.

Table 1 The equations of the government revenues components

Variables	Customs revenues	Income tax revenues	VAT tax revenues	Non-tax revenues	
	[d(dog)]	[d(tat)]	[d(tvsh)]	[d(tat)]	
C	$5.8*10^7$		$9.4*10^6$		
	(3.818)		(6.343)		
AR(1)	-0.934	-0.530	-1.205		
	(34.18)	(6.922)	(17.51)		
AR(2)		-0.413	-1.139		
		(4.903)	(15.21)		
AR(3)		-0.507	-1.153		
		(6.397)	(15.34)		
AR(4)			-0.523		
			(7.555)		
MA(1)		-0.981		-0.300	
		(86.85)		(3.507)	
MA(2)	-0.979				
	(427.4)				
D_{08}	$-2.6*10^7$	$7.5*10^7$		$1,2*10^6$	
	(3.605)	(3.976)		(6.630)	
D_{sez}			$4.1*10^6$		
			(6.84)		
D_{10}	$2.78*10^6$				
	(4.163)				
SAR(26)		0.210			
		(2.424)			
SAR (52)				0.226	
				(2.951)	
SMA (52)				-0.500	
				(4.133)	
Obs.	163	163	160	112	
Adj R^2	60%	78%	85%	60%	
D-W	2.00	1.83	1.99	2.10	D_{08} – Dummy për efektin e dhjetorit
RMSE	$2.2*10^6$	$2.5*10^6$	$2.5*10^6$	$1.0*10^6$	D_{sez} – Dummy për efektin e mesit të muajit
Theil Coef	0.099	0.16	0.19	0.15	D_{10} – Dummy për efektin e fundit të muajit
Bias Prop.	0.00	0.00	0.10	0.09	

T-stats between brackets: significant in 0.5% level
Source: Bank of Albania

The total revenue time series displays peak in the second week and in the last week of the month, as it was affected by the cycle of the VAT tax revenues and customs revenues respectively. The results are presented in Table 3. The best model of the three was judged to be the second one.

Table 2 The equations of the government revenues time series

Variables	Total revenues (difference)		
	(1)	(2)	(3)
C	4*10^8	3.5*10^8	2.7*10^8
	(5.54)	(5.48)	(3.84)
AR(1)	-0.496	-0.373	-0.354
	(7.18)	(5.61)	(4.64)
AR(2)			
MA(1)	-0.986	-1.034	-0.985
	(117.1)	(39.8)	(106.0)
D_{dc}		-2.7*10^8	
		(2.07)*	
D_{fm}		8.8*10^8	6.9*10^8
		(4.95)	(4.01)
D_{mm}		6.6*10^8	4.9*10^8
		(4.87)	(2.75)
D_{sm}			
SAR(52)			
Obs.	163	163	163
Adj. R^2	74%	77%	75%
D-W	1.95	1.91	1.96
RMSE	6.4*10^8	5.9*10^8	6.2*10^8
Theil Coef	0.12	0.10	0.12
Bias Prop.	0.06	0.14	0.04

T-stats between brackets: significant in 0.5% level, * significant in 1% level.
Source: Bank of Albania

D_{dc} – dummy measuring the December effect
D_{fm} –dummy measuring the end of month effect
D_{mm} –dummy measuring the middle month effect
D_{sm} –dummy measuring the start of month effect

The out-of-sample forecasted values are presented in Table 4. The first column presents the forecasted revenues as a sum of the forecasted values of the four revenues components. The second column presents the forecasted revenues according to the model which has total revenues data as the input data. The third column

presents the forecast produced by the Ministry of Finance. Finally, the forth one is the actual values of the revenues for the respective period. The next three columns are the calculated differences between the respective forecasted values and the actual revenues data.

According to these results, both constructed models perform better than the Ministry of Finance forecasts. When comparing the results of the two constructed models, it seems like the results in column 1 slightly outperform the results in column 2. Nevertheless, they will be tested further more and then, it will be decided which model is the best. Actually, the first model is quite time consuming in producing the results, so it must reasonably outperform the second model in order to be considered as the best model.

Table 3 Out-of-sample performance evaluation (in millions)

Model [1]	Model [2]	Model [3]	Model [4]	Difference [4] – [1]	Difference [4] – [2]	Difference [4] – [3]
2,808.42	2,958.65	2,800.00	2,880.00	71.58	(78.65)	80.00
2,082.27	2,238.98	2,450.00	2,330.00	247.73	91.02	(120.00)
3,080.13	2,848.58	3,000.00	4,080.00	999.87	1,231.42	1,080.00
1,835.04	1,999.02	2,700.00	1,630.00	(205.04)	(369.02)	(1,070.00)
3,158.86	3,111.97	2,100.00	3,330.00	171.14	218.03	1,230.00

Source: Bank of Albania

2.1B Government Expenditures

The government expenditures consist of the capital expenditures and current expenditures. The current expenditures on their own, consist of the payroll expenditures, other wage benefits, interest payments, etc. The government compiles its budget at the beginning of the year and it must have all the necessary information regarding the time and the amount of the expenditures.

Nevertheless, the information BoA receives on the planned expenditures is far deviated from the actual incurred expenditures. Thus, it was considered as necessary to make efforts in running a regression to model the government expenditures.

The regression is run for the current expenditures data, excluding the interest payments since these payments are known in advance and the information is accurate enough. The time series was first-

order differentiated to reach stationarity. Moreover, this series has weekly frequency, extended through July 2000 – October 2003.

The government produces its forecast of expenditures based on the previous year performance, leading to a seasonal behaviour of the time series. The government expenditures peak in the first week and the third week of the month when the payrolls are paid. They also peak in December because of budget realization.

Table 4 Government expenditures econometric equation

Variables	Expenditures [d(shp)]
AR(2)	0.541
	(5.19)*
MA(1)	-0.752
	(7.53)*
D_{dh}	$-4.7*10^7$
	(6.74)*
D_{mn}	$-4.71*10^6$
	(3.37)*
D_{tl}	$8.73*10^6$
	(6.33)*
SAR(52)	0.155
	(2.57)**
Obs.	109
Adj. R^2	72%
D-W	1.89
RMSE	$3.9*10^6$
Theil Coef	0.08
Bias Prop.	0.02

Source: Bank of Albania

We tried to introduce a dummy to see if the parliamentary elections were having an effect on the budget expenditures but the dummy did not seem to be of any statistical significance.

When the out-of-sample forecasting performance was evaluated, it was not clear which of the models outperformed, the build econometric model or the forecast of the Ministry of Finance. The best case remains the accurate information provided by MoF.

Table 5 Out-of-sample performance evaluation of the expenditures model

Our model [1]	MoF model [2]	Actual expenditures [3]	Difference [3] – [1]	Difference [3] – [2]
2,498.27	2,240.00	2,251.08	(247.19)	11.08
1,903.76	2,709.00	2,191.36	287.61	(517.64)
2,304.34	2,660.00	1,939.12	(365.22)	(720.88)
2,889.55	3,185.00	3,662.21	762.66	477.21
2,494.59	2,406.00	2,590.32	95.72	184.32

Source: Bank of Albania

Sometimes, the deviation in the revenue forecast is cancelled out by the expense forecasting error and the final forecast of the budget deficit seems to work much better than the MoF forecast.

2.2 The effect of new t-bill issue on the market liquidity

Ministry of Finance issues new T-Bills based on budget projections. The issuing calendar of Treasury Bills is published quarterly by the Ministry of Finance but it is still open for revision, while the amount issued on the two-year bonds is published one week before the auction.

In running the liquidity forecasting exercise we are interested in the net effect of the primary action transactions. We calculate the amount offered to the banking system by extracting the amount that the other non-bank institution or individuals will invest in T-Bills[2]. Then, this amount is discounted by the last auction yields. Taking into account the amount of the matured T-bills the net effect of the primary market is calculated. Forecasting the amount of other non-bank institution and individuals causes the most of deviation, which is still of no considerable magnitude.

3 BANKNOTES IN CIRCULATION

Banknotes in circulation are the third autonomous factor, which is not in complete control of the Central Bank. Higher demand for

domestic currency results in the increase of banknotes in circulation. Usually the short-term circulation of banknotes is affected by seasonal repetitive phenomena, such as payrolls, weekends, holidays, etc. The Lek banknotes in circulation are observed to influence at the payroll period and before and/or during the holidays. Weekend effect is less observed since Albanian economy is a cash dominated economy and the ATM are infrequently used.

We run a regression for the weekly time series starting from July 2000 and ending in October 2003, using the Box – Jenkins methodology. A dummy variable was included to capture respectively the payroll period effect, the summer holiday's effect, and the end-of-the-year holiday's effect. Another dummy variable was included to mark the deposits withdrawal during the period March-April 2002 that was due to a psychological panic of the population. An interest rate variable was included to mark the effect of the interest change. The interest rate variable was represented by the weighted average interest rate of time deposits in the banking system.

All the included dummies proved to be significant, while the interest rate seemed to affect the independent variable with a time lag of 8 weeks.

Table 6 Econometric model of cash in circulation

Variables	Cash	
	(1)	(2)
C	3.45*10⁹	4.09*10⁹
	(2.42)	(3.41)*
AR(1)	0.354	0.293
	(5.101)	(4.35*)
SAR(52)	0.259	0.196
	(2.242)	(2.751)
MA(3)	-0.272	-0.308
	(3.318)	(3,771)
SMA(52)	-0.589	-0.589
	(3.996)	(3,101.8)
D_{12}	1.40*10⁹	1.46*10⁹
	(5.090)	(6.227)*
D_s	7.20*10⁸	7.21*10⁸
	(7.54)	(7.64)*
D_m	1.93*10⁹	2.00*10⁹
	(5.987)	(6.951)
D_v		3.60*10⁸
		(2.661)
IR(-8)	-4.90*10⁸	-5.86*10⁸
	(2.692)	(3,791)
Bush		0.174
		(3.002)
Obs.	105	105
Adj. R^2	78%	80%
D-E	1.90	1.85
RMSE	7.10*10⁸	4.90*10⁸
Theil Coef	0.53	0.60
Bias Prop.	0.04	0.00
Cov Prop.	0.89	0.95
D_{12} – Dummy to capture the December effect		
D_s – Dummy to capture the payroll effect		
D_m – Dummy to capture the psychological effect of March-April 2002		
D_v – Dummy to capture the summer holiday effect		
IR – weighted average of the time deposit interest rates.		
Bush – reprimet buxhetore të qeverisë që kalojnë nëpërmjet sistemit bankar.		

Source: Bank of Albania

4 OTHER NET ITEMS

We have classified three other factors under "the other items" category:

1. The change in the required reserves
2. The transfers of the Deposit Insurance Agency
3. Administrative transfers

4.1 The Change in Required Reserves

The current regulative framework requires the banks to hold 10 percent of their reserve base within the central bank at monthly intervals. Averaging provision is possible at 20 percent of the required reserve. The reserve requirement affects the liquidity of the banking system:

b- at the end of the holding period;

c- through the averaging provision.

a- The new level of the required reserves is calculated 4 days ahead the value date of the new required reserve and reveals no remarkable difficulties in forecasting the accurate amount of change. The same day, the central bank transfers to the banking system the remuneration of the previously held reserve requirement, which can also be easily calculated knowing the reserve requirement amount and the interest rate.

b- The effect of the averaging position is very difficult to be forecasted since banks use it according to their needs. Nevertheless, it has been observed a systematic behaviour in using the averaging provision during the first and the third week of the one month reserve requirement holding period of Lek 703 million with a standard deviation of ± 230 million. This kind of systematic behaviour can give us an idea of how much the banks are willing to invest in the central bank instruments, especially when the intervention is conducted through variable price REPO auction.

