"**Exchange rate crisis management: A Policy issue for Ukraine and other Transition**

**Countries.**"


Masters Research Report


by Vyacheslav Honchar


Kyiv, 1998

Table of Contents

**Abstract**

Due to turmoil on Asian financial markets, a number of transition economies in Eastern Europe have recently encountered significant outflows of foreign capital. The panic among the Western portfolio investors threatens the stability of regional currencies and increases interest rates. Destabilization of the foreign exchange markets and high interest rates call into question the attainment of financial stabilization and decrease the probability of expected economic growth. The empirical part of this paper deals with estimation of long-run relationships between the money supply, the exchange rate and inflation. For this purpose, cointegration methods are employed, and a vector error correction model is constructed for the forecasting. Furthermore, the variance decomposition answers the question: how long does it take for shock in money supply or the exchange rate to be realized in the price level? Empirical findings provide a basis for policy

iii

implications to work out an anti-crisis program and appropriate exchange rate policy.

**Part I**

## 1. Introduction

"On July 2 of 1997, after months of asserting that it would do no such thing, the government of Thailand abandoned its efforts to maintain a fixed exchange rate for the baht. The currency quickly depreciated by more that 20%; within a few days most neighboring countries had been forced to emulate the Thai example.

What forced Thailand to devalue its currency was massive speculation against the baht, speculation that over a few months had consumed most of what initially seemed an awesomely large warchest of foreign exchange. And why were speculators betting against Thailand? Because they expected the baht to be devalued, of course."[1] The Thai crisis can be classified as a balance of payments crisis, and easily explained in terms of the speculative attack model worked out by Krugman in the late 1970's.[2]

Since the beginning of turmoil in South-East Asia, many analysts have started to pay more and more attention to the transition countries in Eastern and Central Europe. The reason for this attention is "contagion", the phenomenon in which a currency crisis in one country often seems to trigger crises in other countries with which it seemingly has only weak economic links (e.g., Mexico and Argentina, or Thailand and the Philippines).[3]

Currency crisis seems to be one of the most serious problems for transition economies. Experts of the British journal *The Economist* have conducted research targeting to measure the probability of currency crises in different countries of Central and Eastern Europe (results are in the table: Appendix 0).[4] This research was conducted prior to the Hong Kong stock exchange crisis in October 1997. At that time, the transition countries like Ukraine were still unaffected by the Asian turmoil. Researchers have looked at a number of macroeconomic indicators for the

1

transition countries and compared them with the same indicators for Mexico (1994) and Thailand (1996).

Economic theory suggests that the higher the current account deficit, the higher the probability of speculative attack. It is an alarming fact that 18 out of 26 former communist countries an accumulated deficit of current account at 7% of GDP or higher in 1996, while some of them have reached 10% level. If such a huge deficit is financed with flighty speculative capital instead of long-term foreign direct investment (FDI), than a country can be very vulnerable to massive outflow of capital. In most East European economies, the current account deficit was higher than in the crisis countries. According to this indicator, Ukraine looks like the least risky country in the region. The problem is that the Ukrainian current account is financed with high yielding short term T-bills denominated in domestic currency. As a result, the moderate size external debt is very expensive. Thus, Ukrainian external debt was about 20% of GDP at the end of 3rd quarter 1997, while the payments to service the debt were almost 3% of GDP.[5] Moreover, the size of current account deficit could be underestimated by official sources, due to the high volume of smuggled imports, plus data could be intentionally 'improved' by the government. For example, according to the central bank the current account for 3rd quarter of 1997 was in surplus [6], while according to TACIS's "Ukrainian Economic Trends" it was in deficit. At the same time, FDI may be overestimated by official sources in Ukraine, because most long-term funds are attracted by the government or by business under governmental guaranties. For example, $736 mln. of long-term loans were attracted to Ukraine in the 3rd quarter 1997, while $688 mln. (93%) of them were guarantied by government.

