

Besimi, Fatmir

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The Role of the Exchange Rate Stability in a Small and Open Economy: The Case of the Republic of Macedonia

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NATIONAL BANK OF THE REPUBLIC OF MACEDONIA



Working Paper No.10

**THE ROLE OF THE EXCHANGE RATE STABILITY
IN A SMALL AND OPEN ECONOMY:
THE CASE OF THE REPUBLIC OF MACEDONIA**

Fatmir Besimi

Vice-Governor

September, 2004

Fatmir Besimi*
Vice-Governor of the National Bank of the Republic of Macedonia

**The Role of the Exchange Rate Stability in a Small and Open Economy:
The Case of the Republic of Macedonia #**

Abstract

The purpose of this paper is to present the role of the exchange rate stability in a small and open economy, where the case of the Republic of Macedonia is investigated. Also, an accent is given to the role of the expectations of the economic agents for the future movements of the exchange rate, where the speculative implications might be very costly for the domestic economy because of the higher and more volatile interest rates under the regime of de facto fixed exchange rate. On the other side, the liberalization of the capital account raises the question of the flexibility of the exchange rate and the monetary policy autonomy, the so-called impossible trinity. But given the high level of currency substitution and emphasized pass-through effect of the exchange rate on prices, the exchange rate full flexibility is not recommended. The possible shift towards more flexible exchange rate should be very cautious, step-by-step and within narrow margins, having in mind the possible implications on the economy and the financial system. Also, the experiences of the countries in transition show that regardless of the monetary strategy they implement or the official exchange rate regime they have, the countries in transition simultaneously take care of the exchange rate stability.

* Thoughts and conclusions in this paper are those of the author and do not necessarily represent the official statement of the National Bank of the Republic of Macedonia.

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1. Introduction

The experience of the Republic of Macedonia in conducting the monetary policy so far by applying the strategy of targeting of the monetary aggregates until 1995, and then by targeting of the exchange rate, shows that price and exchange rate stability was successfully maintained during the period of transition.

Having in mind the liberalization of the capital account (July 2003), the joining of the World Trade Organization (October 2002), as well as the application for joining the European Union (March 2004), Macedonia faces with significant systemic changes. In such an environment, analyzed from the aspect of the monetary policy and the exchange rate regime, the typical issue of the so-called impossible trinity arouses: liberalization of capital movement, fixed exchange rate and autonomous monetary policy¹.

In such an environment, recently, the issue of the exchange rate regime applied and the adequacy of the exchange rate level become more relevant in the Republic of Macedonia. One should take into account the fact that the unilateral commenting on the possible depreciation (devaluation) of the domestic currency in order to resolve the problem with the deficit in the economy's external sector, thus providing rapid economic growth, can only cause disturbance of the macroeconomic stability without having a real opportunity to meet the objective. Such comments, taking into consideration the liberalized capital account and the exchange rate targeting, may easily be transformed into speculative reactions with negative implications on the domestic economy (increase in the interest rates and their fluctuations) and the foreign exchange reserves (as a category important for the international liquidity of the country). This becomes even more important if the fact that the expectations are a very important component in finance is taken into consideration, having in mind that the economic agents plan their activities and react today depending on their anticipated expectations².

In order to contribute to the discussions about the exchange rate in the Republic of Macedonia, this paper will encompass the analysis of the exchange rate and its role in a small and open economy, such as Macedonia, being a country in transition and an applicant for joining the European Union (EU). In this regard, several aspects shall be analyzed, such as: the Balassa - Samuelson effect and the real exchange rate, the pass-through effect of the exchange rate on inflation and the Euroization.

2. The Republic of Macedonia is small and open economy

When explaining the role of the exchange rate in the economy, the fact that the Republic of Macedonia is a small and open economy with a high share of the foreign trade in the gross domestic product (GDP) and insignificant share of the foreign trade in the international trade, should be taken into consideration:

¹ For more information about the impossible trinity see Obstfeld (1998).

² The expectations are ascertained regardless whether the adaptive or rational expectations are in question. The distinction between the rational and the adaptive expectations, although important, is out of the domain of the research in this paper.

Table 1
Size and openness of the economy of the Republic of Macedonia

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003
Share of the foreign trade in GDP (in %)	87.2	81.8	87.2	90.2	79.5	87.6	76.4	81.9	78.5
Share of the foreign trade in the volume of the international trade (in %)	0,028	0,026	0,027	0,029	0,026	0,027	0,023	0,024	0,024

Source: State Statistical Office of the R. Macedonia; International Financial Statistics

Theoretically, the role of the exchange rate in a small and open economy can be presented through the Svensson (1999) and Ball (1998) model:

$$y_t = \mathbf{a}_y y_{t-1} - \mathbf{a}_r r_{t-1} + \mathbf{a}_q q_{t-1} + u_{yt} \quad (2.1)$$

$$p_t = p_{t-1} + \mathbf{b}_y y_{t-1} + \mathbf{b}_e (e_{t-1} - e_{t-2}) + u_{pt} \quad (2.2)$$

where, y – denoting the logarithm for the output gap (gap between the actual and the potential output); r – real interest rate; e – logarithm of the nominal exchange rate (an increase in the exchange rate means depreciation of the domestic currency); q – logarithm of the real exchange rate (an increase in the exchange rate means depreciation of the domestic currency); π - inflation; t – time period; u – disturbances i.i.d. (identically independently distributed), which include the supply side and demand side shocks, respectively, in the equations of the model; α, β, γ and ϕ - coefficients larger than zero.

The model indicates that the exchange rate influences the economy through two channels³: through the pass-through effect on the inflation, and through the current account of the balance of payments upon the output (i.e. the GDP). The first effect refers to the changes in the nominal exchange rate, while the second one pertains to the changes in the real exchange rate. Analyzed by dynamics, the first effect reacts on short-term basis, while the second one is long-term.