4.2 Transfers of the Deposit Insurance Agency

Deposit Insurance Agency holds its account within the central bank. There are two kinds of transfers to/from the account of the Deposit Insurance Agency (DIA) that can affect the liquidity of the banking system:

- Yearly prim paid by the commercial banks on quarterly basis
- Foreign exchange transactions

The first one is accurately calculated since it is based on the previous year deposit level of each bank. As far as the second type of transaction is concerned, information with respect to the amount and the value date can be received only from the agency itself.

4.3 Administrative transfers

"Administrative transfers" namely include the transfers made by the central bank to the banking system to satisfy its own administrative needs according to its own budget. These transfers are sometimes very difficult to be forecasted. Nevertheless, they count for small amounts, which do not cause remarkable deviation of the liquidity forecasting.

PRACTICAL CONCLUSIONS

A clear and efficient organization of the liquidity forecasting process is essential to produce accurate time projections. Liquidity projections, together with the most recent observations of the situation in the interbank market, form the basis for decisions on discretionary monetary operations. The organizational features and issues regarding the day-to-day implementation of the liquidity forecasting exercise can be summarized as:

1. Communication with data providers

As the analysis of autonomous supply of bank reserves in Section 1.2 has shown, the government is one of the main agents involved in

the transactions that affect liquidity. Through this study, an attempt was made to reduce the government data discrepancy; yet, for better results in the liquidity forecasting exercise, the government should provide all available information on government cash flow projections to the central bank, as well as work on better forecasting techniques of its budgetary funds.

2. Forecasting horizon and intervals

Since the Bank of Albania operates mainly through weekly repurchase agreements, one week should be the minimum liquidity forecasting horizon. Nevertheless, the instrumental framework of the central Bank of Albania allows longer time horizon of money market interventions. As such, being a system with monthly reserve requirements, the forecasting horizon should be at least one month. The one-month forecasting model horizon will be the subject of another study.

3. Additional information

Especially in times of large uncertainties, it might also prove useful to directly contact banks to inquire about their short-term liquidity needs. Requiring banks to make liquidity forecasting will help them to a better management of their liquidity and provide the central bank with additional information.

4. Publication of liquidity forecast

Disclosing the information can help the banking sector to form expectations on the overall liquidity situation by distinguishing more clearly between the central bank's short-term liquidity management actions and its longer-term policy intentions. These can facilitate banks' liquidity management and contribute to stabilizing liquidity conditions. Nevertheless, if liquidity projections are subject to significant error, their publication might have destabilizing effect on interbank money markets. Therefore, it is more suitable to first establish liquidity forecasts with a low degree of error so that the publication of liquidity forecast really contributes to stabilizing liquidity conditions.

* Denalda Duro: Specialist, Monetary Operation Department.

[1] Most of the customs imports duties are paid in cash and the transfers are usually made at the end of the month.

[2] Usually all the other financial institutions invest through banks. Nevertheless, there is still one agency that invests directly since it holds the account within the central bank, as well as individuals who invest directly in the central bank.

THE TRANSPARENCY OF THE BANK OF ALBANIA

*Sofika Note**

1 INTRODUCTION

During the last decade there has been a tendency of the central banks to become increasingly open to the public regarding their work and the decision-making process. Transparency has become an important issue of the central banking and its relevance for the monetary policy is a broadly discussed topic in the academic literature of the central banks. Its significance increases especially in the case of the inflation targeting regime. It is widely argued that transparency is important for monetary policy purposes for two main reasons: it enhances accountability and increases policy effectiveness. However, special cautiousness should be taken in not turning transparency into a final aim in itself. It is and should remain a mean in achieving the final monetary policy objective.

The Bank of Albania has considered transparency very valuable for the monetary policy and has put a lot of efforts in improving it, especially the recent years. Opening to the public should go along with the increase of the public understanding of monetary policy and issues related to it. On the other hand, the public understanding and involvement in these issues comes gradually with the economic development of the country. This material presents an effort to measure the current transparency level of the Bank of Albania,

comparing it with the transparency level of other central banks. This is done through a transparency index, an approach similar to the independence indices. The calculations for the BoA are done for the year 2004 and for the period before 1997. It is seen as appropriate to compare these periods because greater measures in increasing transparency are taken after 1997. The values of the transparency index for 2004 and the period before 1997 are respectively 8.5 and approximately 2, out of 15 points. These numbers show a considerable improvement compared to the period before 1997 and a relatively good level of transparency, compared to the other central banks.

The material is organized as follows: the second section discusses the importance of transparency for a central bank, while the third deals with transparency definitions. The fourth section presents the calculation of the transparency index for the Bank of Albania and the fifth discusses the public understanding in Albania, as an important dimension of transparency, and the role of intermediaries in transmitting the information from the BoA to the public. Finally, the sixth section concludes.

2 IMPORTANCE OF TRANSPARENCY

Economists broadly agree that transparency is important for a central bank in two main directions: making the central bank more accountable and increasing the monetary policy effectiveness.

2.1 Transparency and accountability

Transparency is an element that helps in increasing the accountability of a highly independent central bank. Taking into consideration the tendency of politicians to use the monetary policy for their own short term interests, the monetary policy is consigned to a relatively highly independent central bank. This degree of independence should be accompanied by accountability towards the society, or at least towards its elected representatives. To ensure the accountability of an independent central bank, special institutional arrangements or contracts are established. Despite this, their effect

is limited without transparency because the information related to the central bank activity is important in judging its work (Eijffinger, Hoeberichts, 2000). Transparency helps the public to understand what the central bank is doing and why, giving it the possibility to assess the performance of the central bank. Thus, the central bank should report periodically on its past performance and monetary policy plans for the future. Because of its important role in enhancing the accountability, transparency should not be a choice of the central bank. It is essential that the law defines explicit procedures for the central bank to explain monetary policy actions.

2.2 Transparency, credibility and monetary policy effectiveness

The need for transparency does not come only from the demand for the accountability of an independent central bank. Transparency, by increasing the credibility, makes the monetary policy more effective (Issing, 2001).

Economists have different opinions regarding the relation among credibility, transparency and monetary policy effectiveness. In a survey carried out by Blinder (1999), some of the economists and central bankers think that the credibility of the central bank comes from a successful history in achieving the final objective and that transparency is not a prerequisite in establishing credibility. For some others transparency plays a more important role in achieving credibility and especially in maintaining and further increasing it. However, most of the economics and central banking experts support the idea that transparency, given a high level of credibility, helps in increasing the monetary policy effectiveness.

Transparency ensures the broad support of the public in fulfilling the main objective, turning it into an ally of the central bank. Transparency affects the public behavior related to wages and prices, making it easier to fulfill the final objective of the monetary policy.

The importance of transparency and credibility is justified also by the rational expectations theory. Given the existence of the rational expectations, a highly credible bank may follow a disinflationary policy without having undesirable costs in unemployment (Taylor,

1983; Ball, 1991). Transparency reduces the information asymmetries between the central bank and the private sector about the economic conditions and the monetary policy decisions perspective, thus, contributing to the increase of predictability. Most of the central banks control the short term interest rate, but as theoretical and empirical facts show, it is the long term interest rates that are more important for the economy (Freedman, 2002). Long term interest rates, among others, reflect also the expectations of the short term rates in the future and the risk premium. If the monetary authority is clearer on what is doing today and what intends to do in the future, then the market participants may improve their expectations for the interest rates in the future. To attain this, the central bank does not have to tell what its future actions will be. It is sufficient to identify and make public the factors and conditions that may affect the monetary policy in the future. Furthermore, the well informing on the monetary policy may also reduce the risk premium of the interest rates. As a result, after making the information public, the market movements precede and are consistent with the actions that the central bank will undertake (Freedman, 2002). Thus, transparency helps in bringing the long term interest rates closer to the rates targeted by monetary policy makers.

3 DEFINITION OF TRANSPARENCY

Transparency is a wide concept and not easy to be defined. Many authors give different definitions of transparency. However, in the literature on central bank policy there may be distinguished two of them. Geraats (2000) defines the central bank's transparency as the extent to which the central bank releases information about monetary policy process. The public should have access to the same information that the central bank uses in conducting monetary policy. Based on this definition, the more information the central bank releases, the more transparent it is.

Winkler (2000) goes further in determining transparency. He defines it as "*the degree of public understanding of monetary policy process and decisions*". According to Winkler's definition, transparency does not consist of only making information publicly available. It is fully

attained when the public understands the information released by the central bank. In this direction, Winkler completes the concept of transparency by adding also the need for preparing and transmitting the information, using various means and tools and formulating the message according to the specific needs of different audiences. In this aspect, Winkler includes the central bank's activities in increasing the public's knowledge on central banking issues.

Winkler distinguishes three aspects of transparency: *genuineness* of the released information, its *clarity* and the *common understanding* between the central bank and the public.

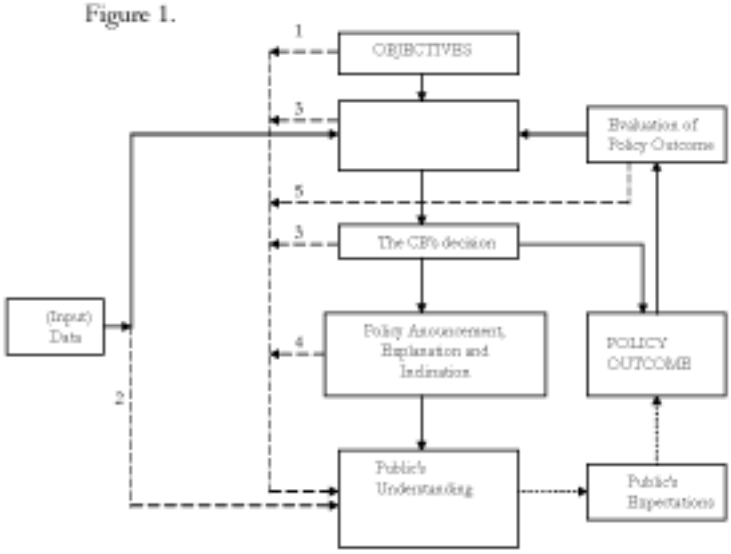
The *genuineness* of information implies that the information released to the public by the central bank should be the same as the information within the central bank, without any intentional change or alteration. This transparency aspect of Winkler is somewhat the same as the transparency definition given by Geraats.

For the information to be *clear* it means that it should be simple and should be communicated to the public in such a way that there is no room for misinterpretations. The clarity of information becomes especially important when it is presented to different audiences.

Common understanding implies that the information given by the central bank, in order to be effective, should be understood and interpreted by the public the same way it is understood and interpreted by the central bank. This requires that the public has certain knowledge on central banking issues, which may come from its own interest or as a result of the central bank activity to stimulate it.

The diagram presented in *Figure 1*, adapted from Winkler (2002), shows the information released to the public in every stage of monetary policy design and implementation and its effects in the creation of the public expectations and in the final outcome of monetary policy.

Figure 1.



The arrows with dashed line represent the information that the public receives from the central bank, which should have the three qualities defined by Winkler (2002): genuineness, clarity and common understanding. The dotted arrows show the creation of the public's expectations and their impact on the monetary policy outcome. The public should have information on every stage of the monetary policy process so that rational expectations are formed. In this way, the public should know what the objectives of the central bank are, what the monetary policy strategy is, in order to achieve these objectives, how and why the decisions are taken. The public should also have access to the data on which the central bank bases its decision. The transmission of an important part of information is done by intermediaries, mainly by the media. As a consequence, they have an important impact on the formation of the public's expectations. The final outcome is a result of the central bank's actions and of the public's expectations.

