Institut für Höhere Studien (IHS), Wien
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# Abstract

This paper attempts to analyze the causes of the inflationary developments in Albania in the years 1994-1997 with the help of econometric methods. We consider monetary and fiscal expansion, imported inflation, and direct demand pull as possible causes. Except for significant effects of direct demand pull and of exchange rate devaluation, the statistical results give only moderate support to the classical economic causes. Seen this way, Albanian inflation appears to be mainly determined by its own expectations and by singular political events.



## Keywords

transition economy, causality, cointegration, consumer price index

## JEL-Classifications

C32, E31, E52

# 1 Introduction

This paper focuses on the inflationary developments in Albania during the period December 1993–December 1997. We aim at identifying the causes for these developments. As a first step, we analyze and explain the dynamics of Albanian inflation and, in particular, we establish a valid statistical model for the inflationary process in the Albanian economy. Modeling is conducted with the help of econometric estimation and hypothesis testing methods. Considering one potential cause after the other, we finally obtain a regression model with slowly changing coefficients that accounts for around 60% of the variance in Albanian inflation. Such an econometric model can serve many purposes, such as forecasting or policy analysis. We are particularly interested in using the model in order to determine the relative importance of each of the considered causes of inflation.

Accordingly, this paper is organized as follows. Section 2 considers the dynamics of price inflation in Albania from a descriptive viewpoint. Section 3 analyzes the potential causes of inflation, starting with the monetary and the fiscal influences. Subsection 3.1 focuses on the dynamic relationship between inflation and the growth of the money supply. We mainly utilize linear regression analysis to quantify the influence of the main monetary indicators on inflation. Subsection 3.2 describes the structure of budget deficit financing and relates it to Albanian inflation. In subsection 3.3, we focus on imported inflation and on the reaction of the Albanian price system to exchange rate devaluations. In subsection 3.4, we analyze the direct influence of real demand expansion on inflation. Section 4 concludes.

# 2 An analysis of inflation dynamics

The purpose of this part is to study the most important inflation indexes in Albania and to analyze their dynamics and velocity. The data of this study are taken from the period December 1993–December 1997, though for some variables slightly longer time periods are available. It must be considered that during this time period the price liberalization reform was nearly fully ended (with very few exceptions) and the very frequent and large price oscillations that are characteristics of an adjustment period are not observed.

Let us begin with a definition of *hyperinflation* and *extreme inflation*

suggested by DORNBUSCH ET AL. ([4]):

'High inflation means different things to different people. ... While Cagan defined *hyperinflation* as an inflation rate of 50% per month, ... we take *extreme inflation* to be rates above 15 to 20% per month, sustained for several months'. ([4], p.2, our italics)

Note that 15–20% per month correspond to around 1,000% per year, in contrast to the case of 'hyperinflation' considered by CAGAN ([2]) of over 10,000% per year. By its growth rate, inflation may be further classified in the following categories:

- *Dragging inflation* has a low annual growth pace of about 2–3%;
- *Galloping inflation* exists when we record quite a high annual growth pace, about 7–20%;
- *Extreme inflation* and *hyperinflation*, respective values of which are mentioned above.

These definitions and categorizations will serve as a basis for comparison of inflation observed in Albania during the considered period. The consumer price index (CPI) is the only disposable index to measure price inflation in Albania. Regarding the computation methodology, it is quite analogous to the CPI indexes of western countries. Here in after 'inflation' will always refer to this CPI index. It is computed by the Statistical Institute of Albania (INSTAT) on a monthly basis, from a basket of consumer goods with specific weights.

## 2.1 Inflation (CPI) dynamics

To analyze the CPI dynamics for the period 12.1993–12.1997 we focus on the monthly change in per cent (%) of CPI and on the main statistical characteristics of this index.

Figure 1 shows that the CPI has increased continuously. We now rather concentrate on its logarithmic rate of increase that approximates the concept of inflation $\pi$ as it is used in economic theory. A logarithmic annual increase can be calculated from monthly data as

$$\pi = 1200 \log \frac{CPI_t}{CPI_{t-1}} \quad ,$$

which definition is preferred to the percentage growth rate due to its better properties with respect to time compounding. The factor 1200 allows its

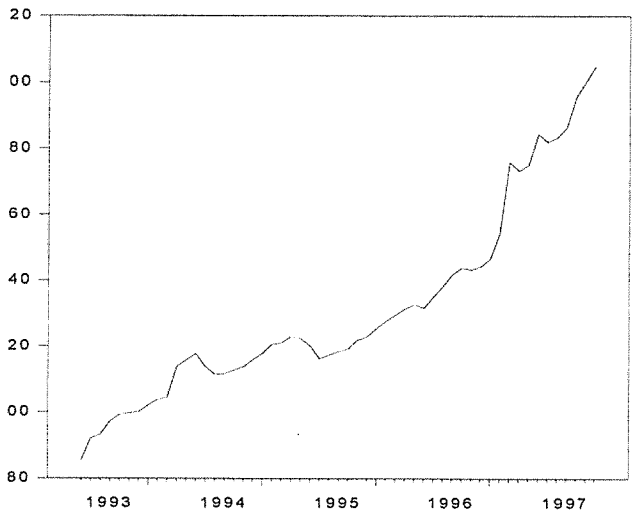


Figure 1: Time series of the Albanian consumer price index (December 1993 = 100).

interpretation as an annual percentage increase. The time series of $\pi$ is shown in Figure 2.

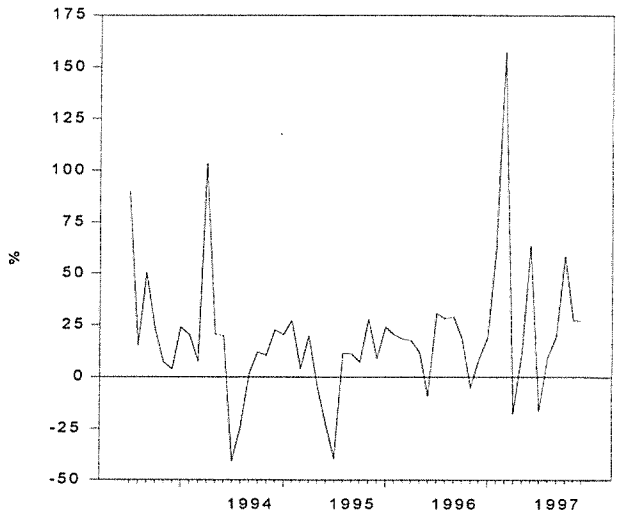


Figure 2: Implied annual price inflation calculated from the logarithmic CPI changes.

The average logarithmic annual growth rate was 19.4% with a standard deviation of this sample mean of 4.4% for the period under investigation. The minimal value was obtained in July 1994 at -40.8% and the maximal one in March 1997 at 157.2%. This maximal value is mostly related to the political turmoil that Albania went through during the year of 1997. Neither the observed CPI inflation nor its volatility permit any clear assessment of the longer-run tendency of the growth pace. The overall impression from Figure 2 is that the rate of inflation appears to be stationary around a central location of around 20%, with wide irregular fluctuation that may raise some doubt about the reliability of the INSTAT data.

Anyway, the conclusion of a relatively low but continuous monthly growth pace of CPI strengthens the supposition that the period under consideration (12.1993–12.1997) was a 'quasi steady-state period'. The selection of this time period also aims at avoiding the extremely large and irregular oscilla-

tions of CPI that resulted from the price liberalization. This liberalization transformed the hidden and repressed inflation, which had already existed in the centrally planned Albanian economy before 1990, into an open inflation.

Also the study of inflation and its causes in this 'quasi steady-state period' allows a better understanding of its longer-run tendency and of its dynamic interaction with other economic indicators. Analyzing the main statistical characteristics of CPI dynamics during 12.1993–12.1997 and comparing it with the above definitions of types of inflation, it evolves clearly that this period's inflation has been far from being considered as hyperinflation or extreme inflation.

The evidence of a basic inflation rate around 20% with repeated episodes of triple-digit rates suggests to classify Albania, for the investigated period, as a country with a galloping inflation. A such inflation of course must represent a worry to the economy of any country due to the consequences that it brings about, such as: the difficulty of controlling inflation, the increase in the velocity of money circulation which on its own causes a new increase of prices, distorting effects of the implicit inflation tax, adverse feedback to fiscal problems (known as the Tanzi effect) etc. (see [4] and [9], [10])

This study does not consider the producer price index (PPI), as it is not available in Albania (INSTAT does not compute it), and hence does not allow an evaluation of the influence from the PPI index or from production cost on the total inflation.