Once an attack begins, currency reserves are the first line of defense. All Eastern European countries possessed more reserves than Mexico; but almost all, much less than

Thailand. It seems like Poland and Hungary can rely on a thick shield, but, as history suggests, the seemingly big enough Thai reserves quickly disappeared once the baht came under severe and persistent attack. Ukraine is the 'leader' by this indicator. Moreover, the NBU spent more than $1 billion of its reserves during second half of 1997. First quarter of 1998 and the net change in reserves could be about 30-50% down, according to a very rough estimation, because information on the currency reserves is contradictory.

The more the exchange rate in real terms goes up, the lower the competitiveness of a country's exports become and, consequently, the higher the probability that speculators will undertake a massive attack. Like Mexico and Thailand, most East and Central European countries have pegged their domestic currencies to USD or a basket of hard currencies. But the inflation level in these countries is significantly higher than in the USA or Germany. So, real exchange rates have reached an overvalued level. Only Hungary and the Czech Republic have experienced insignificant real appreciation with respect to DM over the period from 1994 to 1997, while all the others are much ahead of Thailand and Mexico. It should be stressed that Ukraine is the leader again with 103% of real appreciation.

Those countries whose current accounts reflect high budget deficit can experience major problems trying to maintain their domestic currencies at the declared level. According to this criteria on Hungary, Slovakia and Ukraine are major violators, because their budget deficits are higher than 4% of GDP. Moreover, officially reported data on budget deficits should be considered very carefully. For example, the forecasted budget deficit for Poland was 3% of GDP, but it is underestimated due to the fact that privatization revenues are included on the revenue side of the budget. Once they are excluded, as they should be in normal practice, the actual budget deficit will increase to 6.5% of GDP.

Another indicator which signals accumulating problems is a speed of money growth.

3

Quick growth of the money supply can lead to a consumption boom, which, consequently, can increase current account deficit and accelerate raise in prices of property and assets. High growth of bank's loans is an obvious indicator of a price bubble in the region. But a 36% increase in money supply in Ukraine can not be considered as a serious threat, because it was accompanied by low inflation. The point is that the economy was significantly demonetized during the period of hyperinflation and foreign currency played the roles of medium of exchange and store of value. Observed increases in the money supply is nothing else but remonetization of the economy after financial stabilization.

Economist's analysts argue that no one of these indicators can predict a currency crisis with high degree of confidence, but experience suggests that if several indicators are flashing red, there is a high probability of crisis. The last column Table in appendix 0 provides a rough estimation of currency crisis risks on a 12 point scale. Each country received 0, 1 or 2 points for each indicator. Obtained results suggest that Estonia, Latvia, Lithuania, Poland, Slovakia and Ukraine could experience a currency crisis. Only Hungary and Czech Republic seems to be secure, because they have abandoned fixed exchange rate regimes earlier.

As predicted by the Economist, a number of countries in Eastern Europe have recently experienced significant capital outflows due to the worsening Asian crisis (e.g., Russia and Ukraine in the late 1997, early 1998). Partially this problem results from earlier decisions to peg domestic currencies to one or a basket of hard currencies. The peg is considered to be important to stabilize inflation and impose fiscal discipline on governments. Such an exchange rate policy was also considered helpful in promoting a foreign capital inflow into the transition economies, since these countries desperately need investment for the renovation of production facilities. In most cases, only foreign investment can bring the hoped for economic growth and the rapid convergence of standards of living between developed and transition economies.

4

On the other hand, an inflow of capital can cause a currency crisis, if, for example, due to some external shock, investors withdraw their money relatively quickly, regardless of the fundamentals in this particular country. Outflows and inflows can have significant effects on the real sector of economy under a fixed exchange rate regime[7]. Sharp changes in the money supply can make banking systems unstable[8]. There is empirical support for this argument: in 25% of all cases a currency crisis is followed by a banking crisis within 1 year and in 33% of all cases -- within 3 years.