4 CONSTRUCTING THE TRANSPARENCY INDEX

Transparency is a qualitative concept and it is not easy to give a quantitative assessment of it. Several authors have tried to measure

it by using the index approach, which is similar to the indices of independence. Among them we mention Eijffinger, De Haan, Amtenbrink (1999), Gros & Bini-Smaghi (2001), Eijffinger & Geraats (2003), De Haan & Amtenbrink (2003). To build the transparency index for BoA, the Eijffinger and Geraats 2003 index is chosen, as it is more comprehensive and covers more topics than the others.

4.1 Methodology

Eijffinger and Geraats (2003) define transparency as "*the extent to which the central bank releases information regarding the monetary policy decision-making process*". The authors identify 5 kinds of transparency: political transparency, economic transparency, procedural transparency, policy transparency and operational transparency, each of them related to a specific stage of the decision-making process. Thus, an important advantage of this index is the distinction between several kinds of transparency, which allows for further analysis on the role of transparency in the monetary policy decision-making process.

1. Political transparency refers to the openness about policy objectives. It takes into account the formal definition of monetary policy *objectives*, including a prioritization in case there are conflicting objectives, and the specification of the target in *quantitative terms*. Political transparency is enhanced by *institutional arrangements and contracts* which ensure the central bank's independence, minimizing the political pressures in achieving the final objective of monetary policy.
2. Economic transparency is related to the economic information that is used for monetary policy purposes. This kind of transparency is shown in the publication of *the economic data* the central bank uses, of *the models* used for economic forecasts and of the central bank's internal forecasts.
3. Procedural transparency refers to the way monetary policy decisions are taken. This is attained by publishing *the monetary policy framework* and by releasing *the minutes* and *the voting records*.
4. Policy transparency implies the prompt announcement of the policy decisions. Besides, it also involves giving an explanation of the decision and providing a policy inclination for the future.
5. Operational transparency refers to the implementation of

the monetary policy actions. It also implies the discussion on the errors in meeting *the operating targets* and on the macroeconomic disturbances that affect the transmission of monetary policy.

The above aspects of transparency are also shown in *Figure 1* in the second session. The information released by the central bank to the public in each stage of the monetary policy process is represented by the dashed arrows, each of them marked by a number in accordance to the corresponding transparency aspect.

4.1 The transparency index of the Bank of Albania

The Eijffinger and Geraats transparency index is constructed by adding up points which are given depending on the answers to several questions about the type, the quantity and sometimes, the quality of information released by the central bank. There are three questions for each transparency aspect defined above. Depending on the answer, 0, 1 and sometimes 0.5 points are given for each question.

Below there is the transparency index for the BoA for 2004, according to the concept defined by Eijffinger and Geraats. The index for the period before 1997 is given at Appendix 1. The index is constructed according to the judgment of several specialists at the BoA with a heavy weight of the author. Points given behind the question marks are motivated afterwards, for each question separately.

1.a *Is there a formal statement of the objective(s) of monetary policy with an explicit prioritization in case of multiple objectives?* → 1 point

The primary objective is defined in the law of the BoA and is "to achieve and to maintain the price stability". The fulfillment of all the other objectives depends on the fulfillment of the primary one. Thus, this criterion is fully met.

1.b *Is there a quantification of the primary objective?* → 1 point

Quantitative targets for the main objective have been set since 1999 and have been published initially in the annual reports. Recently the quantification of the price stability target is promoted evermore. It is revised every year and is published in the Monetary Policy

Document released in the beginning of each year. For the last years it has been in the range of 2-4 percentage change of the Consumer Price Index as measured by INSTAT, from December to December. Considering that the effect of publicly setting a quantitative target is the same, even though there is no legal responsibility for achieving it, we think that this criterion should be considered as met.

1.c *Are there explicit institutional arrangements or contracts between the BoA and the government?* → 1 point

The BoA enjoys a high level of legal independence (Cani, Baleta, 2002). Although the real independence is not as high as it should be, so far there have not been any cases when this independence has been violated and/or the final objective has been threatened.

2.a *Is the basic economic data relevant for the conduct of monetary policy publicly available? The focus is on the following variables (at least quarterly data): money supply, inflation, GDP, unemployment rate and capacity utilization.* → 1 point

Regarding this criterion, at least quarterly data is available only for three out of the five variables. There is monthly data for inflation and the money supply and quarterly data for unemployment rate, published in the websites of the BoA and INSTAT. The other variables are not published, simply because there is no data available. Therefore, considering that assessing the transparency level is based on whether the available information is released or not, this criterion may be considered as fully met.

2.b *Does the BoA disclose the formal macroeconomic model(s) it uses for policy analysis?* → 0 points

No macroeconomic models are publicly available, thus, this criterion is not met.

2.c *Does the BoA regularly publish its own macroeconomic forecasts*? → 0 points

The inflation forecast is considered as confidential and it is not disclosed. Thus, the point for this criterion is zero.

3.a *Does the BoA provide an explicit policy rule or strategy that describes its monetary policy framework?* → 1 point

Regarding the monetary policy framework of the BoA, it is publicly available in the BoA's website and the Monetary Policy Document. It is published annually and it describes the final target, the intermediate and operational targets, the way they are achieved and the monetary policy instruments that are used.

3.b *Does the BoA give a comprehensive account of policy deliberations (or explanations in case of a single central banker) within a reasonable amount of time?* → 0 points

This criterion refers to the release of the minutes of the board's meetings. In the case of the BoA they are not published, thus, no points are given for this criterion.

3.c *Does the BoA disclose how each decision on the level of its main operating instrument or target was reached?* → 0 points

This criterion requires the release of the individual voting records, currently not disclosed by BoA.

4.a *Are the decisions about adjustments to the main operating instrument or target promptly announced?* → 1 point

BoA fulfills the criterion of the prompt announcement, meaning that whenever a decision on monetary policy is taken, it is immediately released to the public via a press release.

4.b *Does the BoA provide an explanation when it announces policy decisions?*→ 0.5 points

Regarding the policy explanation the rating is half the points. The policy explanation criterion requires not only fully detailed explanation of the reasons behind a certain decision, but also including forward-looking assessments. This is not always the case for the BoA.

4.c *Does the BoA disclose an explicit policy inclination after every policy-meeting or an explicit indication of likely future policy actions (at least quarterly)?* → 0 points

Despite the evident improvements in this direction, the explicit indication of likely future policy actions is not released periodically.

5.a *Does the BoA regularly evaluate to what extent its main policy operating targets (if any) have been achieved?* → 1 point

This criterion is fully met. For the operational targets, which are the Net Domestic Assets and the Net International Reserves of the BoA, quantitative targets are set, and their achievement is assessed periodically, in the monthly, semiannual and annual (monetary policy) reports, providing also reasons for significant deviations.

5.b *Does the BoA regularly provide information on (unanticipated) macroeconomic disturbances that affect the policy transmission process?* → 0.5 points

This criterion requires regular information provision on macroeconomic disturbances that affect policy transmission process, including a discussion on past forecasts. In the case of the BoA, the discussion consists only in the current macroeconomic developments (at least quarterly) and there are no discussions on the forecast errors. Therefore, the rate for this criterion is only half the points.

5.c *Does the BoA regularly provide an evaluation of the policy outcome in the light of its macroeconomic objectives?* → 0.5 points

The performance of the monetary policy in the light of its macroeconomic objectives is done at least annually, but there is no explicit account of the contribution of the monetary policy to meeting these objectives.

Table 1 shows the transparency index of the BoA together with those of other central banks constructed by Eijffinger and Geraats. As follows from the table, the value of the transparency index of the BoA is 2 in 1996 and 8.5 in 2004. For 2004 it is comparable with that of the other central banks.

If we analyze separately each kind of transparency, we notice that BoA is relatively open about monetary policy objectives (political transparency), monetary policy decisions and their explanation (policy transparency) and the evaluation of the achievement of the final and operational objectives (operational transparency).

Meanwhile, the information related to economic data, macroeconomic model(s) and forecasts (economic transparency) and to the way the monetary policy decisions are taken (procedural transparency) is at a lower level than in other central banks.

This quantitative evaluation of transparency enables the comparison between central banks. It would be of interest to compare the level of transparency of the BoA to that of central bank,s which are in a similar stage of development as Albania, but currently no transparency indices are available. However, as the BoA aims to approach the model of a modern central bank, especially the ECB, comparing the BoA with these banks is more important in a forward-looking aspect.

Table 1

Central Bank Transparency*	BoA 1996	BoA 2004	ECB	Bank of Canada	Reserve Bank of Australia	Bank of Japan	Reserve Bank of New Zealand	Sveriges Riksbank	Swiss National Bank	Bank of England	Federal Reserve
Political Transparency	1	3	3	3	3	1.5	3	3	2.5	3	1
Formal Objective	0.5	1	1	1	1	0.5	1	1	0.5	1	0.5
Quantitative Targets	0	1	1	1	1	0	1	1	1	1	0
Institutional Arrangements/Independence	0.5	1	1	1	1	1	1	1	1	1	0.5
Economic Transparency	0	1	2.5	2.5	2	1.5	3	2	1.5	3	2.5
Economic Data	0	1	1	1	0.5	1	1	1	1	1	1
Policy Models	0	0	1	1	1	0	1	0	0	1	1
Central Bank Forecasts	0	0	0.5	0.5	0.5	0.5	1	1	0.5	1	0.5
Procedural Transparency	0	1	1	1	1	2	3	3	1	3	2
Explicit Strategy	0	1	1	1	1	0	1	1	1	1	0
Minutes	0	0	0	0	0	1	1	1	0	1	1
Voting Records	0	0	0	0	0	1	1	1	0	1	1
Policy Transparency	0	2	2	2	1.5	1.5	3	3	2	1.5	3
Prompt Announcement	0	1	1	1	1	1	1	1	1	1	1
Policy Explanation	0	0.5	1	1	0.5	0.5	1	1	1	0.5	1
Policy Inclination	0	0	0	0	0	0	1	1	0	0	1
Operational Transparency	1	2	2	2	1.5	1.5	2	3	0.5	2.5	1.5
Operational Objectives	0.5	1	1	1	1	0.5	1	1	0.5	1	1
Transmission Disturbances	0	0.5	0.5	0.5	0.5	0.5	0.5	1	0	1	0
Evaluation Policy Outcome	0.5	0.5	0.5	0.5	0	0.5	0.5	1	0	0.5	0.5
Total	2	8.5	10.5	10.5	9	8	14	14	7.5	13	10

4.2 Methodology limitations

When constructing the transparency index of the BoA, there are several methodology limitations not only for the case of Albania,

but also in general. First, Eijffinger and Geraats index assesses transparency more in the aspect of quantity than in the aspect of the quality and clarity of the information released. It does not take into account the understanding of the information by the public or the agents, which is an important aspect of transparency (Winkler, 2000). Thus, a high value of this index implies a high level of released information, but this does not mean that transparency has necessarily contributed to the increase of the monetary policy effectiveness and/or to the improvement of central bank's accountability.

Another drawback of this index is that it includes some transparency aspects, such as the release of the minutes and individual records, which are currently highly debated among economists and central bankers. These practices are not adopted even by very transparent banks and are not considered as necessary for the increase of the transparency. Releasing the minutes and the voting records increases the accountability of the decision-makers, but at the same time, it may hamper them in having different points of view or changing their attitude towards important policy decisions.[2]

In measuring the transparency of the BoA, one of the reasons why the transparency index is lower than that of the other central banks is the lack of information that according to the index criteria should be publicly available. Furthermore, a central bank should have a certain level of confidence in the information it releases. For example, the forecasts of the central bank should reach a satisfactory level of accuracy before being published; otherwise the credibility of the central bank may be endangered.