3. Balassa - Samuelson effect and the real exchange rate

In order to explain the influence of the real exchange rate, the so-called Balassa - Samuelson effect (Balassa, 1964 and Samuelson, 1964) should be elaborated. The model represents the economy by two sectors: open and closed sector, i.e. sectors for tradables and non-tradables. Hence, the consumption basket consists of two price components:

$$p_C = ap_T + (1 - a)p_N \quad (3.1)$$

where p_C is logarithm (rate of change) of the consumer price index; p_T and p_N are logarithms (rates of change) of the prices of tradables and non-tradables, respectively; also, the weights are given through a and $(1-a)$ for tradables and non-tradables, respectively.

The equilibrium prices of tradables and non-tradables are assumed to be equal to the relationship between the wages and the labour productivity (unit labor cost). Presented in logarithms, will obtain:

$$p_T = w - q \quad (3.2)$$

$$p_N = w - v \quad (3.3)$$

³ More information about the effects of the foreign exchange rate on the domestic economy, see in Svensson (1999), Ball (1998), Agenor (2000), Arestis and Sawyer (2003).

where q is logarithm (rate of change) of the productivity in the sector of tradables; while v is logarithm (rate of change) of the productivity in the sectors of non-tradables in the country. Further, it is assumed that at the level of the national economy, the wages are equalized in both sectors, on the assumption that there is labor mobility between the sectors.

Furthermore, the model assumes that the relative purchasing power parity holds in the sector of tradables (on a long-run):

$$e_{ppp} = p_T - p_T^* \quad (3.4)$$

where e_{ppp} - (logarithm of) exchange rate, when the purchasing power parity is valid in the sector of tradable goods; the asterisk * denotes parameters in a foreign country (for example, European Monetary Union). However, a special attention should be paid on the fact that the purchasing power parity is based on very strict assumptions: non-existence of trade barriers and full liberalization and flexibility of prices.

If we assume (such as De Grauwe, 1996) that the share of the tradables and the non-tradables in the consumption basket of the accession country and the Monetary Union are equal ($a=a^*$), as well as the labour productivity in the sector of non-tradables is equal ($v=v^*$), together with the assumption about the purchasing power parity in the open sector (equation 3.4), arranging according to e_{ppp} , we shall obtain the following relationship:

$$e_{ppp} = (p_C - p_C^*) - (1-a)(q - q^*) \quad (3.5)$$

The above relationship represents the productivityadjusted relative purchasing power parity theory of the exchange rate determination, which supposes that the exchange rates, on a long term basis, contain two determinants⁴: relative increase in the inflation, and relative increase in the productivity in the sector of tradable goods (Beachill and Pugh, 1998).

Thus, if the country joins the monetary union and no adjustments to the exchange rate are possible ($e_{ppp}=0$), the prices of tradables (see equation 3.4) will be equal to those of the monetary union at the level of ($p_T=p_T^*$), thus obtaining:

$$p_C - p_C^* = (1 - a)(q - q^*) \quad (3.6)$$

It could easily be ascertained from this equation that if there are differences in the the productivity growths in the sector of tradables among the Monetary Union member states, their inflation rates (measured through the consumer price index) have to be different as well.

According to the aforementioned, being small and open economies, the accession countries shall be price takers on the international market, i.e. the prices of tradables will be set at the level of the EU prices ($p_T=p_T^*$). Assuming, lower level of productivity in the sector of tradables ($q < q^*$), according to the "given" price of the tradable goods, the wages in nominal terms (in the sector of tradables in the candidate counties will be lower than those in the EMU ($w < w^*$), because if not, they will lose the competitiveness. According to the Balassa-Samuelson effect, since the labour productivity growth between the sectors differs (the sector of tradables and the sector of non-tradables), while the wages have a tendency of being slightly different, the prices in the sector of non-tradables in the candidate countries will be lower than those registered in the EU. The Balassa-Samuelson effect also assumes that the countries have different productivity growths in the sectors of tradables, while the difference in the productivity growths in the sector of non-tradables (for example, services) is negligible

⁴ This is consistent with the monetary approach to exchange rate determinants, as the interest rate has an impact in the short run.

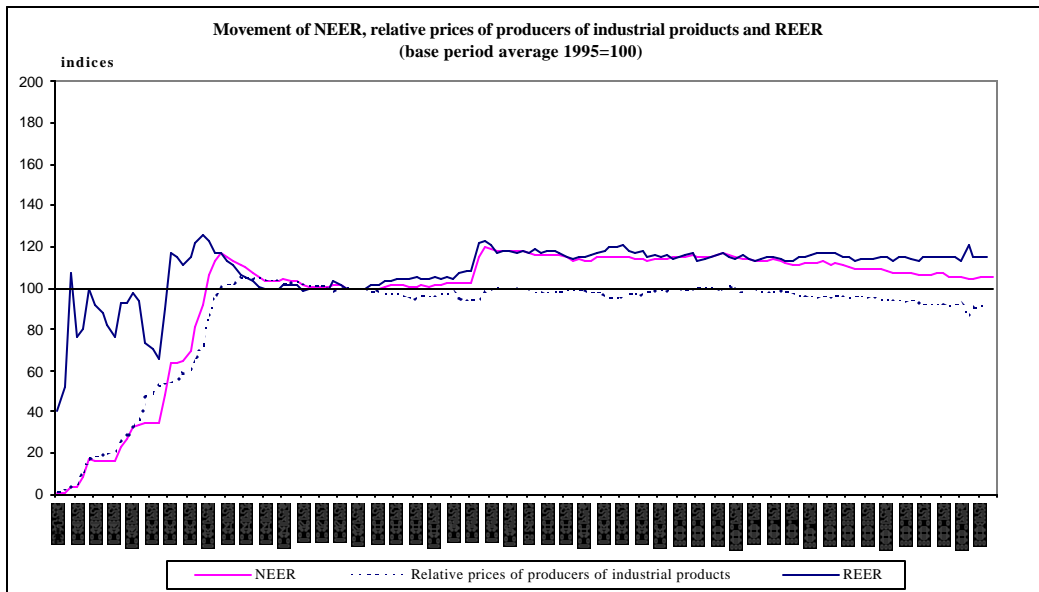
($v=v^*$). Hence, the higher productivity growth (in the sector of tradables) registered in the accession countries in order to catch-up the EU level, will increase the wages in all sectors (presumed flexibility of wages). Thus, the prices of the non-tradable goods will increase relative to the prices of tradable goods, resulting in a higher rate of inflation, such as presented in the equations (3.1) and (3.6).