Defending the exchange rate is costly for the government, because usually an increase in interest rates is called for in developed countries. Bensaid and Jeanne have modeled the behavior of government and speculators in case of higher interest rates costs for the economy.[9] Their model suggests that such a crisis is self-fulfilling. Empirical evidence from European countries in early 1990's supports this view. For example, in Italy rigorous defense of the exchange rate increased the burden of government debt to an unsustainable level, which reinforced the speculative attack and finally the government was forced to devalue the lira. In similar circumstances, France put a significant burden on the real sector and the government abolished support for the currency in the face of a deeper recession threat, all of which lad to the currency crisis of July 1993.

Considered models can not be applied directly to transition countries. The point is that devaluation can bring some additional costs for transition countries as compared to developed countries. A number of transition countries have recently experienced hyperinflation and the exchange rate may significantly influence inflationary expectations of economy. An increase in inflation is perceived to have an adverse effect on the confidence of domestic and international investors. Thus, there is an urgent need to study the relationship between inflation and the exchange rate. The magnitude of the cost which devaluation can put on the economy should

5

be assessed, but there is not much research in this field so far.

The exchange rate of the Ukrainian currency with respect to USD has been almost constantly under pressure since September 1997 due to an outflow of foreign capital from the internal T-bill's market. During this period, the hryvna has survived a few speculative attacks and the Ukrainian central bank has imposed some additional regulations on capital movements. The continuous real appreciation of domestic currency since 1995 has made the nominal exchange rate adjustment unavoidable. Thus, during this period, Ukraine has experienced high inflation (1995 - 60%, 1996 - 40%, 1997 - 10%), while exchange rate was relatively stable within 1.7 - 1.9 hr/$ band. Major discussions among economists and officials on whether the hryvna should be devalued or not started at the end of 1997. A number of Ukrainian policy-makers and their advisors argued that a devaluation can cause economic disaster, because it will cause one-to-one change in inflation and destroy all the attainments of financial stabilization. This argument was considered as the major one against devaluation as a corrective measure. As the result, an unsustainable currency band (1.75-1.95 hr/$), was announced for the first half of 1998. While the band for 1997 was 1.7-1.9 hr/$  by the mid February, the hryvna was already out of the band, which made foreign investors even more pessimistic about investment perspectives in Ukraine.

The results obtained can have significant policy implications for Ukraine and other countries which are in similar conditions. They can help to work out some measures to treat currency crisis or prevent it. It is particularly important to treat currency crisis in the least costly way, because political regimes are not stable enough and mistakes can be dramatically important for the future of democracy and economic progress in transition countries.


**Part II**

## 2.1 Theoretical background

For the purpose of this research we need to start from two basic theoretical concepts. These concepts are the quantity theory of money and purchasing power parity.

The quantity theory of money argues that inflation should be determined by money supply growth in excess of GDP growth, velocity of money and real GDP[10].

$$M \ V = P \ Y \qquad\qquad (2.1)$$

where M is the money supply, V is the income velocity of money, P is the price level in economy and Y is total income. The theory suggests that causality should go from the money supply to prices. Thus altering the money supply a central bank can attain desired level of inflation in economy.

The purchasing power parity (PPP) is a very old concept which is based on the 'law of one price' and can be presented in the form as follows:

$$P_1 = SP_1^* \qquad\qquad (2.2)$$

where $P_1$ is the price of good 1 in domestic country, $P_1^*$ is the price of good 1 in the foreign country and S is the exchange rate (the domestic currency price of a unit of foreign currency)[11]. There are a number of assumptions which underline this law. First, it assumes no transportation costs. Secondly, it assumes perfect information -- individual agents know the prices of each good in both countries. Thirdly, there are no barriers to trade. All these assumptions are required because identity (2.2) is guarantied by arbitrage[12]. Two versions of PPP can be derived from the law of one price. The absolute (or strong) version of PPP can be described by the equation as follows:

$$P = SP^* \qquad\qquad (2.3)$$

where P and $P^*$ are the general price indices in the domestic and foreign countries

7

respectively. Unfortunately, almost all of the previously mentioned assumptions do not hold in practice. So, there was the need to develop the relative (or weak) version of PPP which is as follows:

$$S = bP/P^*  \qquad (2.4)$$

where b is a constant which reflects factors preventing absolute PPP from holding. In other words:

$$dS/S = dP/P - dP^*/P^*  \qquad (2.5)$$

There is one problem in working with PPP concept. The point is that neither the absolute nor the relative version say anything about causation[13].