Another concern related to measuring the transparency index of the BoA is the fact that this index considers the release of information which may not be necessary at this moment for the Albanian public. Not all the information a central bank may release is of the same importance for the public in Albania as for the public in developed countries. This is due to the relatively slow development of the financial system and the degree of public involvement in it. Measuring transparency being based only in the quantity of information released by the central bank is incomplete. Thus, it is necessary that it is supplemented by an assessment of the public understanding.

5 PUBLIC UNDERSTANDING AND THE ROLE OF INTERMEDIARIES IN TRANSMITTING THE INFORMATION

The degree of public understanding of monetary policy and the role of the central bank in the economy is an issue of great concern. The public understanding depends not only on the quantity and quality of the information publicly available, but also on the public's incentive to pay attention to and to understand this information. To analyze the level of understanding, we may divide the public into two main groups: businesses and households. It is obvious that these two groups have different levels of interest on inflation, the exchange and interest rate developments. Businesses, as producers/traders, importers/exporters, borrowers and investors, are interested in all three factors, thus, being the most interested group in the economy in general, and in the BoA's activity in particular. On the other hand, households will be interested mainly in inflation, as it measures their purchasing power, and in the exchange rate in case they have savings or income in foreign currency. Çeliku and Nasto (2004), while analyzing a questionnaire constructed for this purpose, conclude that the public has increased its knowledge on inflation, which probably is most important to the Albanian households.

However, we cannot say that the Albanian public is well-informed on the BoA and its activity. A survey carried out in October 2003 showed that only 52.5 per cent of the interviewees knew exactly what inflation was, while the percentage who thought that inflation is measured and published by the BoA (38.5%) was almost the same as the percentage who thought that inflation is measured and published by INSTAT (41.5%). The percentage of the interviewees that thought inflation is controlled by the BoA is 56, while 34 percent believed it is controlled by the Ministry of Finance. Probably, it is not a lack of information or disperformance of the BoA. The public may be unaware of these issues. This unawareness, on the other hand, comes from the low degree of public's involvement in the economic life and mainly in the financial system. Albanian households are not so involved in the banking system. The bank deposits and T-bills holdings are more a way to safely put aside some money than a profitable investment, thus the interest rate, as such, is not the

main factor. Household crediting is at a beginning stage, while mortgage loans, though extending, remain choices of a small part of the households because of the low incomes. On the other side, the effect of the public understanding is usually transmitted in the monetary policy by expectations, which it cannot be said that are fully reflected. Maybe for the moment they are not so crucial for the transmission mechanism than for the BoA's credibility.

The BoA has organized lectures and educational campaigns in order to increase the knowledge of the public on the role and the activity of the central bank in the economy. This is a good initiative, as long as it is not turned into a final aim in itself. Besides, these activities are productive only if they target that part of the public that will use the information in the near future. Otherwise the information effect may vanish.

An important factor which affects the public understanding is the way the information released by the central bank is transmitted to the public. Even though the information released by the central bank may be clear, it may not be transmitted accurately to the public. This may come because in most of the cases the communication of the central bank with the public is not direct, but carried out by intermediaries. It increases the risk of information distortion and weakens the positive effects of transparency.

As a result it is important to assess how intermediaries report the central bank's decisions and actions, because they may not correctly communicate them and the explanation behind them to the public. The intermediary which plays the main role in transmitting the information to the public is the media. Furthermore, media is not only an intermediary, but also an educator and a leader of opinion for the public.

In most of the cases, media reaction about the BoA is encouraged by the latter. The economic articles related to the central bank are published mainly when BoA holds press releases or conferences. In such cases, the newspapers publish the information given by BoA, restraining faithfully to the material given by the spokesman or to the bank's representative speeches. Sometimes there are also logical

mistakes in explaining the decisions of the Supervisory Council and even misprints in these articles, which cause the misinformation of the public.

The above problems are due to the lack of appropriate professional knowledge in central banking issues. This is also one of the reasons why BoA is engaged in organizing trainings and special seminars for the journalists that cover economic issues. But what the economic press lacks most are the professional analysis and comments, which despite current improvements, are still limited.

For the current level of public understanding, the quality of the media intermediation in the communication between the BoA and the public may not be such a concerning problem. But along with the increase of the public's interest in central bank's activity, the development of the financial market and the increase of the impact of public's expectations in the monetary policy process, the media will play a more crucial role.

6 CONCLUSIONS

The central bank's transparency is a highly discussed issue these last decades. Considered as an element which affects especially the accountability and the monetary policy effectiveness, transparency is being paid a lot of attention to, in particular in the case of inflation targeting regime. In this material was presented an attempt to measure the transparency of the BoA, including in its concept not only the quantity of information released, but also the understanding of this information by the public.

The first aspect of transparency, the quantity of information released by the BoA, was measured using the Eijffinger and Geraats (2003) index. The index was constructed for 2004 and for the period before 1997. For the years 2004 and 1996 the calculated values are respectively 8.5 points and approximately 2 points. This marks a huge difference. It shows the progress made by the BoA towards a greater transparency. A value of 8.5 points is even almost comparable to the other central banks. The average value of the index for the other

central banks is 10.7 points. The BoA is even equally transparent as the Bank of Japan and even more transparent than the Swiss National Bank. This index could be higher if part of information required to be publicly available would not be scarce. To achieve a higher level of this index, further efforts should be put in providing more accurate information, the release of which would have real positive effects for the monetary policy.

The public understanding is a difficult qualitative assessment of transparency. The current degree of public understanding in Albania remains low, mostly because the development of the financial system. The public interest in the central bank and its role has continuously increased, mainly due to the public's involvement in the economic life. On the other hand, expectations, which are the reasons why public's understanding is important, are not fully reflected and do not have yet important effects on monetary policy.

APPENDIX A: THE TRANSPARENCY INDEX OF THE BOA FOR THE PERIOD BEFORE 1997.

1.a *Was there a formal statement of the objective(s) of monetary policy with an explicit prioritization in case of multiple objectives?* → 0.5 points

This criterion is only half fulfilled before 1997. Although there was a formal definition of the monetary policy objectives, their prioritization was not clear.

1.b *Was there a quantification of the primary objective?* → 0 points

Before 1997 the main objective was not expressed in quantitative terms, thus, the criterion is not fulfilled.

1.c *Were there explicit institutional arrangements or contracts between the BoA and the government?* → 0.5 points

The old law on the Bank of Albania did not attribute it a high level of independence, thus it is judged to rate this criterion by 0.5 points.

2.a *Was the basic economic data relevant for the conduct of monetary policy publicly available? The focus is on the following variables (at least quarterly data):*

money supply, inflation, GDP, unemployment rate and capacity utilization. → 0 points

Only two of the variables were published at least quarterly, thus, the rating is 0 points[3].

2.b *Did the BoA disclose the formal macroeconomic model(s) it uses for policy analysis?* → 0 points

This criterion is not fulfilled: before 1997 no macroeconomic models were publicly available.

2.c *Did the BoA regularly publish its own macroeconomic forecasts*? → 0 points

The inflation forecast was not made public at the time. Even today it is considered as confidential. Thus, this criterion is not met for the period before 1997.

3.a *Did the BoA provide an explicit policy rule or strategy that describes its monetary policy framework?* → 0 points

Before 1997 there was no clear monetary policy framework publicly available. Therefore, the rating for that period is 0 points.

3.b *Did the BoA give a comprehensive account of policy deliberations (or explanations in case of a single central banker) within a reasonable amount of time?* → 0 points

No minutes were publicly available at that period, thus the criterion is not met.

3.c *Did the BoA provide an explanation when it announces policy decisions?*→ 0 points

No voting records were published at the time, thus the rating is 0 points.

4.a *Did the BoA disclose how each decision on the level of its main operating instrument or target was reached?* → 0 points

Before 1997, differently from nowadays, the decisions on the changes of monetary policy instruments were not published immediately. Therefore, this criterion is not met for that period.

4.b *Were the decisions about adjustments to the main operating instrument*

or target promptly announced? → 0 points

At that period, the BoA did not give an explanation of the reasons behind the decision taken.

4.c *Did the BoA disclose an explicit policy inclination after every policy-meeting or an explicit indication of likely future policy actions (at least quarterly)?* → 0 points

Before 1997 the BoA did not give any policy inclination at all, thus, the criterion is not met.

5.a *Did the BoA regularly evaluate to what extent its main policy operating targets (if any) have been achieved?* → 0.5 points

Even though there was some discussion on the achievement of the operational targets, there was no detailed explanation on this issue. Therefore, the rating for this criterion is 0.5 points.

5.b *Did the BoA regularly provide information on (unanticipated) macroeconomic disturbances that affect the policy transmission process?* → 0 points

The information about macroeconomic disturbances is actually published at least quarterly in the monetary policy reports. Before 1997 this information was published rarely or not at all.

5.c *Did the BoA regularly provide an evaluation of the policy outcome in the light of its macroeconomic objectives?* → 0.5 points

Regarding this criterion, 0.5 points may be given to the BoA, because the explanations were not as clear as they should and there were no measures of the quantitative contribution of the monetary policy to achieving the macroeconomic targets.

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Vrojtim për tërheqjen e opinionit mbi arsyet e rritjes së çmimeve në pragfesta nga bizneset dhe të "pranimit" nga konsumatori të kësaj rritjeje, Banka e Shqipërisë, 2003.

NOTES

* Sofika Note: Specialist, Research Department.

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[1] For the central banks other than the BoA the index is constructed by Eijffinger and Geraats in 2002.

[2] Blinder, et. al (2001) presents a detailed discussion on this issue.

[3] To have 0.5 points more than 3 variables should be published.

INFLATION FORECAST IN ALBANIA

*Gent Hashorva**

ABSTRACT

In this paper I focus on the development of time series models for forecasting inflation in Albania. The first part of the paper presents the obstacles in the course of inflation forecasting and the history of forecasting process. The specifications and estimation results of other simple models actually used in BOA are presented together with the investigation of the performance of models. The growing acknowledgement of inflation dynamics and the structural changes of the Albanian economy towards a market economy have stressed the necessity of new models.

1 WHY INFLATION FORECAST?

There are long lags between monetary policy actions and their impact on the economy. This means that policies responding only to the current state of the economy might miss the turning points, as such not proving to be stabilizing policies. For that reason, it is generally recognized that central bank policies must be far-sighted, and they have been among the leaders in the macroeconomic forecasting field. The actual way in which forecasts are produced and used at central banks has changed substantially over the past few decades,

reflecting developments in both economic (and econometric) theory and monetary policy regimes.

Regarding changes in monetary policy, throughout the 1990s, a large number of countries either formally or more informally, adopted inflation targeting as a framework of monetary policy. Also, IT is considered to be a very effective strategy for institutional development of Bank of Albania in the future. Due to the traditional arguments of lags in the monetary policy transmission mechanism, the inflation forecast plays an important role in the conduct of monetary policy. The argument is that since the monetary policymaker's instrument, the interest rate, has its strongest impact on inflation several months ahead, policy should be directed towards targeting the forecast of inflation at an appropriate horizon.

The inflation forecast is not only an important decision-making tool, but also a crucial communication device. Monetary policy has become considerably more transparent over the recent decades. We now believe that open communication of monetary policy is beneficial to the stability and predictability of its transmission into the Albanian economy, and it is also crucial for the accountability of an independent central bank.

2 HOW HAS THE FORECAST EVOLVED OVER TIME?

The Bank of Albania, besides the analytical work of the factors that might affect the inflation rate in the short-term, performs inflation forecast based on simple statistical model. Recent years are used in the models, as the pattern of inflation rate during this period is different from that belonging to the period before 1999, according to a Chow test.