# 3 Causes of Inflation

The identification of the causes of inflation is a difficult but politically relevant question, in Albania as well as in many other countries. The difficulties are due to the fact that inflation is a product of many interrelated factors or causes acting jointly and simultaneously and not a consequence of one specific cause. Although some of the causes of inflation causes are common — these are known as classical causes — each country also has its own idiosyncratic causes. Looking at inflation from a wider point of view, a classification into two large categories can be conducted:

1. Economic causes
2. Political causes

In this study we mainly consider the economic causes of inflation and not the political ones but we are aware of the fact that these two categories have reciprocal relationships and influences between them.

Inside the category of economical causes one may discern two groups:

1.1 Classical causes of inflation like the increase of the money supply [1] and fiscal policy problems,

1.2 Specific causes, which are related to transition processes from a planned to a market economy, structural transformation of the main branches of the economy, possible temporary subsidies, etc.

The classical causes of inflation may be classified as follows:

1.1.1 Inflation caused by excess of demand against supply, or demand pull,

1.1.2 Inflation caused by increase of production cost, or cost push,

1.1.3 Imported inflation (through the exchange rate and foreign inflation from the imports),

1.1.4 Programmed inflation (fiscal policy, taxes).

In this study we will mostly consider the classical causes of inflation in order to analyze the form and extent of the influence of the money supply increase (monetary aggregate M2 and M3), of fiscal policies, and of the exchange rate on the determination of the inflation rate.

## 3.1 Classical Causes of Inflation: the Dynamic Interaction of CPI and M2.

### 3.1.1 Money M2

In this section we analyze the influence of the money supply on inflation. Considering the newly adopted law 'For Bank of Albania' ([1]) where the main objective of the Albanian central bank, Bank of Albania (BoA), is the 'achievement and keeping of the price stability through a set of monetary policy instruments...', this approach seems to be necessary.

[1] the monetary agregates that are investigated in the study are M2 and M3

Considering the BoA objective, we note that BoA is the only responsible monetary authority for the compilation and application of the monetary policies and therefore determines the money supply. The well known definition of inflation by Milton Friedman who states that 'Inflation is whenever and wherever a monetary phenomenon' emphasizes the importance of investigating the direct influence of money supply growth, as one of the main factors, on price inflation.

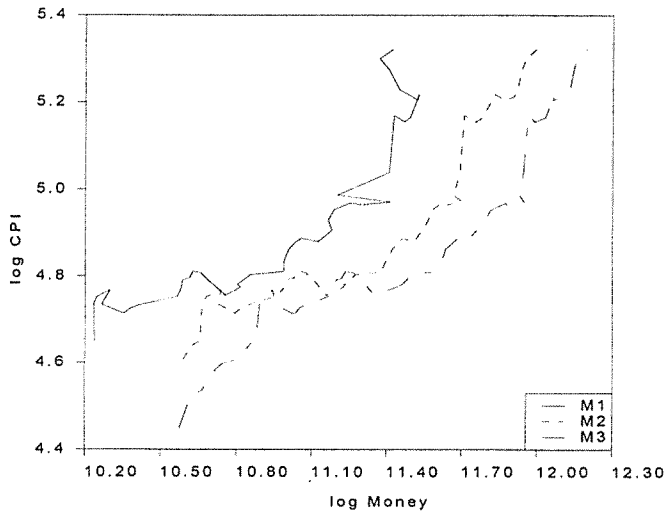


Figure 3: Joint development of money and CPI variables, in logarithms

Figure 3 shows that, apart from theoretical considerations, the aggregate M2 is perhaps the definition of money that is of the most interest here, as it displays the closest relationship to the CPI in a double logarithmic scale. This visual impression is confirmed by regressions of CPI on all three money variables. In most cases, very similar results are found if broad money M3 is used instead of M2. We will return to this issue later.

In accordance with the classical economic theory the money supply growth (in our case M2) that causes an aggregate demand growth constitutes one of the crucial reasons of inflation. To estimate the influence of aggregate M2 change on the CPI, we utilize several linear regression equations, cor-

relation, canonical correlation, and graphical analysis for the two variables M2 and CPI for the period 12.1993–12.1997 based on the data shown in the Appendix. The variables used for the statistical analysis are:

M2: Money supply (currency outside banks, demand and time deposits, in Lek),

CPI: CPI as a cumulative index in per cent where as the base period December 1993 (= 100%) is used.

In accordance with common macroeconometric usage, all variables were transformed by taking logarithms. This transformation stabilizes variances over time and it also allows to compute a growth rate by simple differencing. We already indicated that differenced logarithms are always multiplied by 1,200 in order to enable a comparison of the logarithmic growth rate and annual percentage growth. The sample size or number of observations is $n = 49$, as the observation period is 12.1993–12.1997. In a simple linear regression, the resulting degrees of freedom (d.f.) are $n_{df} = 47$. If (logarithmic) growth rates are used, these numbers reduce to $n = 48$ and $n_{df} = 46$.

The sources of the data in the Appendix tables are the statistical report of BoA ([1]) and the computations of CPI by INSTAT.

Looking at the M2 dynamics as monthly percentage changes — the time series is shown graphically in Figure 4 — reveals that the average pace of M2 growth (logarithmic growth at an annual rate) is 35.2% per month and the standard deviation of the mean rate is $\sigma$=4.1%. We may conclude that there is a longer-run tendency of a continuous growth in the monetary aggregate M2. However, the series contains some outliers. For example, M2 money decreased at an annualized rate of −42.1% in January 1997 and increased by 133.7% in December 1994. Figure 4 yields an overall impression of money growth during the period of investigation.

### 3.1.2 Dynamic interaction of CPI and M2 in 'levels'

We now consider our key question about the nature of the relationship between the monetary supply growth (M2) and the velocity of inflation. To give an answer to this question we estimate a double-log-linear regression equation by ordinary least squares (OLS) with CPI as the dependent variable and M2 as the only explanatory variable, as it may be suggested by the scatter diagram in Figure 3.

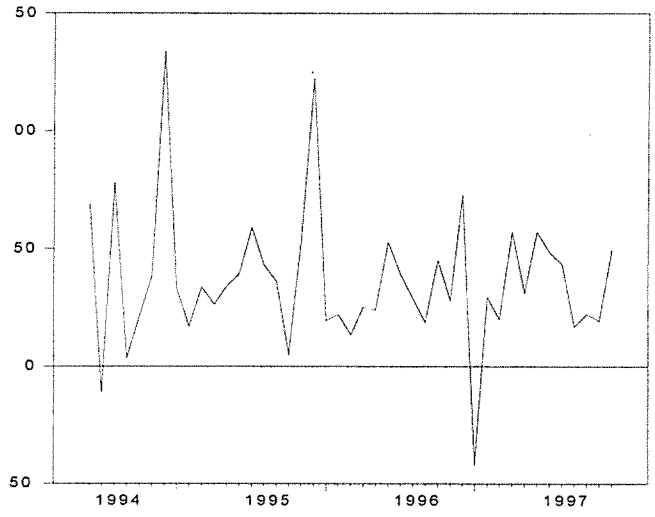


Figure 4: Monthly observations on the annualized logarithmic growth rate of Albanian money M2.

Table 1: Level regression of $\log(CPI)$ on $\log(M2)$ by OLS.

Dependent variable CPI period 12.1993-12.1997
Number of observations 49
degrees of freedom 47

| variable | regression coefficient | standard deviation | $t$–statistic |
|---|---|---|---|
| Intercept | 0.23 | 0.29 | 0.78 |
| $\log(M2)$ | 0.41 | 0.03 | 16.11 |

$\bar{R}^2 = 0.843$ DW–$d = 0.151$ $Q(12) = 143.82$

linear regression equation:

$$\log CPI_t = 0.23 + 0.41 \log M2_t + \hat{u}_t$$

The regression results are given in Table 1. The high value of the adjusted correlation coefficient and the high $t$–value of 16.11 may seem to indicate that there is a statistically significant relationship between the two variables log(M2) and log(CPI). However, the Durbin-Watson statistic is extremely low and also the portmanteau $Q$ statistic points at the high residual autocorrelation. Figures 2 and 4 and these regression results all suggest that the variables may be stationary after differencing ('integrated of order one') and that the regression is spurious and that $t$–values are inflated. This presumption is confirmed by statistical hypothesis tests, such as the tests by DICKEY and FULLER (1979). These tests clearly indicate that both variables, log(M2) and log(CPI), are integrated of order one. We omit the details, as we will report on the more powerful bivariate canonical correlation analysis that points into the same direction.