### 2.2 The model

We can start from the quantity equation. But in case of Ukraine, real GDP will be excluded from the model, because GDP of the shadow economy is not reported in official data. So, including real GDP as explanatory variable, we can get an obvious measurement error. Moreover, there is little variation in real GDP as compared to variation in other variables. Thus, we assume real GDP to be constant and our model will be as follows:

$$MV = P.$$

The income velocity of money supply can not be assumed constant in the period of hyperinflation as it is usual in case of low and stable inflation[14]. Thus, the velocity can be described as a function of interest rate or inflation. The higher inflation or interest rate the higher the income velocity of money. We can not effectively use interest rate for our purpose, because the real interest rate, was sometimes negative during the period of hyperinflation in Ukraine. So, we are left only with inflation as a proxy for the velocity.

Now we can ask a question, how do the people estimate inflation then the government prints money to finance budget deficit? There is not much trust in official data on inflation under such circumstances. Moreover, these data are usually very late, because in situation of daily price increase, the public uses the exchange rate index as a proxy for inflation.

From the theoretical point of view, it can be reasonably assumed that PPP holds in case of high inflation in Ukraine and low inflation in US. Moreover, low inflation in US allows us to assume the price level in foreign country to be fixed and changes in the domestic price level should be approximately equal to changes in the exchange rate. Unfortunately, the theory does not say anything about causality between these variables. Thus, exchange rate may be incorporated in the quantity equation as a proxy for the income velocity of money, due to its influence on inflation expectations.

In a summary, we can say that the exchange rate index should be incorporated in this model as third explanatory variable for two reasons. First, the exchange rate has a direct effect on inflation through the price of imports. It is an important channel of influence, because most transition economies can be classified as small and open ones. Second, an indirect relationship between these variables operates through agents' expectations of inflation, which might be indicated by the exchange rate devaluation. Thus, the model which is to be used for empirical research looks like follows:

$$\hat{P} = \hat{M} + \hat{E}$$

where E is the exchange rate index. The intuition behind this model is that monetary policy influences both prices and the exchange rate. The excess money starts to chase the same amount of goods and services. In this case, foreign currency can be treated as a special kind of good which is very liquid. So, due to higher liquidity, the exchange rate will

react faster than prices of goods and services to the change in money supply. Economic intuition suggests that a monetary shock is partially transmitted to prices through the exchange rate.

### 2.3 Data and functional form.

The economic theory does not say anything about which monetary aggregate is the best to be used in the quantity equation. The money supply is proxied in our case by cash money in circulation M0 in millions of hryvna (source: The National Bank of Ukraine). It does not matter too much which monetary aggregate to use in our case, because all of them -- M0, M1 and M2 -- are closely correlated with each other. Moreover, Ukrainian economy has been significantly demonetized during hyperinflation and as a result the difference between M0 and M1 is not very big.

The cash exchange rate (EXCASH) of the hryvna in respect to USD is selected as a proxy for the exchange rate, because the official exchange rate was far below the market rate and there was an interruption in functioning of Ukrainian Interbank Currency Exchange in 4th quarter of 1993 - 1st quarter of 1994. So, the only time-series available for the period since 1993:01 is the cash exchange rate. The index of cash exchange rate hrn./$ (1993:01 = 1) is calculated as an average between bids to buy and sell and average for every month for commercial banks in Kyiv (source: Kalina LTD). The choice of the proxy for inflation was significantly influenced by the choice of the proxies for the two other variables. As long as, the decision is made to use the cash money in circulation and the cash exchange rate, it is also reasonable to use CPI (CPIINDEX) as proxy for inflation (source: The State Committee of Statistics). Intuitively the cash money in circulation and the cash exchange rate should influence consumer's prices the most.