At the beginning of this process, the work was concentrated on creating time series or otherwise known as data basis, comprising the first step in studying inflation performance on scientific basis. But, lack of data on SNA, real indicators, uncovered private sector, not reliable and timely data was and remains a big problem for the process.

Nonetheless, over the past 3-4 years much effort was put in improving our data, leading to substantial development in our forecasting. Changes in the structure of the CPI basket (change in the imputed rent price index in October 2003) were made, new indicators, such as, indicator of prices of agriculture products were constructed and appropriate changes in the calculation of nominal effective exchange rate (NEER) as proxy variable in our models for nominal exchange rate were applied.

2.1 The four ways of forecasting inflation by the BoA used until 2005

In an early phase of forecasting, simple variables which depended on the time series of inflation (the historical average method and trend method), were used. The first model, the historical average, is based on historical means where the performance of inflation over years is analyzed (recent years are assigned a higher weight in determining inflation).

In a second method, trend method, the inflation variable is explained by the time variable. This method measured the trend after the effect of seasonality and the rare component are eliminated from the inflation time series.

The equation has the form of:
$INF = T+S+R$

where T is the linear trend, S the seasonal component and R the rare component.

Eliminating the seasonal component the correlation would appear as

$INF^* = T+R$

where INF* is the seasonal component of corrected inflation.

This method might be used to maximally clear the data from the rare oscillations (with the method of exponential flattening). It offers

the most possible maximal elimination of the irregular component but not the total extinction of its effect.

Finally, the equation used for forecasting is INF**= T where INF** is the corrected inflation from the seasonal and rare components.

The method INF**= b1+b2T, i.e. a linear correlation or INF**= b1+b2T+ $b3T^2$, i.e. a quadratic correlation between inflation and time is thereafter applied.

The model reflected only the inflation dependence from the time variable, meaning that it does not take into account other macroeconomic and social indicators, which bear an indisputable impact on inflation.

This phase was followed by the construction and the utilization of simple statistical models, which, as time demonstrated, not only helped the Bank of Albania to understand and analyze its development in analytical way (since then empiric studies have been mostly made) but also made short-run forecasting.

The first econometric model explained the behavior of the monthly rate of inflation, depending on the previous monthly inflation rate, from the demand side factor, the real effective exchange rate (REER), which was changed to the nominal effective exchange rate (NEER)[1], and M1, which operate in the supply side. All series are seasonally adjusted. The model is as follows:

MODEL 1

$$CPI_t = 7.06+1.00CPI_{t-1} - 0.14NEER_{t-1} +0.00004M1_{t-3}$$

or

$$\Pi = 7.06-0.14NEER_{t-1} + 0.00004M1_{t-3}$$

R^2-ADJ. = 0.97, SE=3.98, Sample: 1994:01-2000:12

In this model t is time, CPI is the consumer price index, NEER is the nominal effective exchange rate, M1 is the aggregate, Π= CPI –CPI(-1) is the monthly inflation rate.

However, the main issue with this kind of equation is its lack of theoretical consistency. This becomes even more highlighted and can lead to wrong forecasting conclusions because of the fact that the time series is short and it is a series that has suffered many shocks in which the Albanian economy has gone through, thus, it has become a series with many interruptions. The obtained estimates are based on simple OLS. Since the variables are defined in levels and the series are not stationary, the risk of spurious regression is relatively high.

In these conditions, it is a well-known fact that the time series need to change into stationary series making them ready for analyses and forecasting.

The ongoing study of inflation behavior in the Bank of Albania has reached a new and more consolidated phase. To eliminate the problem mentioned above, equations with more stationary series were considered to be used and a new model from the class of ARIMA model to be introduced.

On the other hand, the reason of constructing these kinds of models is that in cases of emerging market economies, they suggest that contrary to industrialized countries, where real factors emerge as the main determinants of inflation, nominal factors play a more important role in these kinds of market economies (Domaç, 2003). The IMF (1996) shows that the output gap does not play an important role in explaining inflation in developing countries. Instead, changes in money growth and nominal rates have higher explanatory power in explaining inflation. In particular, changes in exchange rate are one of the key determinants of inflation in emerging market economy.

MODEL 2

Econometric model 2 is defined as:

$$INF12_t = 0.84INF12_{t-1} - 0.27INF12_{t-2} + 0.29INF12_{t-1} + 0.02D12M1_{t-12} - 0.08D12NEER_{t-1}$$

where subscript t is time, INF12 is the annual inflation rate,

D12M1 is annual growth of M1, D12NEER is annual change on NEER.

R^2-Adj. = 0.76, SE=0.01, Sample: 1998:01-2004:12

MODEL 3

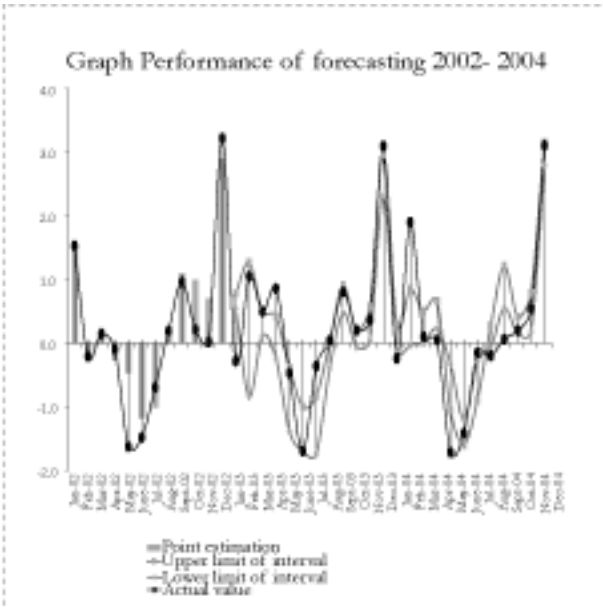
D(CPI) AR(1) AR(6) MA(6) SAR(12)

R^2-Adj. = 0.73, SE=0.76, Sample: 1998:01-2004:12

Based on these equations, inflation rate has been forecasted for the remainder of the year. Then the upper value and the lower value give the upper and the lower limit of the interval (range) of forecasting for each month (before 2002, we used a point estimation of inflation and the method of intervals increased the probability to approximate the real value).

2.2 On the performance of the inflation forecast

The accuracy of forecasting inflation for the period January 2003- December 2004 is 60-70 percent. The performance of forecasting inflation rate can be divided into two phases. The first one, during 2003, when the actual value resulted within the forecasted interval, in 60 per cent of these cases this rate has been closer to the upper value of the forecast. During 2004, 70 per cent of these cases have been closer to the lower rate of forecast. Generally, the



rate of inflation in 2003 fluctuates at the upper level of the objective interval of the Bank of Albania, in 2004 at a lower level. The graph below shows the behavior of the interval (range) of forecasting from 2002 to 2004.

Regarding the recent models, the analysis shows that model 2 forecasts better that the ARIMA model in terms of error minimization. The best out of sample forecast ability of structural model is displayed in the table below through the comparison of two coefficients of models, root mean squared error and mean absolute error:

	Model 2	Model 3
Root Mean Squared Error	0.01	1.1
Mean Absolute Error	0.008	0.8

However, we bear in mind that in the present status these models are not an automatic pilot for inflation forecasting. They are no more but also no less than an important input into the monetary policy process.

3 WHAT COULD WE DO IN THE FUTURE?

One way to this direction is the analysis and possible forecasting within the groups of CPI, in order to shed light on the role of particular groups on the general rate of inflation. Some results:

$$INF12A_t = -0.56+0.65INF12A_{t-1} + 0.39INF12GR_{t-1}$$

R^2-ADJ. = 0.81, SE=1.68, Sample: 1998:01-2004:12

In this model t is time, INF12A is the annual inflation rate of "food" group in Albanian CPI, INF12GR is the annual inflation rate of "food" group in Greek CPI.

Another method attempted before (see Hledik, 2002), is using a Granger-Engle single-equation cointegration test to provide an alternative to the methodology that has been used by the BOA.

The following monthly data series were used:

- CPI= consumer price index based on the newly calculated weights (2001) of individual goods and services.
- P_IMP= monthly estimates of import prices obtained as a weighted average of foreign prices (in Lek) both in terms of commodity (4 main groups) and country (3 main trading partners) weights in total imports.
- M3= broad money including foreign exchange deposits.
- Y = estimates of quarterly GDP that were converted into monthly series assuming constant monthly growth rates.
- IR12 = interest rate on deposits (12 months).

All the variables (with the exception of deposit rates and GDP) were seasonally adjusted and tested for stationarity. All the variables are integrated of order one.

P_CPI= - 2.41+0.46P_IMP + 0.000964IR12 + 0.58LM3 – 0.34YL

R^2-ADJ. = 0.96, SE=0.04, Sample: 1996:01-2002:04

All the variables have expected signs. The residuals (labeled as ECM) of the equation were saved and tested for unit root. The test confirmed the stationarity of the residuals, supporting the hypothesis of a long-run relationship between the variables. The dynamics model gives this result:

D(P_CPI)=0.24D(P_CPI(-1)+0.30D(P_IMP)+0.39D(LM3SA(-3) - 0.006720 D(IR12(-2) - -0.32 D(YL(-12) - -0.27 ECM(-1)

R^2-ADJ. = 0.59, SE=0.01, Sample: 1997:02-2002:04

All the variables have expected signs. The model can be used for short–term forecasting, because the exchange rate, GDP and M3 should be endogenously influenced by monetary policy decisions.

NOTES

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[1] The reason of changing from REER to NEER is that NEER may better explain the demand side factors for a small open economy, with a weak export sector as in the case of Albania. REER can capture important demand effects in small open economies where there is a strong export sector. This is not the case for Albania; therefore the nominal exchange rate or import prices should be used instead in order to capture the direct exchange rate effect on inflation.

CORE INFLATION IN ALBANIA: MEASUREMENT AND RELATION TO MONETARY AGGREGATES

*Evelina Çeliku**

ABSTRACT

Given the difficulties faced in forecasting and influencing total inflation in the long-run, central banks in some countries choose to control and forecast core inflation as a more direct expression of their monetary policy. They construct it by excluding from total inflation those elements that have a temporary effect on consumer prices and are less related to the monetary policy decisions. In this paper, after identifying the proper theoretical and statistical criteria on the effectiveness of the estimations and use of core inflation by the central bank, we suggest the optimal calculation method for the case of Albania. We conclude that the most appropriate way to construct the core inflation is thought the trimmed mean approach. The paper also takes a step on a topic that can be further discussed in future papers and relates to whether changes in the increase rate of the monetary aggregates might help forecast the inflation rate, and vice versa.

1 CORE INFLATION: A COMPONENT OF HEADLINE INFLATION

Inflation and its measurement has become an interesting object of discussion among economists, researchers and policymakers in

the central banks for several years. This concerns not only the aspect of meeting a clear and quantitative inflation target, which can be achieved through a relative stability of consumer prices, but also the improvement of central banks ability to forecast the future inflation trend. Considering the difficulties in forecasting and controlling the headline inflation in the long-run, the central banks in some countries choose to control and forecast the core inflation, as a more direct expression of their monetary policy.

The combination of the factors not related to the monetary policy, causes temporary shocks on total inflation. In this case, interpreting the consumer price index will become more difficult and the index cannot be a reliable indicator for the monetary authority, because it disturbs the inflation trend due to external and temporary reasons. Having a good indicator of the price trend in the long run, in some way means the isolation of the inflation rate from these temporary effects.