The joint movement through time of money and prices, which is shown in Figure 3, may indicate that the two variables are *co-integrated* in the sense of ENGLE and GRANGER (1987). Two (or more) variables are said to be co-integrated if they are integrated of order one individually and there is a linear combination of the variables that is stationary. Although some authors have used the Durbin-Watson statistic of a regression between the variables, as it is shown in Table 1, the general impression is that such a test has low power if it is compared to more specific hypothesis testing procedures. In particular, we applied the multivariate likelihood-ratio testing procedure by

Table 2: System cointegration test (Johansen test) for variables $\log(CPI)$ and $\log(M2)$.

| $p$ | $\zeta_1$ | $\zeta_1(5\%)$ | $\zeta_2$ | $\zeta_2(5\%)$ |
|---|---|---|---|---|
| 1 | 0.18 | 2.71 | 2.34 | 13.31 |
| 2 | 0.10 | 2.71 | 2.66 | 13.31 |
| 6 | 0.40 | 2.71 | 8.65 | 13.31 |

Note: $p$ is the number od conditioning lagged differences, $\zeta_i(5\%)$ denotes the 5%–significance point for each test statistic.

JOHANSEN (1995) and found that Albanian money and prices (in logarithms) are *not co-integrated.*

The cointegration test by JOHANSEN relies on calculating the canonical correlation statistics between first-order differences and lagged levels of the two series, conditional on lagged differences. The number of lagged differences is chosen such that the residuals are close to uncorrelated white noise series. Although one lag appears to be sufficient for this criterion, we also calculated specifications for longer lags. With none of the specifications do the cumulated canonical correlation statistics surpass the critical values. $\zeta_1$ is a function of the smaller canonical correlation. If it is significant, the system is stationary (i.e., both variables). $\zeta_2$ is a function of both canonical correlations. If only $\zeta_2$ is significant, the variables are cointegrated. The test procedure, which was conducted with the help of the RATS program code CATS, concludes that the variables are not co-integrated.

The result corresponds to economic theory, as the growth of the money stock follows the sum of the price growth (inflation) and the growth of real output, in a closed economy in equilibrium. Hence, the two variables should be separated by the real growth of the Albanian economy. It was also mentioned that both money growth and inflation have isolated outliers that, however, occurred at different time points.

### 3.1.3 Dynamic interaction of CPI and M2 in growth rates

If two variables are integrated but not cointegrated, the best way to model their dynamics is by taking first differences (cf. [12]). Treating the two

Table 3: Vector autoregression for growth rates $\Delta \log(CPI)$ and $\Delta \log(M2)$.

| dep.var. | constant | $\Delta \log(CPI)_{-1}$ | $\Delta \log(M2)_{-1}$ | $R^2$ | $Q(11)$ |
|---|---|---|---|---|---|
| $\Delta \log(CPI)$ | 0.017 | 0.116 | -0.146 | 0.03 | 3.83 |
| | [2.50] | [0.78] | [-0.86] | | |
| $\Delta \log(M2)$ | 0.035 | -0.057 | -0.174 | 0.03 | 8.99 |
| | [5.73] | [-0.42] | [-1.16] | | |

differenced variables $\Delta \log(CPI)$ and $\Delta \log(M2)$ in a vector autoregression (VAR) and estimating the relationships by OLS resulted in the evidence collected in Table 3.

From Table 3 it is evident that none of the regressors has a significant influence on the dependent variables, except for the regression intercept. It follows that both variables follow mutually independent random walks with positive drift. The regression correlation coefficient is extremely small and the residual diagnostic statistic $Q$ indicates that there is no substantial autocorrelation in the errors.

The somehow surprising result that money and inflation are largely independent is still subject to some arguments. Firstly, there may be contemporaneous correlation in the changes; secondly, the low power of the $Q$ test still leaves open the possibility of significant influences at longer lags; thirdly, seasonal effects may be present; fourthly, there may be nonlinear dynamic interaction that has been missed in the linear VAR approximation. The two latter points will be addressed in the next subsections.

The simultaneous correlation between the two growth rates is small at -0.14. This value is not significant and also points into the wrong direction. If it were taken seriously, it would mean that monetary contraction is connected with unusually high inflation. This kind of cross-effect can be ruled out on statistical as well as on theoretical grounds.

To investigate cross-influences at longer lags, we present the cross-correlation function (CCF) of $\Delta \log(CPI)$ and $\Delta \log(M2)$ in Figure 5. The horizontal lines are approximate 5% significance bounds. It evolves that all cross-correlations are insignificant, excepting the long lag of 15. This correlation corresponds to an influence of money growth on inflation with a lag of more than one year. Being positive and seeing money in the lead and inflation in

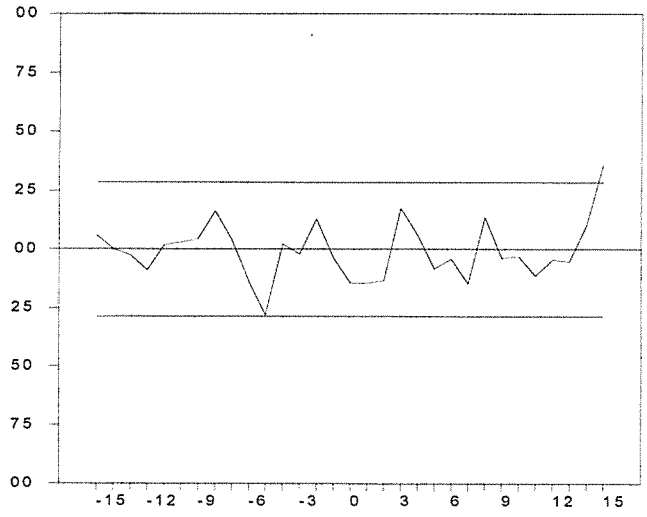


Figure 5: Cross-correlation function of money growth ($\Delta \log(M2)$) and price inflation ($\Delta \log(CPI)$).

the lag, it points into the right direction but it is only marginally significant and hence it may also be a sample artifact. Closer inspection of the data reveals that the time lag between the monetary expansion in December 1995 and the inflationary peak in March 1997 is exactly 15 months. Hence, the allegedly significant cross-correlation depends on two outliers that may be unconnected in the real Albanian economy.

The overall conclusion from the statistical evidence is that Albanian money growth and inflation are at best loosely related.

In order to get additional insight in this problem and to put it into the framework of economic theory, we now consider the quantity theory of money equation where $Mv = PY$ and $v = PY/M$. Here, $Y$ denotes real output, $P$ is the price level, $M$ is the (nominal) money supply, and $v$ is the so-called velocity of money. In logarithms, adopting the notation of lower-case letters denoting log transforms of variables denoted in capitals, this equation reads

$$\log v = p + y - m \tag{1}$$

Whereas the quantity theory of money did view $v$ as a time-constant characteristic of the economy, most economists nowadays conceive $v$ as a function of further variables, among which inflation may play a role. Moreover, it is uncertain whether $v$ really is related to the speed of turnover of currency. Commonly, $v$ is seen as a sort of lower bound on the true velocity of money circulation (see e.g. [6], p.342).

Computing the velocity of money circulation $v$ as simple annual averages on the basis of narrow money $M1$ and gross domestic product (GDP) for the period under investigation (years 1994–1997) results in a monotonous decrease from a value around 6.5 in 1994 to a value around 3 in 1997. These numbers are sometimes interpreted such that the turnover period of money has increased from two to four months. Hence, this may mean that an increase of $M2$ at time $t$ gives the full effect on $CPI$ at a later time ranging somewhere between $t + 2$ and $t + 4$. Unfortunately, we could not find such a time lag in the dynamic relationship of money and prices. The observed time lag of 15 months seems far too long to be of economic relevance. On the other hand, ignoring the non-stationary nature of the variables altogether and considering the CCF of the level series instead of the differenced series in Figure 5 results in a peak at exactly the zero lag. Within the frame of linear dynamics, potential delays in the processing of monetary signals to

prices do not seem to play a role in explaining the absence of a significant relationship of money and prices.