10

The functional form is suggested by the nature of data. The cash money in circulation and the CPI increase exponentially, while the index of cash exchange rate can also be approximated by an exponential function. Thus, all three variables will be used in the natural logs, denoted by capital L before the name of a variable.

### 2.4 Causality tests

It is important to check causality first for a number of reasons. First, it is important for the specification of the model then OLS is to be used as a method of estimation. Second, it is important for interpretation of the results for policy-makers. The Granger test is to be used for the determination of causality. "The Granger causality test assumes that the information relevant to the prediction of the respective variables is contained solely in the time series data on these variables."[15] Since the future cannot predict the past, if variable X (Granger) causes variable Y, then changes in X should precede changes in Y. Therefore, in a regression of Y on other variables (including its own past values) if we include lagged values of X and it significantly improves the prediction of Y, then we can say that X (Granger) causes Y and vice versa.[16]

Unfortunately, this simple test has one significant drawback and one has to be careful in implementing the Granger causality test. The problem is that the number of lagged terms to be included in regressions is an important practical question. The theory does not say anything about optimal number of lags to be included.[17] So, the direction of causality may depend crucially on the number of lagged terms included. One can conclude this discussion that the Granger causality test is very sensitive to the number of lags used in the analysis. That is why Davidson and MacKinnon suggest using more rather than fewer lags.[18]

The results of Granger causality test, which are available in the appendix 1, confirm

11

the quantity theory of money and our intuitive expectations about cause-effect relationship between inflation and the exchange rate. These results allows us to reject with more than 99% confidence the hypothesis that money and the exchange rate do not cause CPI with 3 and 4 lagged values included. To account for the test's drawback, different lag specifications were attempted from 2 to 6 and the results are similar though not so strong. At the same time we fail to reject null hypothesis that CPI does not cause neither money nor exchange rate at any acceptable level of confidence. The results obtained allow us to conclude with a high degree of confidence that the exchange rate cause CPI and the cash money supply cause CPI, not the other way around.

### 2.5 OLS methodology

Having determined causality, we can start building our model. The model specification is chosen based on the results of causality test. LCPIINDEX is treated as dependent variable, while on the right hand side LM0 and LEXCASH are assumed to be independent with a constant term. By their nature, these three time series should not be stationary by nature and cointegration methods should be applied here to deal with this problem. Early results of least squares confirm this assumption. (Appendix 2)

All three coefficients are highly significant and the adjusted R-squared is extremely high, while Durbin-Watson statistics is dangerously low. All this indicates that we may have a spurious regression problem. The Engle-Granger method can be employed here. It yields consistent long-run estimates, error correction coefficients (speeds of adjustment terms) and a residual-based cointegration test (ADF). The test however possesses biased

standard errors and low power in a univariate, non-simultaneous framework[19]. For this test, residuals from the previous regression should be tested for a unit root. (Appendix 3)

Thus, according to the results of the Engle-Granger test, the non-stationarity of the residual can be rejected at the 1% significance level. It means that coefficients obtained are long-run elasticities of CPI with respect to money and exchange rate index. Due to price rigidity, we can not hope for immediate adjustment to the long-run equilibrium. To account for this phenomena, an error correction model can be employed. For this purpose, a first difference of logged CPI is regressed on first difference of logged money, exchange rate and the lagged residual from the previous regression. (Appendix 4)

The error correction model suggests that 33% of disequilibrium is eliminated in the first period. This rather high speed of adjustment is not surprising for a country which has recently experienced hyperinflation. R-squared is sufficiently high for forecasting purposes, but it should be remembered that the original long-run coefficients can be biased, because of the low power of Engle-Granger test of cointegration.

### 2.6 Johansen cointegration

To address the limitations of the Engle-Granger methodology, the Johansen approach can be used. The Johansen methodology yields consistent

coefficient estimates and standard errors in a multivariate framework that concurrently estimates the number of cointegrating relationships as well as allowing for hypothesis testing. The endogenous framework allows for simultaneous interactions between CPI, money supply and the exchange rate, as well as the examination of role of each particular variable in the determination of other variables through variance decomposition device. The Johansen methodology's disadvantage

is that asymptotically efficient estimates assume that the correct lag length and model are chosen. Hall's, Stock & Watson's and Toda's Monte Carlo simulations reveal that in finite samples Johansen estimates are very sensitive to the choice of lag length and sample period[20].