In the short-run, external shocks may occur, causing deviations of the inflation trend from its historical trend. This does not mean that such events should not be taken into account, but their relevance on the study of the inflation trend must be reconsidered. Some factors causing fluctuations and shocks on the consumer price tendency might be:

- The seasonality of groups, subgroups or specific items in the consumer basket;
- The presence of goods and services with administered prices;
- The presence of consumption goods which are often taxed, affecting directly or indirectly the increasing pace of headline inflation;
- The presence of certain events, such as: natural disasters, uncertain political situations, etc., which can lead to temporary shocks of the macroeconomic equilibriums within the country.

The isolated presence of the above elements, especially in the first and in the second group of factors, can be easily excluded from the

inflation estimation. The methods used on this purpose are simple and applicable, if there is a detailed database. The problem becomes a little more complicated if we try to calculate the long-run trend series of inflation that excludes the combined effect of those factors causing temporary shocks on inflation. A variety of methods have been developed concerning this issue, starting with the elimination methods and continuing with the econometrics methods. All the methods consider the fact of how and to what extent they meet the theoretical and statistical criteria. The evaluation of the criteria is done in accordance with the specific conditions of different monetary policy regimes implementation from the central banks. These methods aim at identifying the long-term component of inflation, which in fact is considered to be the real monetary inflation, representing the inflationary tendency of the economic agents.

In the case of an inflation targeting regime, it is necessary to have the appropriate tools to measure this trend-inflation. This would improve the monetary policy efficiency, which means that the reaction toward every real price changes may lead to an overestimation of the temporary effects.

If the central bank follows the monetary aggregates trend, it is particularly interested in the long term component of inflation and in the existence of a steady relationship between the demand for money and prices.

The paper is structured as follows. In section 2, it tries to offer a judgment over the various methods used to measure the core inflation. Section 3 presents the core inflation in the case of Albania and discusses the chosen method and the degree it satisfies the main economic and statistical criteria. The relation to monetary factors such as aggregates M1 and M3 and the core inflation are tested. Then, in the following step, the Granger causal effect relationship between core inflation and the monetary aggregates is analyzed. The paper suggests not only a better way to measure the core inflation, but also tries to further clarify its relation with monetary aggregates. This is an important step in forecasting core inflation, which, as previously explained, makes not only an essential component of total inflation, but is the component that better explains the past and the future

action undertaken by the monetary policy to keep inflation under control.

2 METHODS FOR MEASURING CORE INFLATION: SOME CRITERIA

The methods that separate the permanent components from the temporary components and distinguish the non cyclical component of inflation –i.e. core inflation and structural inflation- have been enriched with new statistical and econometric elements. Despite their continuous improvement, there are still a lot of problems, concerning the fulfillment of the statistical and economic criteria and the transparency of the central bank. In general, meeting the economic criteria means that the core inflation is a good representation of monetary inflation or the long run inflationary trend. The statistical criteria are based on the fact that the relative standard deviation of the core inflation series must be low to maintain a high explanatory level of total inflation from the core inflation. The transparency concept refers to the degree of understandability of the core inflation, estimated by different methods. A better understood method, a more transparent central bank in communicating the core inflation to the public.

According to the literature, the methods can be grouped as follows:

a) Smoothing according to a moving average method;
b) Exclusion method i.e. excluding certain items from the consumer basket;
c) VAR or structural VAR (SVAR).

The first category uses a set of filters including: the simple moving average, the weighted average, Kalman filter and Hodrich & Prescott filter. The application of these methods provides us with the best possible inflation trend, without any random or temporary element. This is a good estimator of the long-run inflation developments related to the trend. The main advantage of these techniques is their simplicity. The main drawback is their arbitrariness; moreover, their

credibility depends heavily on the filter used. This implies that this category of techniques might not meet the economic theory criteria. As long as we are not sure if the random component or any other intermediary process is eliminated, the choice of the filter remains arbitrary. This requires a complete analysis of the cycle, which can be done using certain preliminary indicators[1]. The estimation of inflation through this category of methods is not transparent and difficult to understand by the public.

The second category is known as the "zero weight method". This excludes from the inflation estimation, those goods and services that appear sensible to the external shocks and those with administered prices. For example, while using this method, Blinder (1982) excludes the electricity, agricultural products and the interests of mortgage loans. The decision to exclude such items form the basket is difficult to be supported from the economic point of view. From the statistical point of view, the high price volatility (high standard deviations) of the above-mentioned items gives good reasons for using such techniques.

If the basket contains goods and services with controlled (administered) prices, the decision to exclude them permanently is economically sound. This is because the changes in the prices of these items, which are immediately reflected in the CPI value, relate to factors out of the central bank control. Despite the difficulties, the inflation measured after permanently excluding certain items from the consumer basket, makes better information for the public. The technique used by Bryan and Cechetti (1994, 1995) is developed on the same principle, but it is somewhat changed and more flexible. The authors propose not to eliminate the same basket components every time. The elements to be excluded should be placed on the ends of the weighted deviation distribution of basket items prices. A similar method has been used till December, 2001, to estimate the core inflation in Albania. It was applied for the first time by Schiesser (1998). The efforts to review the core inflation estimation have continued after introducing the new consumer basket, which has a different structure from the old one[2]. This method assumes a normal distribution of the weighted price changes of the basket components, but this hypothesis is not always fulfilled by the inflation

series. Another shortcoming of this method is the inability to improve the correlation between the inflation and the economic cycle (this can be represented by the industrial production). So, this method aims at meeting the statistical[3] criteria but it is far from fulfilling the economic criteria. It also appears to be more complicated than the excluding method and as a consequence, less transparent for the public. Methods, such as, trimmed mean, median, etc., are the most widely used methods of this category.

The third category of methods makes a good combination of the economic criteria with the statistical criteria. Quah and Vahey, 1995, tried to segregate inflation into two main parts: the first is a long term stable inflation (core inflation) and the second, is a short term inflation or the cyclical inflation, which takes into account the temporary inflation shocks. The economic rationale on core inflation is based on the fact that the Philips curve is totally vertical in the long run: the inflation depends on monetary factors, while the product depends on real factors. In this way, the short term arbitrage between inflation and the economic growth, remains almost temporary.

The series of core inflation is generated using a structural model (VAR) which is based on the inflation–production relationship in the long run. The papers concerning this issue generally use the series of industrial product and inflation (Blanchard and Quah, 1989; Jacquinot, 1999; Wynne, 1999 etc.). These methods enable the estimation of the time needed to bring the inflation at the equilibrium point after a disruption caused by external shocks. This would help the central bank to assess the time period during which the monetary policy should remain "neutral", in order to keep the core inflation inside the predicted band.

Among the categories of methods previously explained, the last seems most complete and economically sound. It is a sophisticated approach that has given good results in finding the long time series of inflation in e.g. the Euro Zone, the U.K., France, Germany, Peru, Chili, etc. However, this method seems to damage the transparency in communicating the inflation objective to the public, especially for the countries that target the core inflation, because it is too difficult to understand.

Below, we present a table (proposed for the first time by Wynne, 1999) which summarizes the main criteria used to choose the optimal way to asses the core inflation. Apart from the criteria already mentioned in this paper, the table lists other criteria that should be considered while choosing the estimation method of core inflation.

In general, the decision about the optimal method depends on different factors like: the amount of data available (the type of indicators) and their time horizon, the central bank objective; historical trend of inflation etc. We shall briefly explain each of these criteria and then decide which one is most appropriate for the case of Albania.

Table 1 Methods evaluation criteria

		Methods		
Criteria	Smoothing method (moving average method);	Permanent elimination of certain categories from the basket	Trimmed mean method and median method	VAR
	1	2.1	2.2	3
Is it computable in real time?	Possible	Yes	Yes	Yes
Is it possible to produce forecasts?	Possible	No	No	Yes
Can we look at the past trend of the series?	Yes (?)	Yes	Yes	Yes
Is it understandable to the public?	Yes (?)	Yes	Possible	No
Does it change the data history?	Possible	No	No	No
Is it economically and statistically sound?	Statistically - Yes Economically - No	Statistically - No Economically - Yes (?)	Statistically - Yes Economically - Yes (?)	Economically and econometrically – Yes

Is it computable in real time? The fact that this criterion is listed on the top of the table is not casual. The central bank needs a good estimation of the core inflation, while it publishes the total inflation. Almost all the methods listed in the table meet this criterion. Some of the smoothing techniques proposed by Baxter and King (1995)

cannot assess core inflation in real time because of the lack of the last surveys in the selected time period. Despite that, as long as core inflation is computable in real time, through the well known Hodrick- Prescott filter, it is considered that the smoothing method does sufficiently meet this criterion and that is why we specify the fulfillment as "possible".

Is it possible to generate forecasts? The second criterion has to do with the forecast power of the suggested methods. Among the presented methods, only VAR offers such ability. The central bank is interested in forecasting the core inflation, based on the real sector data and on monetary aggregates while keeping the long term macroeconomic equilibrium. While this criterion is sufficiently fulfilled in the VAR approach, the other methods appear unable to generate direct forecasts. They need to apply additional forecasting techniques in order to make extrapolations for the future periods, based on the obtained core inflation series. The trend component resulting from the smoothing method can produce core inflation forecasts related only to the time variable. That is why we consider this criterion "possible" to be fulfilled.

Can the series be backward looking? This criterion has to do with the ability of various methods to estimate core inflation, without excluding the possibility to review the series back in time. The estimated inflation series need to be reviewed for different reasons. For example, if the consumer basket will be rebuilt, then it will become necessary to review the inflation series after the moment when the new basket was introduced. As a consequence, core inflation must be also reviewed back in time. All the methods manage to fulfill this criterion. In case of the 'smoothing methods', the past series of inflation are only partially used. Some of them exclude certain segments from the series, because of the requirements of the smoothing techniques. The bigger the reduction of the series, the less the technique fulfills the requirement to extend it in time. In most of the cases we deal with methods of linear interpolation which able us to look back into the past trend of the core inflation series.

Is the information transparent and understandable to the public? This criterion is really relevant to the central bank. It is directly

related to the transparency level that the central bank should have during the communication with the public. From the moment that the central bank considers the core inflation an important part of the communication process, it is necessary that the public perceives it as deriving mostly from the monetary policy actions. This requirement becomes indispensable if the central bank targets the core inflation. Since the inflation target regime (IT) requires a high degree of transparency and understandability, it is crucial that the estimation of the core inflation (if it would be targeted or published on a regular basis), transmits a clear and transparent information to the public. This can be achieved by using some simple estimation techniques. Further sophistication of these techniques would make them less understandable and transparent. As we already mentioned, the VAR technique is too complicated to be understood by the public. The trimmed mean method is also difficult to understand: the public does not know what we exclude monthly from the consumer basket. Although, comparing to the VAR techniques, it is easier to simplify and increase its understandability.

Does it change the data history? This criterion is strongly related to the previous one. If the central bank intends to communicate the core inflation figures to the public, it is important that the data history does not change significantly if a new inflation value is added to the series. A change in the data history would weaken the credibility of the core inflation information published by the central bank, harming in this way its reputation and the reliability of its monetary policy. As a matter of fact, the econometric techniques review all the past values once a new value is added to the series. If the technique chosen is highly accurate, which means the error is small, the changes due to the new data entry would be insignificant and vice-versa. This problem can be overcome by using the trimmed mean methods and those methods that systematically exclude some items from the consumer basket.

Is it economically and statistically sound? When we presented the estimation methods of core inflation, we stressed that not all of them can meet the economic and statistical criteria. These criteria can be better fulfilled by VAR methods, which mean that these methods can generate a more accurate core inflation series. However, not

meeting the criteria of transparency and public understanding is a significant limitation in applying such empirical methods.