For the sake of an experiment, we nevertheless regressed Albanian inflation on the growth rate of money M2 and a constant. This results in the linear regression equation

$$\begin{aligned} \Delta CPI_t &= -0.00 + 0.55\Delta M2_{t-15} + \hat{u}_t \qquad (2) \\ &\quad [-0.08] \quad [3.16] \\ \bar{R}^2 = 0.219 &\quad Q(8) = 2.99 \end{aligned}$$

Residual autocorrelation is insignificant, and so is the constant term. The regression $F$ statistic reveals that the adjusted $R^2$ is significantly different from zero but we know that this is due to a single pair of outliers in the regressand and the regressor. This equation yields forecasts for the first three months of 1998 at annualized rates of 24.1%, 14.7%, and 39.4%. These predictions can be compared with the actual realizations of 40.9%, 21.3%, and 13.8%[2]. The predictions have the correct magnitude but yield no further information about the direction in which Albanian inflation develops. A simple extrapolation of the mean results in a comparable prediction error.

### 3.1.4 Seasonal effects

Most economic variables, national accounts aggregates as well as monetary aggregates, prices, or employment, are subject to seasonal variation. This seasonal variation can be determined by the climatic cycle or by cultural traditions. Ignoring or 'adjusting' the seasonal variation can lead to inefficient estimation of economic relationships or even to substantial distortions of the statistical results.

The four years 1994–1997 are certainly too few to allow any final conclusions with respect to the shape and stability of seasonal patterns in Albanian inflation and money growth. We follow MIRON's suggestion (cf. [8]) and use regression on (monthly) seasonal dummy variables as a first crude approximation to the true seasonal cycle.

We find no significant seasonal effects in CPI inflation. This corresponds well to the small seasonal variation in most comparable economies, though,

[2]These values for 1998 are not contained in the Appendix tables, as these concentrate on the period under investigation.

in some countries, some variation is caused by political traditions, such as increasing the prices of some goods in the public sector at certain times of the year. MIRON ([8]) describes how, in the US, the Federal Reserve Bank has used a policy of stabilizing prices and interest rates over the seasonal cycle at the cost of some seasonality in money growth. Although some economists — among them Milton Friedman — have suggested to move to a policy of non-seasonal money, the policy of the Fed seems to agree with MIRON in the conclusion that the welfare loss due to seasonal variations in interest rates may be larger than the additional volatility caused by seasonal patterns in money.

In full accordance with this view, we find that seasonality in money growth is significant indeed. Figure 6 shows the average seasonal pattern over the years 1994–1997 in the annualized logarithmic increase in M2. The peak in December is mostly rooted in two expansionary episodes in the Decembers of 1994 and 1995 but there is also evidence on a smaller expansion during the summer months. Notice that the seasonal pattern in $M2$ growth

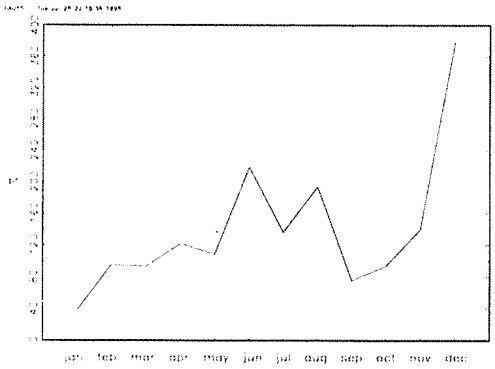


Figure 6: The seasonal cycle in annualized logarithmic growth of M2.

is not reflected in price inflation and hence does not help in explaining or predicting the CPI.

### 3.1.5 Allowing for structural change

In particular in a transition economy, such as Albania, one always has to allow for the possibility that economic relationships cannot be found on statistical grounds, as the parameters of economic interest have experienced changes in the observation period. We account for this possibility in two ways. Firstly, we run separate regressions for shortened subsamples (*sample splitting*); secondly, we parameterize the economic parameters, i.e. the regression coefficients, in a hierarchic fashion that allows for continuous change.

We decided to split the sample at the end of 1995, i.e. approximately at the half of the original sample, which gives two subsamples of 25 and 24 observations, which are possibly further reduced due to lags and to differencing transformations. Notice that the degrees of freedom are now very low, which may impair any statistical conclusions. The change in regression coefficients should reflect the structural changes in the transmission mechanism from money to inflation in the Albanian economy.

It turns out that one has a significant reaction of inflation with respect to M2 growth $\Delta \log(M2)$ in the first subsample. In detail, we found

$$\begin{aligned} \Delta \log(CPI_t) &= 0.01 - 0.34 \Delta \log(M2_{t-7}) + \hat{u}_t \\ &\quad [3.04] \quad [-2.83] \\ \bar{R}^2 = 0.305 &\quad Q(4) = 6.97 \end{aligned} \tag{3}$$

Although this regression equation passes statistical diagnostic tests, the long lag of 7 months may seem unsatisfactory. Also note that $t$–values may be inflated due to the preliminary specification search (the pre-test or Lovell bias). One may suspect that the regression results, that are based on only 15 degrees of freedom, may be due to some local outliers. A comparable dynamic regression analysis for broad money M3 yields

$$\begin{aligned} \Delta \log(CPI_t) &= -0.02 + 0.32 \Delta \log(M3_{t-2}) + 0.39 \Delta \log(M3_{t-4}) + \hat{u}_t \\ &\quad [-1.93] \quad [1.86] \qquad\qquad [2.33] \\ \bar{R}^2 = 0.239 &\quad Q(4) = 2.14 \end{aligned} \tag{4}$$

Although the second lag of M3 growth is only marginally significant, this regression may be more convenient than (3) because of the more reasonable lag structure.

In stark contrast to these two significant linear relationships among growth rates for 1994/95, no such relationship can be found in the second half of the sample period, neither for M2 nor for broad money M3. This already indicates that the structure of the transmission mechanism has changed in the sample interval. This presumption is confirmed by statistical tests of the Chow type. Using the lag design of (3) and (4) and inserting dummy constants $D_t$ for the second half of the sample as well as regressors multiplied with such dummies implicitly assumes the form

$$\Delta \log(CPI_t) = \beta_1 + \beta_2 D_t + (\beta_3 + \beta_4 D_t)\Delta \log(M2_{t-7}) + \hat{u}_t \qquad (5)$$

for (3) and similarly for (4). For M2, the dummies are highly significant; for M3, they are significant at a marginal significance level ($p$–value) of 3.7%. In summary, the null hypotheses of structural stability were rejected and the suspicion of a structural change was confirmed.

The equation (5) serves as a statistical workhorse for Chow-type tests but it is not plausible to assume that an economic relationship changes sharply at a certain time point, unless there are strong indicators for such a change, such as a publicly announced switch of policy targets. It is more plausible that change has occurred smoothly and gradually. It evolved that the equation

$$\Delta \log(CPI_t) = \beta_1 + (\beta_2 + \beta_3 t)\Delta \log(M2_{t-3}) + \hat{u}_t$$

yields a marginally significant and also plausible description of dynamic interaction[3]. The joint null hypothesis $H_0 : \beta_2 = \beta_3 = 0$ is rejected at a marginal significance level ($p$–value) of 5.2%. We summarize the regression results as

$$\begin{aligned} \Delta \log(CPI_t) \quad &= \quad 0.008 + (-0.339 + 0.019t)\Delta \log(M2_{t-3}) + \hat{u}_t \\ &\qquad\quad [1.27] \quad [-1.15] \quad [2.19] \\ \bar{R}^2 = 0.089 \qquad &\qquad Q(11) = 9.70 \end{aligned} \qquad (6)$$

Only the trending part of the coefficient is significant but any further reduction turned out to be unrewarding. Notice that the causal influence from money to inflation is *positive* for most of the sample and hence corresponds

[3]In slight deviation from the usage of $t$ as a time subscript, $t$ is a time trend starting in 1 at the beginning of the sample and increasing by 1 from one month to the next one. This natural definition does not affect the estimates, excepting the intercept.

to theoretical considerations, though the estimate $\hat{\beta}_2$ is negative. Also note that a lag of three corresponds to our considerations about the velocity of money $v$. With respect to broad money M3, the optimal equation after some model selection search is similar but attains a slightly poorer fit.

$$\begin{array}{rcl} \Delta\log(CPI_t) & = & 0.008 + (-0.103 + 0.013t)\Delta\log(M3_{t-3}) + \hat{u}_t \\ & & [1.19] \quad [-0.39] \quad [1.78] \\ \bar{R}^2 = 0.057 & & Q(12) = 8.59 \end{array} \tag{7}$$

In both cases, a direct inclusion of a trend term as a regressor did not improve the regressions.