Using lag intervals from 1 to 3 and assuming a linear deterministic trend in the data the Johansen cointegration test is conducted and the null hypothesis of no cointegration between our variables can be rejected at 1% significance level. (Appendix 5)

Both estimated long-run coefficients for the money supply and the exchange rate are statistically significant at 1% level. The estimated elasticity of the money supply .71 is close to the one estimated with the least squares methodology, while elasticities for the exchange rate are significantly different in these two attempts. This disparity in values of long-run coefficients can be attributed to the fact that the Johansen method better accounts for endogeniety of CPI and exchange rate, while in the least squares specification the exchange rate is assumed to be strictly an exogenous variable.[1]

To address the problem of sensitivity of the Johansen method to number of lags, included similar tests were conducted for different lag combinations: 1-4, 1-3 and 1,3. The obtained results allows us to reject the absence of cointegration with a probability of more than 99%. These tests also suggest the presence of only one cointegration equation with probability 95%. Estimated in these attempts long-run coefficients lies in the relatively narrow bands for LM0 from 0.62 to 0.91 and for LEXCASH from 0.18 to 0.45. Maximum estimates obtained in case of only 2 lags included seems to be artificial because even in the case of Ukraine more lagged values should be analysed to assess the long-run relationship.

---

[1] Johansen method is generally accepted among professionals as superior to Engle-Granger least squares approach to treat cointegratin relationships between variables. So, we would suggest to stay with Johansen estimated coefficients.

14

**2.7 Vector error correction model**

The vector error correction model (VECM) allows for gradual adjustment. The optimal form of VECM was selected according to a number of criteria. Standard errors and AKAIKE information criteria were minimised and R2 – maximised. Thus the optimal model includes three consecutive lagged terms. The VECM supports previous findings that about 30% of disequilibrium is eliminated every period, with the coefficient on error correction term highly significant. (Appendix 6)

This model seems to be pretty good for forecasting the CPI and the exchange rate. The adjusted R-squared of the CPI model is .85. Forecasting the exchange rate is difficult because Ukraine has a sort of fixed regime and the central bank plays an important role in exchange rate determination in an actions at the Ukrainian Intrabank Currency Exchange. There are administrative bands in which the cash exchange rate can fluctuate relative to the official exchange rate.

**2.8 Variance decomposition**

This device allows us to identify the role of external shocks for each of the endogenous variables. To this end, forecast errors are calculated for each variable for different periods (12 in our case). Variation in current and future values of innovations is perceived as a source of forecast error. The ambiguity in interpreting impulse response functions arises from the fact that the errors are never totally uncorrelated. When the errors are correlated, they have a common component which cannot be identified with any specific variable. A somewhat arbitrary method of dealing with this problem is to attribute

all of the effect of any common component to the variable that comes first in the VAR system. In this particular situation, we attribute common shocks to M0, because the theory suggests that this is the only exogenous variable in our system. Variance decomposition is presented in Appendix 7.

Inflationary inertia plays the major role in inflation determination, but its role is quickly decreasing over time. At the same time the role of the exchange rate is increasing during the first quarter, but afterwards it diminishes too. It is only the money supply which determines inflation in the long-run. Thus, the relatively important role of exchange rate in very short-run should be mentioned, but in the long-run the importance of this factor is even lower than inflation inertia.

Variance decomposition of the money supply confirms the theory. It is obvious that this variable is strictly exogenous, because it determines itself almost for 100%.

From variance decomposition of the exchange rate, the conclusion can be made that this variable is totally determined by its own inertia and money supply. Moreover, money supply is the only important factor for determination of the exchange rate in the long-run.