The higher inflation, as it was explained previously by the Balassa-Samuelson effect, can have different implications on the economy, depending on the exchange rate regime. Thus, in the flexible exchange rate regime, the increased inflation will be followed by a nominal depreciation of the domestic currency. While, the application of the fixed exchange rate regimes can lead to real appreciation of the domestic currency and loss of the competitiveness of the accession countries relative to EU, which has a negative impact on the trade balance, i.e. increases the current account deficit. Although the Balassa-Samuelson effect is obvious in some countries, it is not enough of an argument for applying flexible exchange rate on a long-term basis (Coricelli, 2004), because of the exchange rate pass-through effect on inflation and the level of euroization (explained below in the text).

In order to see the Balassa-Samuelson effect in the Republic of Macedonia, having in mind the strategy of exchange rate targeting, i.e. pegging of the Denar exchange rate to the Euro (the Deutsche Mark), the real effective exchange rate should be analyzed, which should point to the competitiveness of the Republic of Macedonia in the international trade.

Chart 1

Movement of the nominal and the real effective exchange rate and relative prices according to the prices of the producers of industrial products



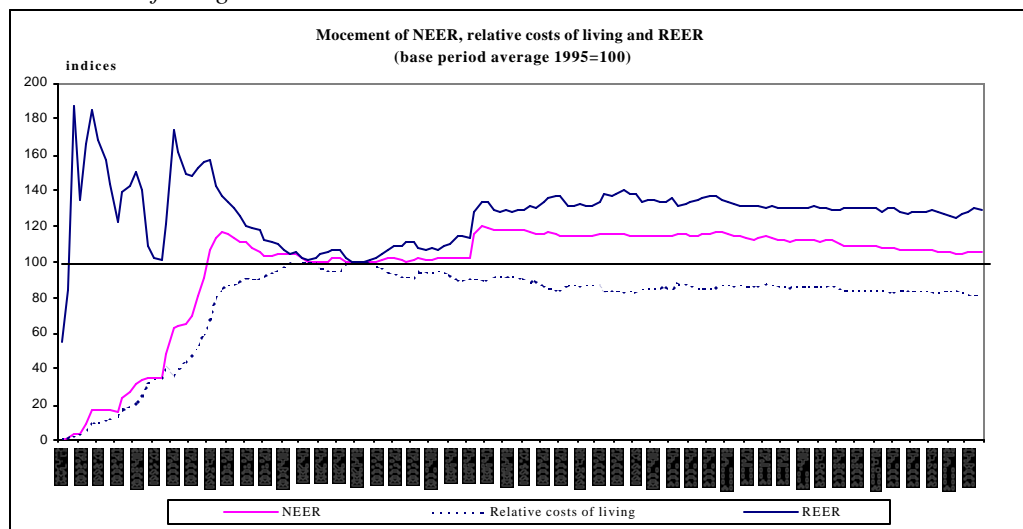
Source: National Bank of the Republic of Macedonia

In the charts 1 and 2 the movements of the real exchange rate of Denar at the beginning of the period of transition are given, according to two criteria, in order to distinguish the possible methodological differences. According to both criteria, prices of the producers of industrial products and the costs of living, a similar movement in the real effective exchange rate of Denar is registered. It should be emphasized that until 1995, when nominal depreciation of the Denar and lower exchange rate stability was registered, is characterized by significant fluctuations in the real Denar exchange rate. The period of targeting the exchange rate, as a nominal anchor in the monetary strategy, is characterized by a more stable movement of the

real Denar exchange rate. The level of the real effective exchange rate still exceeds the level registered in 1995, which means that in comparison with that period, as well as with the period just before the devaluation in 1997, the real effective Denar exchanged rate is more favorable from the aspect of the competitiveness of the country.

Chart 2

Movement of the nominal and the real effective exchange rate and relative prices according to the costs of living



Source: National Bank of the Republic of Macedonia

The data pertaining to Macedonia (table 2) indicate that there is no significant real appreciation of the Denar during the last decade, which in comparison with 1995, according to the both indices for calculating the real effective exchange rate, the Denar depreciated⁵ by 13.9% and 25.6% in 2003.

Table 2

Movements of the nominal and the real effective exchange rate and relative prices of the industrial products and costs of life

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
NEER	0.65	32.35	106.39	104.34	100.00	101.30	118.21	113.92	114.56	115.31	112.24	108.75	104.97
Rrp	1.25	22.24	67.60	96.84	100.00	94.92	94.16	89.73	89.01	94.44	91.51	90.12	90.44
REERcm	52.32	145.44	157.37	107.74	100.00	106.72	125.55	126.96	128.71	122.10	122.65	120.68	116.07
Rip	1.63	32.99	86.65	102.79	100.00	95.90	100.27	99.39	99.38	100.90	96.35	94.81	92.20
REERip	40.09	98.06	122.78	101.51	100.00	105.64	117.90	114.62	115.27	114.28	116.49	114.71	113.85
Rcl	1.19	21.50	67.77	97.08	100.00	94.11	91.62	86.12	85.40	86.66	86.00	83.67	83.56
REERcl	55.06	150.45	156.99	107.48	100.00	107.64	129.03	132.27	134.14	133.06	130.51	129.97	125.63

Notes:

1) NEER - nominal effective exchange rate; REER - real effective exchange rate; R - relative prices (domestic relative to foreign prices).