The modeling of a changing coefficient by a linear trend is arbitrary. Because the regression equation is in a double-logarithmic form, we also considered a logarithmic trend $\log(t)$ for a comparison. If the true change of coefficients is slower than linear ('sublinear'), such a specification may dominate (6). However, the equation

$$\begin{array}{rcl} \Delta\log(CPI_t) & = & -0.028 + 0.002t + (1.650 - 0.546\log(t))\Delta\log(M2_{t-1}) \\ & & [-1.19] \quad [2.41] \quad [1.26] \quad [-1.39] \\ & & +(2.17 - 0.71\log(t))\Delta\log(M2_{t-2}) + \hat{u}_t \\ & & [1.64] \quad [-1.77] \\ \bar{R}^2 = 0.069 & & Q(11) = 7.38 \end{array} \tag{8}$$

uses more parameters than (6) but nevertheless does not attain the adjusted $R^2$ value of the linear-trend specification. For broad money M3 we obtain slightly longer lags

$$\begin{array}{rcl} \Delta\log(CPI_t) & = & -0.006 + (-1.835 + 0.620\log(t))\Delta\log(M3_{t-3}) \\ & & [-0.69] \quad [-1.68] \quad [1.94] \\ & & +(1.405 - 0.406\log(t))\Delta\log(M3_{t-4}) + \hat{u}_t \\ & & [1.50] \quad [-1.49] \\ \bar{R}^2 = 0.035 & & Q(12) = 9.68 \end{array} \tag{9}$$

and also a poorer fit than for the linear-trend specification. Direct inclusion of time trends yields no improvement in the $M3$ equation.

Two remarks are in order. Firstly, neither the equation (6) nor (8) are entirely satisfactory on economic as well as on statistical grounds. The modeling of the change in the linear coefficient is arbitrary and a so-called smooth

transition function (cf. [11]) may be preferable that cares for plausible properties in the longer run, which our specifications cannot do. However, four years of monthly observations do not suffice for reliably identifying such complicated time-series models. Nevertheless, our specifications highlight the possibility of nonlinear dynamics in the relationship of Albanian inflation and money growth and are potential candidates for short-run prediction. Secondly, the statistical analyses of previous sections relied heavily on the assumption of structurally stable linearizations of dynamic interaction. A generalization of concepts such as 'integrated of first order' or 'co-integration' to nonlinear dynamics is not trivial (see [5]) and the application of such generalizations is beyond the scope of this paper.

In summary, there is no dynamic interaction between money and inflation in a linear frame but we have found some evidence on nonlinear interaction that may be interpreted as a linear relationship that changes slowly over time.

## 3.2 Fiscal Causes of Inflation

It is well known that one of the main reasons of money supply growth in Albania up to now has been the covering of the budget deficit, directly through credits (loans) from the Bank of Albania or indirectly through interventions in the security market (government treasury bills, T.B.). Therefore it is worth while to consider the development of the state budget deficit more closely, in order to properly assess the influence of fiscal expansion on inflation and on the monetary expansion in M2 and M3. This is the topic of this section. We give a general framework of fiscal causes of inflation which together with monetary ones belong to the category of classical causes.

In this paper, 'fiscal causes of inflation' will mainly refer to the budget deficit, but also to tax increases that have to do with programmed inflation, to wage increases in the public sector, etc. Among these variables, it is probably the budget deficit that exercises the strongest influence on the economy, particularly when this deficit goes on and is sustained for a relatively long time. The worries for the effects of a persistent budget deficit on inflation and on whole economy derive from the following three questions:

1. **Does the budget deficit cause inflation?** — Indeed, no economic theory or data evidence at our disposal can assert that the budget

deficit itself is quite sufficient to cause inflation. It becomes a stimulus of inflation when it leads to an excessive expansion of the money supply (M2 and M3). Therefore, a persistent budget deficit may cause the money supply to increase faster than would be required by economic growth, and hence may cause an inflationary pressure. We may conclude that the continued financing of the budget deficit from the creation of new money (printing money) may cause inflation.

2. **Does the budget deficit crowd out the private investments?** — The government borrowing to finance its deficit does absorb a considerable part of savings, which, if there were no such deficit, probably would be invested into the economy, thereby reducing private investment. This reduction derives also as the result of an increase of the interest rate through governmental borrowing.

3. **Does the continuous budget deficit damage the future generations?** — The greater is the budget deficit, the greater is the part of capital that is not going to be reinvested into the economy, hence production falls below its economic potential in a given period. The budget deficit is a matter of concern for any country, independently from its source of financing, domestic or foreign, as it increases the debt interest payments. This will decrease the GNP more than the GDP and thus lower the investments.

In accordance with these considerations about the budget deficit we try to find evidence on the indirect influence of fiscal causes and their effects on inflation. The descriptive figures in Tables 8 and 9 give a general impression of these causes, the tendency of the budget deficit over the years, the way and sources of its financing, the part that the Bank of Albania (direct and indirect) credit to the budget deficit occupies as compared with the aggregate M2 increase, the ratio of the credit to the government and credit to the economy, etc.

Looking at Tables 8 and 9, which display the financing structure of the budget deficit for the years 1990–1997 and some projections for the 1998, we see that for all these years we have to do with a continuous budget deficit which in these last five years ranges at 8.5–11.3% of GDP.

Regarding the financing structure of the budget deficit during 1990–1997, we have to deal with two periods:

1. 1990–1994, the period of the budget deficit financing only through the direct credit from the BoA (printing money),

2. 1995–1997, the period of the budget deficit financing from diverse sources like:

i Direct credit from BoA,

ii The issuing of government treasury bills (open market operations, O.M.O),

iii The government deposits (privatization receipts),

iv Foreign credit.

The separation into two periods of budget deficit influence on inflation serves to improve the statistical evidence of the cross-effects in the presence of important structural changes in the financing structure of the budget deficit. It is worth noting that during this period the security and capital markets have not been very competitive. The Tirana stock exchange has been opened in May 1996, and up to now its main activity has been trading the government treasury bills to a very limited number of participants (mainly state-owned second-level banks, etc.).

As we may see from Table 8, during the period 1990–1994 (with a very small exception for 1994) almost the whole budget deficit was financed through the direct credit from BoA. Issuing money used to be the only way of deficit covering. Therefore during this period we could say that the budget deficit has been the key stimulus of inflation and it also has exercised an inflationary pressure on the whole economy.

Table 9 shows that after 1994 the financing structure of the budget deficit has been changed, by a marked lowering of the share of direct credit financing and of purchases of treasury bills from the BoA in favor of financing from other sources like foreign financing or purchasing treasury bills from the banking system. In the year 1996 this factor only amounted to about 27.7% of the total of budget deficit, as compared to the 100% that it had occupied up to 1994.

The indicators for 1997, due to the turmoil that Albania went through, have somewhat stopped and even reversed these developments but we think they will be reestablished in the future. The tendency to lower the share of direct budget deficit financing from the BoA is in full accordance with the

newly adopted law 'For Bank of Albania' ([1]) which determines fixed limits [4] for this kind of credit.

From the same table we see that even within the factor of the total credit from the Bank of Albania to the budget deficit one observes a falling share of direct credit and a rising share of credit through BoA treasury bills.

Although the share of budget deficit that is financed through the credit from the BoA has shown a falling tendency, we see that a large share of the growth in the monetary aggregate M2 was absorbed by the financing of the budget deficit via credits from the Bank of Albania.

Although the statistical evidence of a dynamic influence from M2 growth to price inflation has remained somewhat weak, this analysis of the financing of the public household raises concerns that one of the main factors that caused Albanian inflation during 1993–1997 has been the persistent budget deficit. These concerns are aggravated by the way that it was financed in those years, as reported.

The budget deficit may also have influenced inflation by more indirect channels, namely by hampering private investment as well as by increasing the nominal interest rate. If, from Tables 8 and 9, we compare the shares of the credit for the economy and credit for the government within the total of credit one sees that, on the average for 1993–1997, about 65% of total credit has belonged to the government credit and only 35% to the credit for the non-government sector of the Albanian economy.