**Part III**


**3.1 Conclusions and Policy implications**


A cointegrating model provides robust estimates of long run elaticities of the CPI wich respect to the money supply and exchange rate. Unbiased estimates of standard errors can be used for constructing confidence intervals, while VECM allows accurate forecasting of inflation and the exchange rate.

© Vyacheslav Honchar, EERC, 1998.          16

The major result of this research is that economic theory finds support in Ukraine. The money supply plays the main role in determination of inflation and the exchange rate plays money supply. Monetary policy is the only exogenous variable in the system of equations considered and exchange rate policy is a derivative instrument. Thus, it can be concluded that the role of the exchange rate is somewhat overestimated and overemphasized by international advisors and government officials in Ukraine. The price shock of devaluation can be significant only in very short run, but will hardly have any adverse impact on fundamentals.

Moreover, the corrective effect of managed devaluation can outweigh the negative effect of inflation and its adverse impact can be smoothed by tight monetary policy. It should be taken into account that the real exchange rate with respect to USD has increased eight times since 1993:01. The hryvna is too expensive now as for transition country which is targeting to attract foreign capital. Moreover, interest rates remain very high: 49% annual on 9-month government T-bills, while some banks are loosing liquidity and the banking system as a whole is on the edge of crisis. Expensive credits for the economy can delay expected for this year economic growth. The latest data for the beginning of 1998 confirmed my empirical results. There was no one-to-one change in the CPI observed since the beginning of the mild devaluation in January 1998. The CPI has been growing much slower than exchange rate index. But the warning should be made here that estimated elasticities can be useful only in the case that devaluation is slow and predictable. In the case of a sharp and uncontrolled devaluation the estimated coefficient for the exchange rate may be useless, because the massive panic can increase prices with a one-to-one ratio or even higher.

**Endnotes**

[1]Krugman, Paul, "Currency crises", http://web.mit.edu/krugman/www/disinter.html, 1998, p.1

[2]Krugman, Paul. "A Model of Balance of Payments Crises", *Journal of Money, Credit and Banking,* 1979, 11, pp. 311-325.

[3]Krugman, 1998, *loc. cit.*

[4] "Trouble Ahead in Eastern Europe?", *The Newsletter About Reforming Economies Transition*, November 1997, vol. 8, #5, p.19.

[5] Ivannik, Natalia. "Platiojnyi balance [Balance of payments]." *Visnik NBU [Herald of the National Bank of Ukraine]*, March 1998, pp. 10-11.

[6]*Ibid.*

[7] "Exchange rates. The fixed and the flexible. The Czech Republic is the latest emerging economy to allow its currency to float within a pre-set band. Why are these bands becoming so popular?", *The Economist*, 16 March 1996, pp. 84-86.
"Exchange rates. Fix or float, sink or swim?" *The Economist*, 21 June 1997, pp. 81-82.

[8]. Goldfajn, I & Valdes, R, "Capital Flows and the Twin Crises: The Role of Liquidity", *IMF Working Papers*, July 1997.

[9] Bensaid, B., Jeanne, O., "The instability of fixed exchange rate systems when raising the nominal interest rate is costly", *European Economic Review*, Vol. 41, #8, Aug. 1997, pp. 1461-78.

[10] Mankiw, Gregory. Macroeconomics. 2nd. ed. New York: Worth Publishers. 1994, p. 147.

[11] Gibson, Heather. International Finance. London and New York: Longman. 1996, p. 51.

[12] *Ibid.*

[13] Gibson, *op. cit.*, p. 52.

[14] Mankiw, *op. cit.*, p. 149.

[15] Gujarati, Damodar. Basic econometrics. 3nd. ed. New York: McGraw-Hill. 1995, p. 620

[16] *Ibid., p. 621.*

[17] *Ibid., p. 622.*

[18] *Ibid., p. 623.*

[19.] Strauss, J.,"Does real GDP determine stock prices", *Working paper*, EERC Ukraine MA Program at National University of Kyiv-Mohyla Academy, 1997. P. 6.

[20.] *Ibid., p. 7.*

19