The remaining methods seem to contain limitation deriving mainly from the drawbacks in the economic theory aspect.

3 CORE INFLATION IN ALBANIA

3.1 Selection of the optimal method

In this section we will try to discuss the selection of the most appropriate method to estimate core inflation in the case of Albania.

The group of VAR methods theoretically seems to be the most comprehensive. Despite that, the use of the other methods mentioned so far is still preferred by most central banks. This is because the other methods show a higher degree of transparency compared to the VAR methods. On the other hand, applying the VAR techniques requires a large amount of timely data. In the transition economies and particularly in the case of Albania, this requirement is difficult to meet. Data are often not timely or cover short periods of time. This implies that the application of VAR to estimate core inflation in Albania is still impossible.

The first category of methods (smoothing methods – first column in Table 1) is used to identify the inflation trend. This does not imply that this trend represents the best core inflation. The choice of filters is often arbitrary, which is a serious theoretical drawback of these methods, and it makes their use difficult in the case of Albania.

The methods available and the degree of criteria fulfillment leads to the idea that in the case of Albania, core inflation can be better constructed through the second category of methods, which excludes different items from the consumer basket (column 2.1 and 2.2 in Table 1).

The rationale behind the selection of these methods is: first, the criteria of being understandable and transparent to the public are fully

met; second, the necessary database to measure core inflation in real time is available; third, it is possible to review past series of inflation data; forth, it does not change the actual series of data, but only adds the newly calculated values of upcoming periods; fifth, the economic and statistical criteria are just partially met. The core inflation calculation, after excluding the items with administered prices from the consumer basket (the method in column 2.1), is economically and rather statistically sound. This is because the volatility of these prices does not depend on the monetary policy action, but on the policy of price administration, which goes beyond the control of central bank. At the end, inflation is clean from the external shocks which artificially cause high standard deviations. Excluding the items with high price volatility from the consumer basket (method of trimmed mean – column 2.2), seems to be statistically supported as well. As we already mentioned before, the simultaneous fulfillment of statistical criteria is a necessary precondition during the application of this method. It is economically valid, especially in those cases where the price change due to changes in administered tariffs applied on different items. This methodology leads such items to fall inside the excluding band. So, they are excluded from the estimation of core inflation along with other high price volatility items. The same reasoning is valid in the case when taxes are applied on different goods and their effect is reflected on the prices. It causes a price movement that is not related to the monetary policy actions but to the fiscal reforms.

We conclude that in the case of Albania, the trimmed mean approach can generate the best core inflation series. This is because it combines the simultaneous exclusion of the effects of 'seasonal' inflation or deflation, 'administered' inflation or inflation as the cause of other external shocks.

3.2 The past experience of core inflation calculation in Albania

The methodology of measuring core inflation in Albania was introduced for the first time by McNeilly and Schiesser, in 1998. During the following years, core inflation was continually measured, reported and analyzed, until the end of 2001.

In December 2001 was introduced a new consumer basket, which showed a new profile of the Albanian consumption. It was necessary to review the series of the core inflation. Relying on inflation series, which covered the period from 1993 to 1995 and using some relevant statistical criteria, Schiesser tested different methods in order to select the most appropriate one for the estimation of core inflation in Albania. Different categories of core inflation were estimated using the following techniques:

a – Seasonal adjustments of the inflation series. This is because of the obvious presence of the alimentary items in the consumer basket (about 72 percent of the basket);

b – Applying the trimmed mean method excluding 12.5; 25; 50; 75 and 87.5 percent of the items in the consumer basket. This method enables the elimination of the combined effect of seasonal factors, administrative factors and other factors that cause sharp and temporary fluctuations in the inflation rate. In each case was build a sub basket, which served to estimate core inflation for the items placed at the center of the weighted price standard deviation distribution (for further details refer to McNeilly and Schiesser, 1998, pg 27-34).

The statistical criteria used to select the optimal method, involve indicators of core inflation volatility.

Firstly, core inflation estimation requires a low level of volatility: it should fluctuate less than the total inflation. This means that the coefficient of variation (standard deviation/mean) should be as small as possible, the smallest of all the core inflation estimation.

Secondly, core inflation requires the existence of a strong correlation with the total inflation series. In this case, the items that show high price volatility and the items that do not follow the same direction as the long run trend of total inflation, should be excluded from the core inflation estimation. If the correlation coefficient results above the average, the core inflation series can be used to forecast inflation for the future periods.

The following relationship exists between these two criteria:

1. The larger the number of excluded items, the lower the coefficient of variance.
2. The exclusion of these items weakens considerably the relation between the two series of inflation (core and total inflation). Therefore, the simultaneous fulfillment of both criteria is an optimization process, where the researcher's reasoning is very important.

In Schiesser's case, even though the linear correlation coefficient of the seasonally adjusted series was high, the series was still considered inappropriate for the estimation of core inflation, because it experienced a high coefficient of variance. While using the trimmed mean with 12.5 and 25 percent, the lowest coefficient of variance was recorded during the estimation that involved only 75 percent of the items of the consumer basket. Despite the fact that the correlation coefficient resulted a little lower compared to the one with the trimmed mean 12.5 percent, it is still considered to be high, about 0.73 versus 0.81 (McNeilly and Schisser, 98, Table 9). From the analysis of the coefficients of variance and correlation, we concluded that the most appropriate category of core inflation in the case of Albania is the one that includes only 75 percent of the items placed in the center of the distribution of individual indices changes. So, 12.5 percent of the items on both tails of the distribution are excluded from the consumer basket.

Although the presentation of the new basket brought new information about significant structural changes on the spending pattern of a typical Albanian family during the period 1993-2001, we still notice that:

- The seasonal effect is still significant, but it appears to be smoother because of the lower weight that the alimentary product group has in the new basket. During certain periods of the year, such as May - August and December 1999-2003 the seasonal effect has been pretty obvious, especially in the subgroups fruits and vegetables.

- The new basket is composed mainly by the goods and services with liberalized prices, nevertheless, the presence of goods

with administered prices may cause temporary shocks on total inflation, because of the continuous reviewing of the tariffs and different prices. These kinds of disturbances should be excluded from the inflation estimation, because they have little to do with the monetary policy. We refer precisely to the price of electricity and water;

- The presence of certain items in the basket, whose prices are relatively affected by the fiscal reforms, often causes changes in inflation;

- The presence of certain events e.g. elections, campaigns, uncertain political situations, not related to the monetary policy, can also lead to temporary shocks in future expectations of inflation. Although it appears to be much smoother compared to the past periods, it should not be neglected.

3.3 The results of core inflation measurement using the new consumer basket

The analysis and the efforts on building the category of core inflation are based on the data of the new consumer basket. The estimations of core inflation include the period January 1998 – May 2004, which seems to be sufficient for the purpose.

The first attempt to estimate core inflation using the new consumer basket was based on a one year series of consumer price index. The six years CPI series makes a sufficient database to judge on the most suitable method to estimate core inflation. These estimations also reflect the refinements done by INSTAT on the consumer basket in October 2003[4].

The analysis of the criteria for choosing the best method to estimate core inflation in Albania resulted in the selection of the second group of methods. The due calculation was made to define to what extent the items would be excluded from the basket. The results of calculating the coefficient of variances and the coefficient linear correlation guided us toward the optimal estimation technique.

Together with the application of the second group of methods we made the seasonal adjustment in order to estimate its isolated effect on total inflation. We compared the results for the inflation series after:

A) Cleaning the series of total inflation from the seasonal influences;

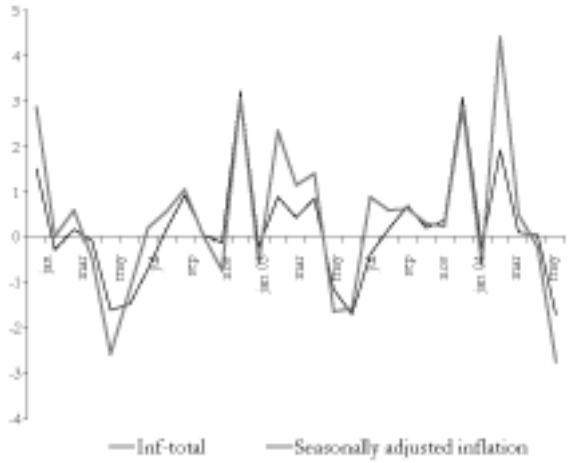
B) Excluding from the consumer basket the items with administered prices;

C) Applying the trimmed mean technique for 75, 70, 60 and 50 percent of the items.

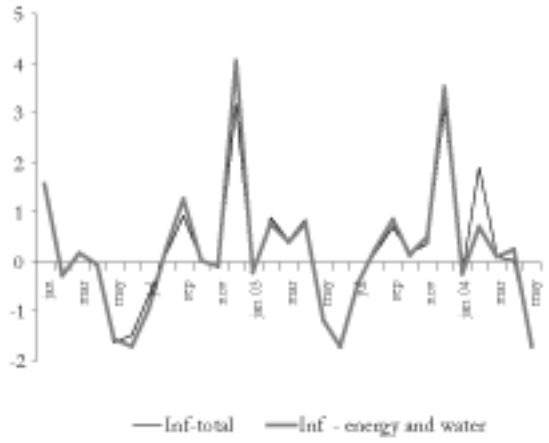
The seasonal adjustment of the inflation series resulted in a new smoothed series with a small coefficient of variances. We also found that there is a small correlation coefficient between the old total inflation series and the new one. This emphasizes the idea that the seasonal effect is a significant explanatory factor for the CPI changes.

The exclusion of water and energy from the consumer basket is done systematically in each case. This is based on the fact that the price change for these items is administered and has to do with the reforms in price liberalization. The inflation estimation results with a higher coefficient of variance compared to the other estimations, because it is able to eliminate only one isolated effect while all other effects remain

Graph 1 Total inflation and seasonally adjusted inflation



Graph 2 Total inflation and inflation after excluding energy and water



the same. Linear correlation coefficient is high. This is because the changes in the price of energy and water, in most cases occur at the same time.

Graph 2 shows that the curves of both total inflation and core inflation move in line with each other. This holds for whole period.

During the period January 2002-May 2004, we can distinguish two important moments in the inflation development, which have to do with the application of higher tariffs on electricity price. This had a significant influence on inflation rate during June –August 2002 and February 2004.

The application of trimmed mean consists in a series of tests in order to find the most appropriate sub basket for the estimation of core inflation, based on statistical criteria we explained before. The items with high price volatility which influence the inflation movement are excluded each month. These items may consist in 17, 25, 30 and 50 percent of the entire basket. Thereafter the weights are rearranged in order give a total of 100 percent. The resulted weights are used on the price index of the remaining items in the basket. Their sum makes the core price index, which is used to estimate core inflation (monthly and annually). Based on the tests results we can select the sub basket that provides us with the better information on core inflation.

In the preliminary study held on July 2003, we concluded that a better way to estimate core inflation is to exclude 12.5 percent of the

items of the basket, placed in each end of the distribution of their price deviation. This means that the core inflation is estimated on the basis of the information of only 75 percent of the goods and services in the consumer basket, whose weighted price deviations are placed in the center of their distribution.

As we already said in the beginning of this Section, the further study of the basket break-down, the new information on the imputed rent, and also the availability of longer CPI series, helped us develop a deeper analysis of the statistical criteria. We conclude that the best way to estimate the core inflation rate is to take into account only 70 percent of the items in the basket, excluding the remaining 30 percent (15 percent in each tail). This estimation gives the lowest coefficient of variance, which means that the series has a relatively low volatility and the highest correlation coefficient with total inflation.