2) rp - retail prices; ip - industrial prices; cl - costs of living.

3) Exchange rate expressed as domestic currency per unit of foreign currency

4) Data: monthly average; Base: average 1995=100; Weight: foreign trade in 1998.

5) Period of analysis is December of the respective years.

Source: National Bank of the Republic of Macedonia

⁵ One should take into account, however, that relative to 1997, when a devaluation of the Denar was made, a slight appreciation is registered in REER of 4.1 and 3.4 percentage points according to the prices of the producers of industrial products and the costs of living, respectively.

Such movements endanger the concept of the Balassa-Samuelson effect, which is based on the assumption that the purchasing power parity (PPP) holds in the open sector on a long-run. Several explanations are possible here: we are taking into consideration the short period, relative to the PPP concept; the productivity growth is related to the pace of the structural changes in the real sector and the share of the informal sector in the economy. Furthermore, the PPP concept pertaining to the international trade without any barriers in reality is not confirmed completely. Also, the structure of the price indices that are being compared varies among the countries that are subject to analyses. In addition, the share of the non-tradable goods and administered prices, which distort the image of the PPP⁶, is also an important segment in the price structure.

Since the period that is analyzed refers to the period of pegging the Denar to the Euro (previously to the Deutsche Mark), the effect on the volume of the trade with the European Union would also be interesting for analysis.

Table 3

Foreign trade of the Republic of Macedonia with the European Union

	(% in total foreign trade, exports and imports of R. Macedonia, respectively)									
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Foreign trade	36.2	37.5	40.4	37.2	39.5	42.5	40.0	45.1	47.1	47.8
Exports	33.6	33.9	42.7	37.4	44.1	45.3	42.8	48.9	51.1	54.7
Imports	38.2	40.1	38.7	37.0	36.3	40.7	38.2	42.5	44.9	43.7

Source: Authors calculations with the data from the State Statistical Office of the R. Macedonia and National Bank of the Republic of Macedonia

Table 3 shows that during the last decade, the trade with the European Union increased from 36.2% to 47.8% of the total trade of the Republic of Macedonia, which points to the economic convergence to the European Union. The qualitative change in the structure is that the exports increased faster compared to imports, as a result of which the share of the exports in the total export of the Republic of Macedonia increased from 33.6% in 1993 to 54.7% in 2003. On the other hand, the share of the imports in the total imports of the Republic of Macedonia registered slower increase from 38.2% in 1993 to 43.7% in 2003. Such a shift in the trade, besides the structural changes and the changes in the real sector, is partially due to the nominal factors, such as the exchange rate i.e. the stability of the Denar exchange rate against the Euro (the Deutsche Mark).

The significance of the stability of the Denar exchange rate against the Euro is also evident taking into account the share of the Euro in the currency structure of the foreign trade of the Republic of Macedonia:

Table 4

Currency structure of the foreign trade of the Republic of Macedonia

	(in %)					
	1998	1999	2000	2001	2002	2003
Total foreign trade	100.0	100.0	100.0	100.0	100.0	100.0
Euro*	0.2	1.3	3.4	11.1	67.1	69.4
US Dollar	41.4	37.4	43.8	35.8	31.1	29.2
Deutsche Mark	49.9	53.1	45.9	45.9	0.0	0.0
other currency	8.5	8.2	7.0	7.2	1.8	1.4

*) for 1998 in European Currency Unit (ECU)

Source: National Bank of the Republic of Macedonia

⁶ In 2003, the share of the administrative prices in the costs of living in the Republic of Macedonia equaled 13.4%, which is satisfactory, compared to the share ranging from 1.0% in Poland to 24.9% in Estonia (Transition Report 2003, EBRD). These estimations are not compared to the Data of the State Statistical Office of the Republic of Macedonia, because of which they may not be identical.

Taking into consideration the high share of the European Union and the Euro in the foreign trade of the Republic of Macedonia, the stability of the Denar exchange rate against the Euro is vital for the Macedonian economy. Certain analyses (Besimi, 2003) indicate that slight fluctuations of the exchange rate have positive effects on the foreign trade, and accordingly on the economic growth in a small and open economy as a result of the "regime shift" effect.

Furthermore, the issue of the equilibrium exchange rate, i.e. avoiding the exchange rate misalignments, which is a complex issue from the aspect of defining the adequate level of the exchange rate that will provide internal and external equilibrium in the economy, while the possible short-term deviations not to violate the macroeconomic stability (Egert, 2004; Edwards and Savastano, 1999; Vrboska Terzijan, 2003). However, certain simple analyses, such as the analysis of the exchange rate through the so-called Big-Mac index (Gockov, 2003) indicates that the Denar relative to the prices of the hamburger (as a proxy for the costs of living) shows no overvaluation, which is consistent to the results in the aforementioned analyses in this paper.

4. The pass-through effect of the exchange rate on the inflation

The pass-through effect of the exchange rate on the inflation encompasses the influence of the changes in the nominal exchange rate on the inflation through the prices of the imports. The changes of the exchange rate have a direct influence on the prices of the imported goods and services, which afterwards influence the total inflation, no matter whether it refers to the increase in the input prices of the domestic production, or it is achieved directly through the increase in the consumer prices (depending on the structure of the imports).

In order to define the influence of the exchange rate on the prices, i.e. inflation, an empiric analysis is required. Having in mind the lack of longer time series and given the period of transition characterized by larger structural changes, and also the impossibility for preparing more complex analysis containing structural models, or co-integration models, for the needs of this paper more simplified analysis will be provided, such as: correlation between the changes in the exchange rate and the prices, as well as granger causality of the variables.