A singular event that also falls under the heading of fiscal causes of Albanian inflation was the increase in the rate of the value added tax (VAT) in September 1997 from 12.5% to 20%.

## 3.3 Imported inflation

Regarding the category of imported inflation, we could say that this factor has been and still is nowadays an important cause of inflation in Albania. This category of inflation becomes more important when it is known that during this period the trade deficit of Albania has shown a continuous increase due to the quicker growth in imports as compared with exports.

In this study we try to give a general consideration of the importance

[4] the fixed limit, according the new law, of the direct allowed credit from BoA to the gevernment is up to 5% of the three last years average of the state budget revenues.

of imported inflation in its relation to total Albanian inflation. This inflation has been imported into Albania mainly from the neighboring countries which are Albania's major foreign trade partners like Italy, Greece, Turkey, Bulgaria, Macedonia, etc. in two forms:

1. Through the Lek devaluation against the currencies of these major trade partners. The depreciation of Lek — calculated against a trade weighted composite of the four main currencies USD, DEM, ITL, and GRD — from December 1993 to December 1997 has been about 144%.

2. Through the direct import of the price inflation in the trade partner countries, i.e. by importing goods and services into Albania. For the computation of a foreign-trade weighted inflation rate we considered four countries (USA, Italy, Greece, Germany) whose currencies are used in about 80% of Albanian foreign trade.

A time series plot of the trade-weighted exchange rate is given as Figure 7. Note that, although a longer-run tendency of a devaluation of the Lek prevails, the exchange rate has remained remarkably stable over longer time periods and a part of the pronounced devaluation that the Albanian currency experienced in early 1997 was reversed later on.

To give an approximate assessment of the influence of the weighted exchange rate $r$ of the Lek on Albanian domestic inflation, we simply add the first differences of the exchange rate $\Delta r$ as a further explanatory variable to the right-hand side of the nonlinear dynamic equations (6) and (7). The results of this analysis for the period 12.1993–12.1997 are summarized in Table 4.

The statistical model confirms our view that changes in the exchange rate were a key factor in explaining the developments of Albanian price inflation. The significance of the coefficient on $r$ considerably exceeds the significance of the influence from the money supply. However, the simultaneity of movements in $r$ and in inflation does not allow a clear separation of cause and effect. The sampling frequency of one month is long enough that the possibility of causal feedback from inflation to $r$ cannot be excluded. A high rate of inflation may erode the confidence in the Albanian currency (Lek).

The statistical exploration of further variables that are linked in causal relationships to Albanian inflation could be a promising research topic for the

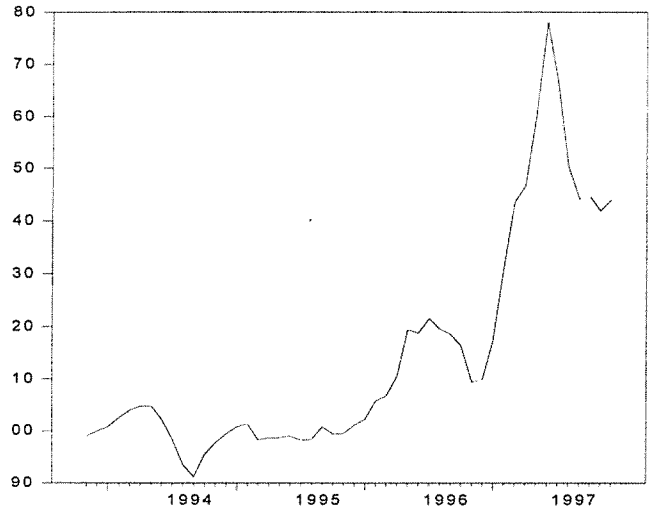


Figure 7: Trade-weighted exchange rate index of the Albanian Lek.

Table 4: Regressions with the exchange rate as an explanatory variable.

| | | | | |
|---|---|---|---|---|
| $\Delta \log(CPI_t)$ | = | $0.004 + (-0.238 + 0.018t)\Delta \log(M2_{t-3}) + 0.002\Delta r_t + \hat{u}_t$ | | |
| | | [0.73] | [−0.94] [2.39] | [3.95] |
| $\bar{R}^2$ | = | 0.325 | $Q(11) = 6.39$ | |
| | | | | |
| $\Delta \log(CPI_t)$ | = | $0.004 + (-0.097 + 0.014t)\Delta \log(M3_{t-3}) + 0.002\Delta r_t + \hat{u}_t$ | | |
| | | [0.70] | [−0.37] [2.01] | [4.05] |
| $\bar{R}^2$ | = | 0.296 | $Q(12) = 7.15$ | |

future. It would be natural to enlarge this topic by adding other phenomena, economic, social, and psychological indicators and factors, classical or specific that may have influence on the inflation in Albania and are not treated in our study. Such a statistical exploration, however, will have to be delayed until more and longer series become available.

## 3.4 Real demand pull

A possible determinant of price inflation has been ignored in this paper up to this point. A demand shock in the economy that is not accommodated by a corresponding expansion of supply exerts an inflationary pressure. This cause of inflation can simply be called the 'real demand pull'.

Our data base contains a monthly index of real economic activity that approximates the Albanian gross domestic product (GDP). Figure 8 displays a time-series graph of the GDP index. It increased smoothly until the economy was hit by a noteworthy slump in 1996, and then started to grow again, although the pre-slump maximum has not been attained by December 1997.

The logarithmic growth of the GDP index can be added as a further explanatory variable to the right-hand side of the equation in Table 4. It turned out that the GDP index growth improves the explanatory power of the regression considerably. Results are given in Table 5. The influence of the real demand pull is negative in the beginning of our sample but becomes positive in the end. The significant negative coefficient of the trend term expresses the growing efficiency of inflation control mechanisms and hence is also clearly interpretable. Further lags of the GDP index growth variable turned out to be insignificant.

Notice that, firstly, the significance of the demand pull and of the currency devaluation exceeds that of the 'classical' direct influence of the money supply, and that, secondly, also the statistical significance of the classical inflation cause has increased by adding the demand-pull variable. Therefore, we consider the equation in Table 5 as maybe the optimal statistical model than can be constructed under the severe restriction of a short data set and the caveats that accompany statistical modeling in transition economies.

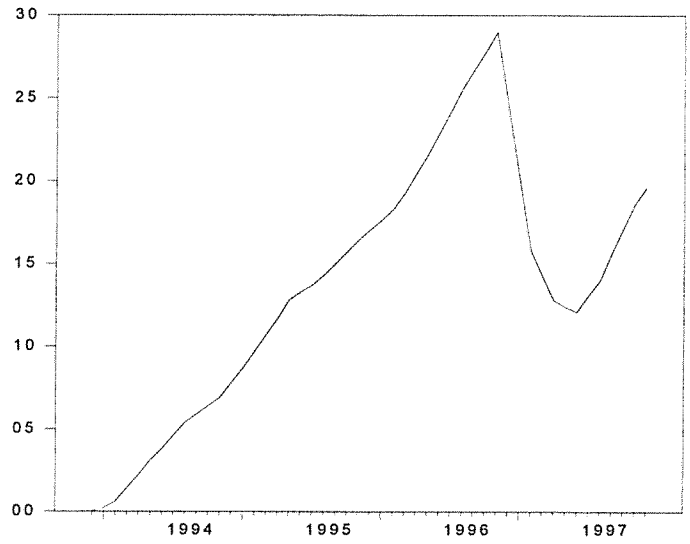


Figure 8: GDP index of real economic activity.

Table 5: Regressions with the GDP index as an explanatory variable.

| | | |
|---|---|---|
| $\Delta \log(CPI_t)$ | = | $0.102 - 0.002t + (-0.455 + 0.026t)\Delta \log(M2_{t-3})$ |
| | | [4.66] [−4.18] [−1.50] [2.61] |
| | | $+0.002\Delta r_t + (-12.60 + 0.28t)\Delta \log(GDP_t) + \hat{u}_t$ |
| | | [3.39] [−4.57] [4.48] |
| $\bar{R}^2$ | = | 0.545 $Q(11) = 4.65$ |
| | | |
| $\Delta \log(CPI_t)$ | = | $0.091 - 0.002t + (-0.243 + 0.017t)\Delta \log(M3_{t-3})$ |
| | | [3.75] [−3.22] [−0.58] [1.37] |
| | | $+0.002\Delta r_t + (-12.086 + 0.269t)\Delta \log(GDP_{t-3}) + \hat{u}_t$ |
| | | [3.12] [−4.08] [4.01] |
| $\bar{R}^2$ | = | 0.478 $Q(11) = 9.44$ |

# 4 Conclusions

Inflation analysis in Albania, particularly for the actual economic conditions that exist, is important from the theoretical point of view as well as from the practical one, as the control of price inflation will constitute one of the main elements of the Albanian macroeconomic stabilization.