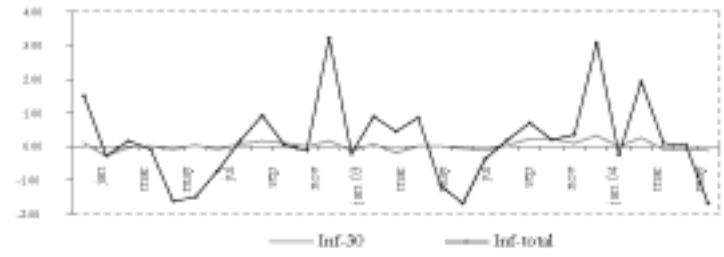
Table 2 Statistical criteria according to the methodology

Criteria				Trimmed Mean		
	Total inflation	Inflation excluding seasonality	Inf. excluding Energy & water	Inf - 30	Inf - 40	Inf - 50
1. Coefficient of variation	6.71	3.51	6.66	*4.66**	6.13	17.86
2. Linear correlation coefficient	1	0.36	0.97	*0.65**	0.60	0.38

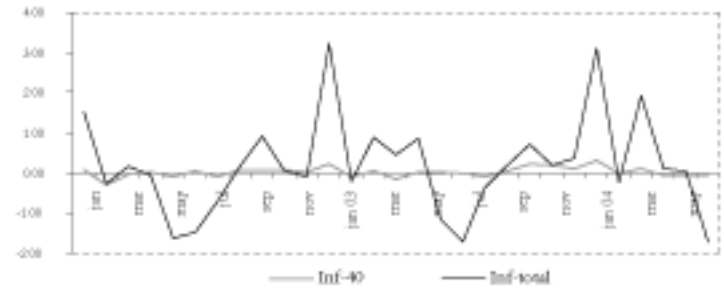
If the economic and statistical criteria are relatively fulfilled, it is expected that in the long run, the mean of core inflation time series should converge with the mean of total inflation series. The estimations show that, during the whole study period, the monthly rate of core inflation approaches the 0.2 percent level and the monthly rate of total inflation approaches the 0.22 percent level, during the study period.

Graph 3 (a,b,c) Monthly total inflation
and core inflation estimated with trimmed mean

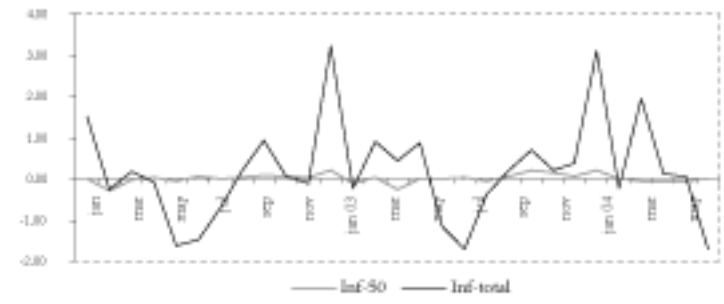
a.



b.

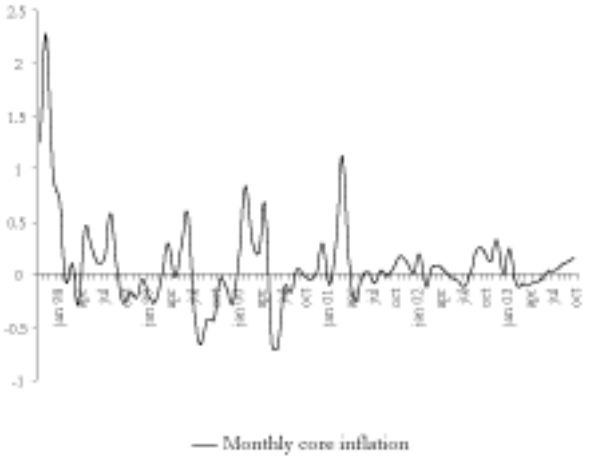


c.

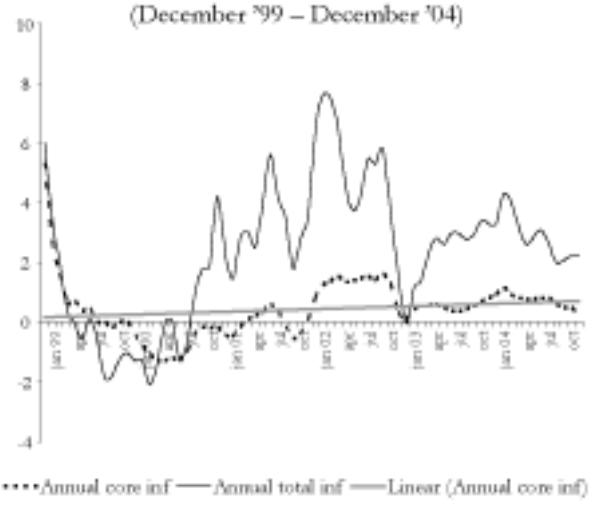


In annual basis, it seems that the core inflation tendency was stable, which means that that factors related to the monetary policy of BoA have been continuously under control. On the contrary, the presence of other factors out of monetary policy, sometimes caused an increase in the annual rate of total inflation.

Graph 4 Monthly rate of core inflation (-30 percent), January '98 – December '04



Graph 5 Annual rates of trimmed mean core inflation (30%) and total inflation on monthly basis (December '99 – December '04)



Following the results of the variation and correlation analysis, we conclude that despite the methodology drawbacks, the best way to estimate core inflation in Albania is to use the trimmed mean method which excludes 30 percent of the articles from the basket. This kind of estimation can also help in inflation forecasting as long as there is a relatively strong relationship (r=0.65) between core inflation and total inflation. If it is possible to forecast core inflation through monetary aggregates, than there is a possibility for

the future to forecast total inflation using the statistics resulting from this analysis.

4 THE RELATION BETWEEN CORE INFLATION AND MONETARY AGGREGATES

Following the methodology proposed, we conclude that core inflation series (30 percent) is stronger related to monetary aggregates than total inflation. In addition, this type of estimation shows that 43 percent of the changes in total inflation are positively related to the changes in core inflation; this fact supports the inflation forecast. As we already mentioned in the first section, the implementation of the inflation target regime requires the ability of monetary authority to estimate and forecast the core inflation performance in order to keep a clear attitude of monetary policy and to recognize the impact of different monetary aggregators on core inflation.

As a first step, we determine whether core rate or total rate is more affected by the monetary aggregates M1 and M3. Referring to the empirical results in Kolasi & Çeliku 2002 and inflation forecasts in BoA, the monetary aggregates affect inflation rate after 3-6 months. Then, based on a general form of equation we tried to formulate some regressions for different scenarios for the average inflation rate (K index). Eight different equations are obtained after using two types of inflation (total and core) and four different values of K.

The R^2 for each regression is estimated:

$$\Pi_t^k = \alpha + \Sigma_{i=0..6} B_i m_{t-i} + \varepsilon_t \qquad (1)$$

where

- Π_t^k – average inflation in the period t, for K future months[5];
- m_{t-1} – growth rate of monetary aggregate in the period t-i;
- k - takes the values : 6, 12, 18 and 24 months.

Table 3 shows the R^2 estimated for each regression. For the growth rate of monetary aggregates, a 6 month time lag is used.

Table 3 R2 _ estimations*

(K)	Total inflation rate	Core Inflation Rate**
	M=M1	
6	0.11	0.30
12	0.41	0.52
18	0.25	0.47
24	0.14	0.68
	M=M3	
6	0.24	0.06
12	0.02	0.04
18	0.07	0.22
24	0.01	0.17

Note: *The data cover the period January 1998 - December 2004
**Monthly rate of core inflation is estimated using the trimmed mean approach excluding 30 percent of the items from the basket, as presented in the previous section.

The results show that core inflation is more related to monetary aggregates than the total inflation. In most cases, the aggregate M1 shows a good explanatory power towards the core inflation rate. A further consideration can be made with regards to the time horizon of this relation: the explanatory power increases when the time horizon of inflation rate averaging increases over 12 months. This finding fulfills the theoretical criteria of the existence of core inflation as an indicator of the effect monetary factors exert over inflation. Core inflation is affected in a considerable extent by the aggregate M1, after a period of 12-24 months. This conclusion relates to the fact that during the observation period, the end of the year periods are much more easily effected than the other periods of the year. The results mentioned so far reinforce the idea that the monetary aggregates can affect inflation for a period of six months to two years.

As a second step we used equations 2 and 3 to find out if the changes in the increase rate of monetary aggregates might help to forecast the inflation rate and vice-versa.

Under the null hypothesis the coefficient Ψ_i is equal to zero. If the null hypothesis is rejected, the money growth influences the fluctuation of the inflation. We applied the Granger Test to estimate the relationship between inflation (equation 2), money (equation 3) and monetary aggregates. The last two indicators display some time lags:

$$\Pi_t = \alpha + \Sigma_{i=1...c} B_i \Pi_{t-i} + \Sigma_{i=1...c} \Psi_i m_{t-i} + \varepsilon_t \quad (2)$$
$$m_t = \alpha + \Sigma_{i=1...c} \xi_i m_{t-i} + \Sigma_{i=1...c} \varrho_i \Pi_{t-i} + \mu_t \quad (3)$$

where,

m_{t-1} is the growth rate of monetary aggregates in period t-1 and c is the number of time lags used.

The tests results are shown in Table 4. It follows that the monetary base (Granger test) causes the inflation rate and the aggregates M1 and M3 causes the core inflation. On the other hand, the inflation rate affects or even (Granger) causes changes on M3, which does not happen in the case of core inflation. Both indicators, inflation rate and core inflation rate can cause M1. These results indicate that there is a cause-effect relation between the inflation rate and the monetary aggregates, which must be taken into account during the forecasting.

Table 4 Granger tests on the casual relationship between money and inflation

	Monetary base		M1		M3	
	M→ Π	Π→ M	M→ Π	Π→ M	M→ Π	Π→ M
Inflation rate	0.0124	0.4511	0.1782	0.0595	0.0808	0.0127
Core inflation rate	0.6269	0.0358	0.0197	0.0258	0.0002	0.4849
Note: * The values in the table are the probabilities (p-values) the null hypothesis is rejected.						

5 CONCLUSIONS

Referring to the experience of other central banks and to our results for the case of Albania, we conclude that the core inflation is a relevant indicator for the decision making process of the monetary authority.

This paper suggests a method based on the trimmed mean approach as it gives the best statistical results. It is applied for 70 percent of the items of the basket.

It is also important to estimate core inflation excluding the items with administered prices.

The inflation targeting implementation process should take into consideration the total and core average inflation and not only the end of the year inflation. The paper concludes that in particular, the average core inflation rate is more related to the monetary aggregate M1. This result also tests the estimation of core inflation, which shows that the time series calculated is the inflation component depending on the monetary policy.

Granger causality tests indicate that the monetary base influences the total inflation rate, while the aggregators M1 and M3 influence the core inflation. This relation should be carefully considered in the analysis and the forecast process of the factors, as the results prove the existence of a cause-effect relationship between inflation and the monetary aggregates.

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NOTES

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[1] Gregory & Smith (1996), Smith (1996) suggest a general filter that can be estimated using the moment method.

[2] Note by E. Çeliku "Core inflation and its estimation", available upon request (in Albanian).

[3] It takes into account the coefficient of variance for core inflation and the correlation coefficient between total inflation and core inflation.

[4] The high weight of the imputed rent in the group "Rent, energy, fuel etc…" leads to serious deformation in the CPI of this group and in the total CPI. Furthermore, this group of items includes energy and water, which are items with administered prices.

[5] K future months are obtained from the actual inflation rate series.

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