The correlation analysis (table 5) indicates that in the last decade of the transitional period, significant correlation between the movements and the changes in the exchange rate (shown as Denar/Euro) and the prices of the producers of industrial products (PPI) and retail prices (PRS) was registered.

Table 5

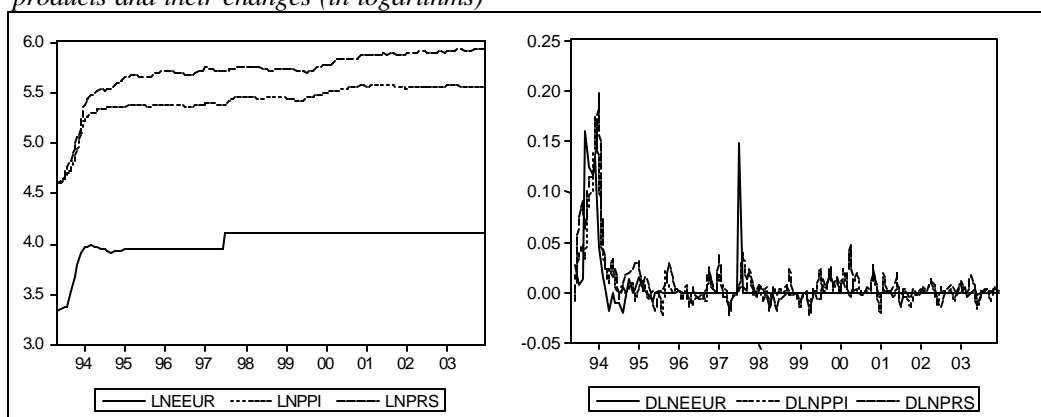
Correlation matrix of the movements and the changes in the exchange rate, the prices of the producers of industrial products and retail prices (in logarithms)

1993:5-2003:12	LNEEUR	LNPPPI	LNPRS	1993:5-2003:12	DLNEEUR	DLNPPPI	DLNPRS
LNEEUR	1.00000	0.80983	0.53057	DLNEEUR	1.00000	0.63720	0.58036
LNPPPI	0.80983	1.00000	0.84401	DLNPPPI	0.63720	1.00000	0.84908
LNPRS	0.53057	0.84401	1.00000	DLNPRS	0.58036	0.84908	1.00000

Similar conclusion can be drawn from the analysis of the chart pertaining to the movement of the exchange rate and the prices as well as their changes. Thus chart 3 indicates that the prices show very similar movement to that of the exchange rate. The chart containing the changes in the exchange rate and the inflation (price changes) is much more indicative, showing that at the beginning of the nineties, with the exchange rate being more unstable, the inflation was higher. Since 1995 increased stability of the exchange rate is registered, thus stabilizing also the inflation.

Chart 3

Movement of the exchange rate, the retail prices, and the prices of the producers of industrial products and their changes (in logarithms)



It can be ascertained that during the analyzed period, the pass-through effect was significant, with the strategy of exchange rate targeting being of key importance for controlling the inflation.

As it seems logical to raise the issue of causality the aforementioned results and arguments are supported by the so-called Granger Causality analysis, which should point which occurrence precedes the other, and vice versa, i.e. whether the prices follow the changes of the exchange rate, or vice versa, the exchange rate is stable because of the stability of the prices. One indicative analysis, without going into deeper structural examinations, is the so-called Granger Causality test (Table 6), where the results show that one can reject, with a critical value of 5%, the null hypothesis that the changes of the exchange rate do not precede (or, "do not cause") the changes in the prices, while the alternative hypothesis that the changes of the prices do not precede the changes of the exchange rate can not be rejected. In other words, the test shows that the changes in the exchange rate "are causing" changes in the prices.

Table 6
Granger causality

Pairwise Granger Causality Tests			
Sample: 1993:05 2003:12			
Lags: 6			
Null Hypothesis ^{*)} :	Obs	F-Statistic	Probability
DLNPPPI does not Granger Cause DLNNEUR	121	1.1509	0.33818
DLNNEUR does not Granger Cause DLNPPPI		19.198	4.0E-15
DLNPRS does not Granger Cause DLNNEUR	121	1.0755	0.38174
DLNNEUR does not Granger Cause DLNPRS		9.8465	1.2E-08
DLNPRS does not Granger Cause DLNPPPI	121	2.6116	0.02106
DLNPPPI does not Granger Cause DLNPRS		8.4280	1.7E-07

*) Critical value of 5%

Subsequently, we are trying to make a more formal analysis of the pass-through effect of the exchange rate on the inflation. To that end we apply the methodology of vector autoregression (VAR). This methodology enables us to analyze the movements of certain economic categories through time series, while at the same time avoids the problem of endogeneity of the variables, which is present in the structural econometric models. The analyzed period is

May 1993 – December 2003 with monthly data in order to have a larger number of observations so as to obtain more accurate results (table 7).