Inflation in Albania for the period 1993–1997 at annualized rates has ranged among values that may classify it as a 'galloping inflation'. However, it is comforting to note that the level of inflation appears to be under control and it has not shown any tendencies of acceleration. The average monthly inflation rate in its annualized form has been around 20% and rates in the triple-digit range have been few. Such high rates were observed, for example, in March 1997 during the turmoil period in Albania.

The period 1993.12–1997.12 that we have chosen to study inflation in Albania should be considered as a quasi steady-state period. The start of this period was selected in order to exclude the preceding phase of price liberalization in which very big and frequent inflation oscillations had occurred as a consequence of the transition from a planned and centralized economy to a market economy.

The determination of the causes of inflation, everywhere and not only in Albania, is a rather difficult and complicated problem. Here, by means of statistical analysis we have considered some of them, which has led us to the following conclusions.

The inflation in Albania may be characterized more as a demand-pulled inflation than a cost-pushed one. In favor of this conclusion witness the continuous and relatively high growth of monetary aggregate M2 and M3, the continuous budget deficit increase, increases in the interest, the consistent increase of imports against exports and, as a consequence of the trade deficit, the depreciation of the Lek against foreign currency. Additionally, we have found evidence of a direct influence of real demand growth on inflation with a time lag of approximately three months.

During this period, another very specific factor that exerted a considerable impact on Albanian inflation was the presence of pyramidal financial schemes (mainly in the years 1995/1996) which, by offering very high 'interest rates' on deposits [5], generated an aggregate demand in excess of the country's

[5]The deposits in these firms have been estimated to be nearly 2 billion of USD and

production capacities plus imports (supply). In this way, as a consequence of the excess of aggregate demand, they led to a strong increase of inflation.

Although to a comparatively smaller extent, also cost-increasing factors for production and services have been present during this period in Albania and have left their mark on the inflation. Here we can mention the VAT increase in October 1997 from 12.5% to 20%. Also, the increase in the interest rates has contributed to rising capital prices. Such a price increase for one of the basic production input factors eventually leads to an increase in consumer prices.

Returning to the classical causes of inflation, it appears that, in the period 1993–1997, Albanian inflation was linked loosely to monetary expansion (aggregates M2 and M3) and more strongly to inflationary expectations and to the continuous depreciation of the Lek. The key cause of the growth in the aggregates M2 and M3 has been the need of the budget deficit covering through issuing money from the Bank of Albania.

The fact that the logarithmic price variable has been so close to the (drifting) random-walk model during the observation period, a model that is characterized by the last available value (plus a positive drift constant) being the most efficient prediction for future developments, insinuates that inflationary expectations have been the key determinant of future inflation. In that sense we could say that Albanian inflation in Albania has been mainly self-determined. However, as an external cause we identified the continuous depreciation of the Lek. During the period 1993–1997 this depreciation has significantly and immediately influenced inflation. This evidence should be compared to the very low import elasticity with respect to the exchange rate, which has been reported to be nearly 0.1%.

Although in this paper we could not cover fully the political causes of inflation, we can say that these have been clearly present in Albania during the entire period. We just mention the inflationary peak in the spring of the 1997 that is clearly related to the political and economic turmoil at that time.

In this paper, a particular emphasis is given to statistical evidence by dynamic multiple linear regression analysis in order to assess the presence of possible causal influences of various monetary and economic factors on inflation. These regressions should also enable us to calculate reliable short-

their interest rates ranged to 96% per year and even more.

run predictions of future inflationary developments.

The statistical analysis in this paper was conducted with the software packages RATS and GAUSS.

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# A Tables of data

Table 6: Consumer prices and money supply

| date | CPI | log CPI | M1 | log M1 | M2 | log M2 | M3 | log M3 |
|---|---|---|---|---|---|---|---|---|
| 1993:12 | 100.00 | 4.61 | . | . | 39676.00 | 10.59 | 49512.00 | 10.81 |
| 1994:1 | 102.02 | 4.63 | . | . | 40588.00 | 10.61 | 50707.00 | 10.83 |
| 1994:2 | 103.75 | 4.64 | . | . | 41500.00 | 10.63 | 51902.00 | 10.86 |
| 1994:3 | 104.40 | 4.65 | 27995.00 | 10.24 | 42412.00 | 10.66 | 53098.00 | 10.88 |
| 1994:4 | 113.80 | 4.73 | 27826.00 | 10.23 | 42870.00 | 10.67 | 53821.00 | 10.89 |
| 1994:5 | 115.76 | 4.75 | 28214.80 | 10.25 | 43547.00 | 10.68 | 54779.70 | 10.91 |
| 1994:6 | 117.68 | 4.77 | 29726.00 | 10.30 | 46131.00 | 10.74 | 56641.00 | 10.94 |
| 1994:7 | 113.75 | 4.73 | 28743.00 | 10.27 | 45718.00 | 10.73 | 57518.00 | 10.96 |
| 1994:8 | 111.41 | 4.71 | 31319.00 | 10.35 | 48783.00 | 10.80 | 61227.00 | 11.02 |
| 1994:9 | 111.56 | 4.71 | 31472.00 | 10.36 | 48927.00 | 10.80 | 62279.00 | 11.04 |
| 1994:10 | 112.68 | 4.72 | 32220.00 | 10.38 | 49793.00 | 10.82 | 62975.00 | 11.05 |
| 1994:11 | 113.66 | 4.73 | 33391.00 | 10.42 | 51413.00 | 10.85 | 64538.00 | 11.08 |
| 1994:12 | 115.82 | 4.75 | 38766.50 | 10.57 | 57471.50 | 10.96 | 70775.40 | 11.17 |
| 1995:1 | 117.80 | 4.77 | 39328.60 | 10.58 | 59075.90 | 10.99 | 72228.20 | 11.19 |
| 1995:2 | 120.50 | 4.79 | 39623.70 | 10.59 | 59915.00 | 11.00 | 73069.00 | 11.20 |
| 1995:3 | 120.90 | 4.79 | 40747.50 | 10.62 | 61623.20 | 11.03 | 74610.20 | 11.22 |
| 1995:4 | 122.90 | 4.81 | 41315.50 | 10.63 | 62991.00 | 11.05 | 75834.80 | 11.24 |
| 1995:5 | 122.40 | 4.81 | 42587.60 | 10.66 | 64803.00 | 11.08 | 78163.00 | 11.27 |
| 1995:6 | 120.10 | 4.79 | 44054.00 | 10.69 | 66962.00 | 11.11 | 81391.00 | 11.31 |
| 1995:7 | 116.20 | 4.76 | 46943.90 | 10.76 | 70339.00 | 11.16 | 85030.90 | 11.35 |
| 1995:8 | 117.30 | 4.76 | 48472.70 | 10.79 | 72918.40 | 11.20 | 88616.80 | 11.39 |
| 1995:9 | 118.40 | 4.77 | 49845.70 | 10.82 | 75147.70 | 11.23 | 92794.50 | 11.44 |
| 1995:10 | 119.10 | 4.78 | 49240.90 | 10.80 | 75465.90 | 11.23 | 94857.70 | 11.46 |
| 1995:11 | 121.90 | 4.80 | 51898.70 | 10.86 | 78912.10 | 11.28 | 98708.90 | 11.50 |
| 1995:12 | 122.80 | 4.81 | 59252.40 | 10.99 | 87369.80 | 11.38 | 107449.30 | 11.58 |
| 1996:1 | 125.30 | 4.83 | 59243.40 | 10.99 | 88806.10 | 11.39 | 110427.20 | 11.61 |
| 1996:2 | 127.45 | 4.85 | 59841.10 | 11.00 | 90445.60 | 11.41 | 112295.80 | 11.63 |
| 1996:3 | 129.40 | 4.86 | 60524.40 | 11.01 | 91474.20 | 11.42 | 112928.00 | 11.63 |
| 1996:4 | 131.30 | 4.88 | 61987.00 | 11.03 | 93425.10 | 11.44 | 116564.60 | 11.67 |
| 1996:5 | 132.60 | 4.89 | 63424.60 | 11.06 | 95316.70 | 11.46 | 118421.10 | 11.68 |
| 1996:6 | 131.60 | 4.88 | 67875.70 | 11.13 | 99615.70 | 11.51 | 122723.00 | 11.72 |
| 1996:7 | 135.00 | 4.91 | 71768.50 | 11.18 | 102918.50 | 11.54 | 127947.40 | 11.76 |
| 1996:8 | 138.20 | 4.93 | 70670.70 | 11.17 | 105431.90 | 11.57 | 132166.90 | 11.79 |
| 1996:9 | 141.60 | 4.95 | 72272.00 | 11.19 | 107095.00 | 11.58 | 135472.00 | 11.82 |
| 1996:10 | 143.80 | 4.97 | 77138.00 | 11.25 | 111193.80 | 11.62 | 143626.20 | 11.87 |
| 1996:11 | 143.20 | 4.96 | 81003.60 | 11.30 | 113819.60 | 11.64 | 144385.40 | 11.88 |
| 1996:12 | 144.20 | 4.97 | 90705.20 | 11.42 | 120945.60 | 11.70 | 154668.50 | 11.95 |

| date | CPI | log CPI | M1 | log M1 | M2 | log M2 | M3 | log M3 |
|---|---|---|---|---|---|---|---|---|
| 1997:1 | 146.50 | 4.99 | 73445.50 | 11.20 | 116779.70 | 11.67 | 151968.20 | 11.93 |
| 1997:2 | 154.30 | 5.04 | 90267.60 | 11.41 | 119670.90 | 11.69 | 154251.40 | 11.95 |
| 1997:3 | 175.90 | 5.17 | 91858.10 | 11.43 | 121676.20 | 11.71 | 157031.10 | 11.96 |
| 1997:4 | 173.30 | 5.16 | 95714.30 | 11.47 | 127609.60 | 11.76 | 161205.80 | 11.99 |
| 1997:5 | 175.00 | 5.16 | 97955.60 | 11.49 | 130967.80 | 11.78 | 168071.30 | 12.03 |
| 1997:6 | 184.50 | 5.22 | 101528.00 | 11.53 | 137347.50 | 11.83 | 173967.50 | 12.07 |
| 1997:7 | 182.00 | 5.20 | 100987.00 | 11.52 | 143012.00 | 11.87 | 173317.00 | 12.06 |
| 1997:8 | 183.40 | 5.21 | 98895.20 | 11.50 | 148278.20 | 11.91 | 180170.00 | 12.10 |
| 1997:9 | 186.40 | 5.23 | 93989.70 | 11.45 | 150369.20 | 11.92 | 185329.60 | 12.13 |
| 1997:10 | 195.70 | 5.28 | 89808.30 | 11.41 | 153164.40 | 11.94 | 188189.70 | 12.15 |
| 1997:11 | 200.22 | 5.30 | 86628.00 | 11.37 | 155649.00 | 11.96 | 190310.00 | 12.16 |
| 1997:12 | 204.80 | 5.32 | 91667.00 | 11.43 | 162221.00 | 12.00 | 198547.00 | 12.20 |

Table 7: Exchange rate and GDP index

| date | exchange rate index | GDP index | date | exchange rate index | GDP index |
|---|---|---|---|---|---|
| 1993:12 | 100.00 | 100.00 | | | |
| 1994:1 | 100.80 | 100.20 | 1996:1 | 102.20 | 117.60 |
| 1994:2 | 102.50 | 100.60 | 1996:2 | 105.70 | 118.26 |
| 1994:3 | 103.90 | 101.40 | 1996:3 | 106.70 | 119.23 |
| 1994:4 | 104.68 | 102.20 | 1996:4 | 110.40 | 120.40 |
| 1994:5 | 104.78 | 103.10 | 1996:5 | 119.40 | 121.56 |
| 1994:6 | 102.10 | 103.80 | 1996:6 | 118.70 | 122.89 |
| 1994:7 | 98.30 | 104.60 | 1996:7 | 121.50 | 124.20 |
| 1994:8 | 93.50 | 105.40 | 1996:8 | 119.50 | 125.58 |
| 1994:9 | 91.20 | 105.90 | 1996:9 | 118.50 | 126.70 |
| 1994:10 | 95.40 | 106.40 | 1996:10 | 116.40 | 127.80 |
| 1994:11 | 97.70 | 106.90 | 1996:11 | 109.35 | 129.00 |
| 1994:12 | 99.40 | 107.80 | 1996:12 | 109.80 | 124.60 |
| 1995:1 | 100.80 | 108.70 | 1997:1 | 117.20 | 120.20 |
| 1995:2 | 101.30 | 109.70 | 1997:2 | 131.10 | 115.80 |
| 1995:3 | 98.30 | 110.70 | 1997:3 | 143.60 | 114.30 |
| 1995:4 | 98.60 | 111.70 | 1997:4 | 146.60 | 112.80 |
| 1995:5 | 98.70 | 112.80 | 1997:5 | 160.06 | 112.40 |
| 1995:6 | 99.00 | 113.30 | 1997:6 | 177.95 | 112.10 |
| 1995:7 | 98.20 | 113.70 | 1997:7 | 166.76 | 113.10 |
| 1995:8 | 98.35 | 114.30 | 1997:8 | 150.37 | 114.00 |
| 1995:9 | 100.80 | 115.00 | 1997:9 | 144.18 | 115.65 |
| 1995:10 | 99.40 | 115.70 | 1997:10 | 144.64 | 117.10 |
| 1995:11 | 99.50 | 116.40 | 1997:11 | 141.96 | 118.60 |
| 1995:12 | 101.10 | 117.02 | 1997:12 | 144.00 | 119.60 |

# B Structure of the Albanian budget deficit

Table 8: Albanian budget deficit data 1990–1994.

| Years | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| Budget surplus | -1029 | -3397 | -8618 | -11624 | -20804 |
| in per cent of GDP | 6.1% | 20.7% | 17.0% | 9.3% | 11.3% |
| Budget deficit financing (I+II) | 1029 | 3397 | 8618 | 11624 | 20804 |
| | | | | | |
| I. Domestic financing | 1029 | 3397 | 8618 | 11624 | 13045 |
| I=(1+2-3) | | | | | |
| 1. Direct credit from BoA | 1029 | 3397 | 8618 | 11624 | 12122 |
| 2. Treasury bills | | | | | 923 |
| 2.1. T–bills from BoA | | | | | 290 |
| 2.2. T–bills from banking system | | | | | 633 |
| 3. Government deposit | | | | | |
| | | | | | |
| II. Foreign financing | | | | | 7759 |
| | | | | | |
| Credit for government | | | | | 11624 |
| Credit for economy | | | | | 6770 |
| Total credit (government+economy) | | | | | 18394 |
| | | | | | |
| M2 change year/year, stock | | | | | 17749 |
| M2 change year/year, in % | | | | | 80% |

Note: all numbers, except percentages, are in millions of Leks.

Table 9: Albanian budget deficit data 1995–1998.

| Years | 1995 | 1996 | 1997 | 1998* |
|---|---|---|---|---|
| Budget surplus | -19507 | -31233 | -38083 | -52995 |
| in per cent of GDP | 8.5% | 11.1% | 11.2% | 11.8% |
| Budget deficit financing (I+II) | 19507 | 31233 | 38083 | 52995 |
| I. Domestic financing | 16600 | 28568 | 37743 | 30406 |
| 1. Direct credit from BoA | 5572 | 5100 | 2400 | 16000 |
| 2. Treasury bills | 11028 | 23678 | 35649 | 28906 |
| 2.1. T–bills from BoA | 700 | 3572 | 20834 | |
| 2.2. T–bills from banking system | 10328 | 20106 | 14815 | |
| 3. Government deposit | | 210 | 2489 | |
| II. Foreign financing | 2907 | 2665 | 340 | |
| | | | | |
| Credit for government | 13045 | 16600 | 28568 | 37670 |
| Credit for economy | 9158 | 11315 | 14346 | 15522 |
| Total credit (government+economy) | 22203 | 27915 | 42914 | 53192 |
| | | | | |
| Annual M2 change, stock | 17795 | 29899 | 33575 | 37054 |
| Annual M2 change, in % | 44.8% | 52.0% | 38.4% | 30.6% |

Note: all numbers, except percentages, are in millions of Leks. * denotes predicted values.

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