Table 7
Vector autoregression (VAR)

Sample (adjusted): 1993:07 2003:12 Included observations: 126 after adjusting endpoints Standard errors & t-statistics in parentheses			
	DLNEEUR	DLNPPI	DLNPRS
DLNEEUR(-1)	0.453815 (0.09101) (4.98645)	0.520955 (0.05663) (9.19911)	0.391686 (0.06661) (5.87991)
DLNPPI(-1)	-0.177926 (0.15573) (-1.14252)	0.210550 (0.09690) (2.17275)	0.528136 (0.11399) (4.63326)
DLNPRS(-1)	0.375357 (0.12468) (3.01066)	0.130323 (0.07758) (1.67985)	0.130490 (0.09126) (1.42993)
C	0.000573 (0.00204) (0.28074)	0.001213 (0.00127) (0.95478)	0.002826 (0.00150) (1.89021)
R-squared	0.402348	0.716171	0.718149
Adj. R-squared	0.387652	0.709191	0.711218
Sum sq. resids	0.056793	0.021990	0.030427
S.E. equation	0.021576	0.013426	0.015792
F-statistic	27.37740	102.6120	103.6175
Log likelihood	306.6053	366.3808	345.9231
Akaike AIC	-4.803259	-5.752077	-5.427351
Schwarz SC	-4.713218	-5.662036	-5.337310
Mean dependent	0.006013	0.007414	0.010606
S.D. dependent	0.027572	0.024896	0.029387
Determinant Residual Covariance		1.23E-11	
Log Likelihood		1046.298	
Akaike Information Criteria		-16.41743	
Schwarz Criteria		-16.14731	

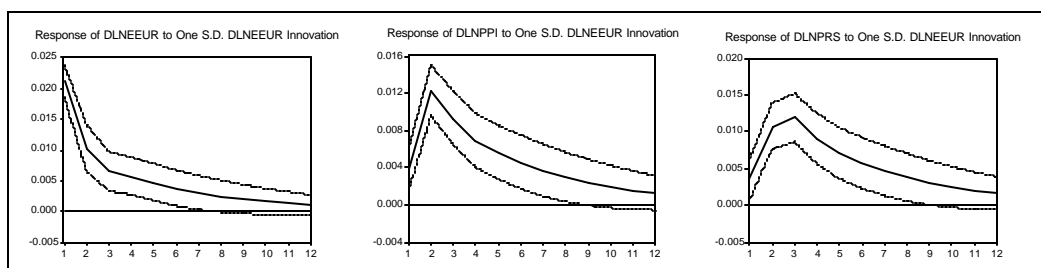
*) Prepared in software application *Eviews 3.1*

In the specification of the model, we started with a period of 6 time lags (6 months), when the results showed that statistically significant are only the changes in the first time lag. The model set in such a manner gives a satisfied explanation of the relation between the inflation and the changes in the exchange rate, which is evident from the R-square. Actually, it is assumed that the model explains 71.6% and 71.8% of the change in the prices of the producers of industrial products and of the retail prices, respectively. The pass-through effect of the exchange rate is more significant with the changes in the prices of the industrial producers relative to the effect on the retail prices (which points to the high import dependability of the domestic production). Thus according to the model, it is assumed that 1% depreciation of the Denar against the Euro in the analyzed period, *ceteris paribus*, will on average, act toward an increase in the prices in the forthcoming month by 0.52% and 0.39%, respectively in the prices of the industrial producers and retail prices.

Within the VAR methodology, two additional analyses can be made, i.e. so called response to impulses and decomposition of the variance. From Chart 4 it is evident that the response of the industrial producers and the retail prices to a change in the exchange rate by one standard deviation is positive, with the response of the prices of the industrial producers being faster and stronger with one time lag, after which the effect reduces throughout the following

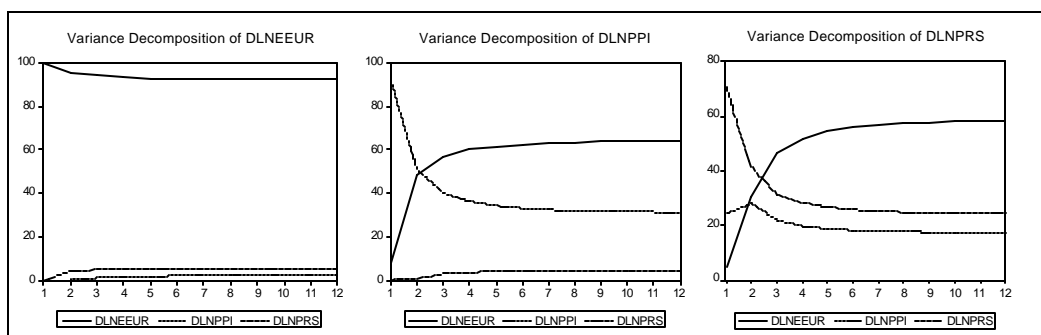
months, whereas the response of the retail prices is slightly weaker, with the positive reaction lasting in two time lags, after which the effect reduces throughout the following months.

Chart 4
Impulse response



Similar conclusion may be drawn from the decomposition of the variance (Chart 5), where the changes in the prices of the industrial producers in a period after a three months of time lag explain around 60% with the changes in the exchange rate, which is similar to the situation in the retail prices. This means that the decomposition of the variance shows that in 12 months of time lag changes in the prices of the industrial producers and in the retail prices are mainly due to the changes in the exchange rate by 64.1% and 58.3%, respectively.

Chart 5
Variance decomposition



The above empirical and econometric analysis clearly points to the high pass-through effect of the exchange rate on the inflation in the last decade, which reveals the significant role that the stability of the exchange rate played in the price and the macroeconomic stability in this period. One should bear in mind, however, that the analyzed period is characterized by two heterogeneous subperiods: with an unstable exchange rate in the first half of the 1990s as opposed to the following period of high stability of the exchange rate. Krstevska et al (2003) argue that the empirical analyses point to weakening of the pass-through effect of the exchange rate on the prices given the greater stability of the exchange rate. Similar conclusion regarding the change of the influence of the exchange rate given the greater stability has been empirically proved by Besimi (2003) regarding the effect of the “change in the regime” of the exchange rate. When drawing such conclusions, however, one should have in mind that the recent period is characterized with a de facto fixed exchange rate and the particular analyses of the effect of the exchange rate in this period could be biased in case of a regression analysis made on the basis of a fixed variable (i.e. exchange rate).

The experiences of other countries in transition (Table 8) confirm the significance that is paid to the exchange rate stability. Regardless of which monetary strategy or official exchange rate

regime these countries apply⁷, they simultaneously care about the exchange rate stability. Also, the literature contains certain recommendations regarding the exchange rate targeting while targeting the monetary aggregates and the inflation (Taylor, 2000; Jonas and Mishkin 2003; Eichengreen 2002).

Table 8
Variability of certain economic indicators important for the monetary policy

	Probability that the monthly change in percents is within the interval of +/- 2.5%			
	Exchange rate ¹	Foreign reserves ²	Reserve money ³	Inflation ⁴
Macedonia	96.8	48.2	32.3	85.5
Romania	46.7	30.3	23.9	9.1
Slovak Republic	83.3	47.2	36.4	38.6
Slovenia	84.4	49.4	28.4	22.7
Hungary	75.6	31.5	29.4	22.7
Croatia	98.9	43.8	31.8	26.1
Czech Republic	81.1	58.4	59.1	36.4

Source: NBRM, CNB, IMF

¹⁾ Monthly average exchange rate, January 1994 - April 2004

²⁾ End of period, January 1994 - June 2001; Macedonia: January 1995 - April 2004

³⁾ End of period, January 1994 - April 2004; Hungary: January 2000 - May 2001

⁴⁾ Annualized monthly inflation rates, January 1994 - April 2004;

Macedonia: monthly rates of inflation (according to consumer prices)

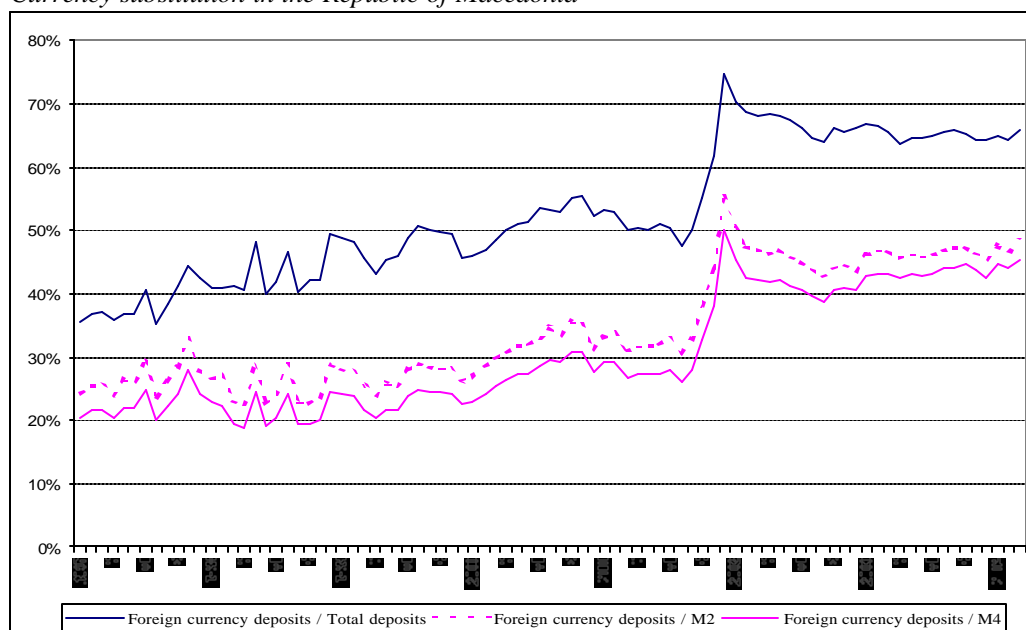
5. Euroization

Currency and assets substitution, in the literature known as “dollarization” or “euroization” are features of the developing countries and countries in transition, which in the past faced with financial and monetary crisis in the system, and hence diminished credibility of the domestic currency. Euroization has its advantages and disadvantages (Balino et al, 1999; Kraft, 2003; Feige et al, 2002). The advantage of the Euroization is illustrated through increased financial intermediation and ‘deepening’ of the financial system in the country, and simultaneously increased competition in the financial sector and reduced prices and interest rates on the financial services. On the other hand, however, the rapid increase in the operations denominated in foreign currency has its influence on the balance sheets of the domestic agents, and hence on the commercial banks. Thus the possible fluctuations in the exchange rate (depreciation, for example) will act towards decreasing the solvency of the domestic agents for repayment of the liabilities denominated in foreign currency, thus leading to a decline in the quality of banks’ placements. Currency substitution also reduces the possibility for seigniorage, which the authorities may use by increasing the monetary base.

In Macedonia (chart 6) there is a significant degree of euroization evident from the following indicators: share of the foreign currency deposits in the total deposits of the banking system, ratio of the foreign currency deposits to the money supply M2 and ratio of the foreign currency deposits to the money supply M4, which in March 2004 equaled 66.0%, 48.2% and 45.2%, respectively. This chart does not present the level of the foreign currency in circulation, since it is difficult to calculate. Indicatively, in the last quarter of 2001 before the euroconversion it is possible to see the amount of foreign currency that entered the banking sector. Part of those funds were withdrawn from banks in the first half of 2002, whereas the rest remained as deposits with banks.

⁷ Except for Macedonia and Croatia that have developed a strategy of exchange rate targeting, i.e. regime of pegged exchange rate, the other countries have a regime of managed floating exchange rate. Most of them apply a strategy of inflation targeting, except for Slovenia, which applies a strategy of monetary aggregates targeting.

Chart 6
Currency substitution in the Republic of Macedonia



Source: National Bank of the Republic of Macedonia

Compared with the other countries in transition, this level of currency substitution is high, with Croatia taking the leading position (table 9):

Table 9
Share of foreign currency deposits in the total deposits

in %	1999	2000	2001	2002	2003
Albania	25.2	27.8	32.1	32.2	30.6
Bulgaria	50.3	54.0	52.7	49.3	48.3
Bosnia and Herzegovina	63.8	54.6	62.5	54.5	50.0
Macedonia	45.6	52.4	74.6	66.0	64.4
Croatia	80.1	81.7	85.5	83.0	79.1
Czech Republic	13.4	13.2	12.5	-	-
Estonia	18.5	23.9	20.8	-	-
Slovak Republic	16.3	17.6	17.7	-	-
Slovenia	31.1	34.5	36.1	-	-

Izvor: International Financial Statistics, Croatian National Bank; Bulgarian National Bank

Currency substitution is very important phenomenon for the domestic economy, especially with regard to the monetary strategy and the exchange rate policy. Currency substitution lowers the efficiency of the monetary policy by participating as a component in the money demand, and it is out of the (direct) control of the monetary authorities. Currency substitution influences the money demand in a way that it jeopardizes the stability and the predictability of the money demand. Based on the liquidity concept, money demand is a function of the income and the interest rates, but we extend it for the component for currency substitution (equation 5.1). On the other hand, currency substitution is function of the expected changes in the exchange rate, which can even more endanger the stability of the exchange rate (equation 5.2):

$$m_t - p_t = f_y(y_t - y_{t-1}) - f_i(i_t - i_{t-1}) - f_s(s_t - s_{t-1}) + u_{mst} \quad (5.1)$$

with, m – the money supply growth, π – inflation rate, y – real output growth, i – interest rate, s – currency substitution, ϕ – coefficients ($\phi > 0$), u – stochastic disturbance in the equation, t – time period.

Currency substitution is presented as a difference between the expected changes in the (nominal) exchange rate and the transaction costs for the exchange of currencies, as well as the expected difference between interest rates in domestic and foreign currency:

$$s_t = \mathbf{j}_e [E_t(e_{t+1}) - e_t] - \mathbf{j}_i [E_t(i_{t+1} - i_{t+1}^*)] - \mathbf{j}_c c + u_{st} \quad (5.2)$$

where, c – transaction costs for the exchange of currencies; E – denotes the expected value of a certain variable in the period $t+1$; e – exchange rate; i, i^* – interest rates on deposits in domestic and in foreign currency, respectively; ϕ – ratios ($\phi > 0$).

The equation (5.2) shows that the expectations for the movements of the exchange rate could influence in the current period the currency substitution and the money demand, and hence on the efficiency of the monetary policy, the inflation and output.

6. Conclusions

From the analysis presented in this paper it is evident that the Denar exchange rate plays a significant role in the economy, especially having in mind the fact that Macedonia is a small and open economy where the process of transition has not been completed yet. Such a situation causes several other aspects to be taken into account in the analysis of the role of the exchange rate, such as:

- Balassa-Samuelson effect, which in the process of catching up with the level of productivity in the EU by the accession countries, causes higher inflation rate, or, in an environment of a fixed exchange rate, also a real appreciation of the domestic currency;
- high pass-through effect of the exchange rate on inflation; and
- high level of euroization, i.e. currency and assets substitution.

The analysis of the movement of the real effective exchange rate does not reveal significant appreciation of the Denar. This is achieved given the prudent fiscal policy and credible monetary policy, which enabled the inflation to be maintained on a low level, adequate to the level in the EU. In this way it was possible to prevent significant real appreciation of the Denar in the process of achieving the level of productivity of the EU.

The analysis of the foreign trade with the European Union, as a major trading partner, and given the targeting of the Denar exchange rate against the Euro, shows that in the transition period the trade with the EU increased, i.e. qualitative movements from a structural aspect are registered, with higher increase in the share of EU in the export relative to the increase in the share of the import of the Republic of Macedonia. This indicates that no negative implications of the movements of the real exchange rate on the trade with the EU have been registered.

Nevertheless, given the liberalized capital account and in order to leave more room for autonomous monetary policy, in certain papers and discussions it is recommended to give some flexibility to the exchange rate which should be managed and with narrow margins in the beginning (often margins of $\pm 5\%$ are mentioned). This would reduce the possibility for

possible speculative attacks on the exchange rate, which could be accompanied with negative implications for the domestic economy.

On the other hand, the pass-through effect of the exchange rate on the inflation is a restrictive factor for the use of the exchange rate flexibility, since in a small and open economy, the pass-through effect is sizeable. The analyses of the pass-through effect of the exchange rate in Macedonia also confirm the significance of this transmission mechanism. One should bear in mind that the size of the effect is reduced if there is greater stability of the exchange rate, thus requiring attention to be paid to the exchange rate stability.

The euroization, i.e. the currency and assets substitution in Macedonia is on a high level, which is a consequence of the inherited low credibility of the domestic currency created in the previous periods characterized with hyperinflation (in the beginning of the 90's). From the aspect of the exchange rate regime, the euroization is another restrictive factor in using the (flexibility of the) exchange rate as an instrument of the monetary and the foreign trade policies. In such environment, the role of the autonomous monetary policy and flexible exchange rate regime becomes less important.

Thus given the high level of currency substitution and emphasized pass-through effect of the exchange rate on the prices, exchange rate flexibility is not recommended. The possible shift toward more flexible exchange rate should be very cautious and within narrow margins, having in mind the possible implications on the economy and the financial system.

However, this should not be misunderstood that an improvement of the trade balance of the country can be based on unilateral corrections of the nominal exchange rate. In essence, the trade balance and thus economic growth should be based on the structural reforms in the real sector in order to increase the competitiveness of the domestic goods in the international markets.

The experiences of the countries in transition show that regardless of the monetary strategy they implement or the exchange rate regime they have, the countries in transition simultaneously take care of the exchange rate stability.

Finally, last but not least is the fact that in this period it is very important not to create wrong expectations about the future setup of the monetary policy and the exchange rate regime, in order not to create speculative reactions with negative implications meanwhile.

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