DETERMINANTS OF THE CHOICE OF AN EXCHANGE RATE REGIME FOR A TRANSITION ECONOMY

by

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Abstract

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(Director of the Christian University)

This paper addresses the question of exchange rate regime selection in a transition country from the political economy prospective. The influence of both political and economic conditions of 13 Central and Eastern European and former Soviet Union countries on the choice of exchange rate regimes is tested empirically by a probit model. Results of the regression determine to what extent country's political and economic structure, including its political instability, openness, historical rate of inflation, and variability of export earnings, help explain the selection of exchange rate regime. Higher political cost of devaluing after pursuing fixed-rate regimes does offset the effect of short-term considerations. Structural and economic variables have a significant influence on the regime choice. The estimated model turns out to be statistically successful, generally in line with the predictions of the theory and actual data for Ukraine.

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GLOSSARY

Currency Board Arrangement	A monetary regime based on an implicit legislative commitment to exchange domestic currency for a specified amount of foreign currency at a fixed exchange rate, combined with restrictions on the issuing authority to ensure the fulfilment of its legal tender
European Monetary System	A system established to encourage monetary stability in Europe, through the implementation of credit and exchange rate policies. Based on the unified composite monetary unit (the euro) consisting of a basket of European Union currencies.
Fixed-rate System	A system which secures a certain parity to one or more certain anchor currencies. Unlike a currency board, the parity can be altered by the authorities without a previous legislative act. Example – European Monetary System
Independent Floating	A regime, where the exchange rate is market determined, with any foreign exchange intervention aimed at moderating the rate change and preventing undue fluctuations in the exchange rate, rather than at establishing a level of it
Managed Floating	A regime, where the monetary authority influences the movements of exchange rate through active intervention in the foreign exchange market without specifying, or recommitting to, a preannounced path for the exchange rate

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Chapter 1

INTRODUCTION

Before 1971 most member countries of the IMF had a declared par value for their currencies, with margins of one percent and the obligation to maintain the par value for their currencies unless a "fundamental disequilibrium" arose. The structure of the world monetary system changed in two fundamental ways. The first change was the movement from practically fixed to floating exchange rates. This fundamental shift dates from 1973, when several different types of exchange rate regimes emerged and were formally legalized as possible choices in the Second Amendment of the IMF Articles of Agreement on April 1, 1978 (Wickham, 1985). The second change was the process of international financial integration that moved the world system from low to high capital mobility. This structural shift is conventionally dated around 1973 or 1974 as well, when Germany and the United States found that, the necessity of shoring up a fixed exchange rate having disappeared, capital controls were no longer needed and could be removed. During the period of 1979-90 increase international capital mobility was more rapid and comprehensive in the United Kingdom, Japan, France, Italy, and a number of smaller countries, all of which had retained extensive capital controls in the 1970s, open up to world financial markets (Frankel, 1995).

These two characteristics of modern international monetary system - floating rates among the major currencies and high capital mobility - should be taken into account during the studying monetary and exchange rate policies.

With the emergence of a variety of exchange rate regimes, increasing attention has been given to the rationale for choosing one type of regime over another. Within the general problem of the suitable exchange rate regime for the developing (transition) countries (and for Ukraine in particular) there are continuing debates around the choice of the nominal exchange rate regime between pegged or fixed rates and independent float ("clean" or at least managed).

While examining the literature on exchange rate regime choice, I found out that this topic is very vast and sometimes "overstudied". The prospects of implementation of a crawling peg system have been the major and important debate in some Latin American countries in 1970s and 1980s, particularly Argentina, Chile, Uruguay, Colombia, when they were attempting to control hyper-inflation and also get the economy out of recession. There is quite a lot of literature on this particular version of the subject (Wickham, 1985 is a good survey of literature; Carrasquilla A., 1995; Kamas L., 1995; Salvastano M., 1992) - and some similarities between those countries and the transition economies today. Even Russia had been looking at the experience of these countries (Kamulainen, Tuomas. 1999).

One of the most important broad works in the field of exchange rate economics is by Mark P. Taylor (1995). This paper reviews the literature on exchange rate economics over the last two decades, with particular reference to recent developments. The author points out at the increasing sophistication of econometric tests in empirical work on exchange rates and shift from examination of macroeconomic models of exchange rates toward work related to foreign exchange market as a financial market (analysis of microstructure of the market, risk premium models). Following this new approach, Roberto Chang and Andres Velasco (1998) propose a formal framework in which such

claims can be analyzed and evaluated. The approach starts from the micro foundations of a country's financial system: study commercial banking, Central Bank policies, and exchange rate regimes as mechanisms whose purpose is to implement socially desirable allocations in an economy with incomplete financial markets. Financial considerations can have such weight that it has been argued that we need a new theory of exchange rate regime choice based on financial structure rather than the degree of price rigidity or the source of stochastic shocks.

Most empirical work reveals relationships suggested by economic theory if research is concentrated on the long or medium-run determinants of exchange rates. But in the short-run macroeconomic fundamentals alone may be not successful (Taylor, 1995), justifying growing interest in market microstructure. Inadequate development of domestic financial markets and lack of integration with the world market greatly influence the possibility of choice of the certain exchange rate regime (Wickham 1985). Therefore it is worthwhile to distinguish between economic factors that may favor a particular type of exchange arrangement and institutional features that may the results of the policies followed by authorities. It is clear however that in terms of assessing the appropriateness of exchange rate regime and policy, the macro fundamentals are of great importance and provide necessary framework for policy debate and analysis.

Following this reasoning it is more likely to observe the result of particular policy as is suggested by the economic theory in the longer perspective. That is why it is possible to expect some positive results from the chosen exchange rate in the medium-run and the process of convergence to the desired exchange rate stability or real targets may well be combined with short-run period of free floating or tight monetary policy. Little consensus has emerged on the link

between the exchange rate regime and macroeconomic performance. At a theoretical level, it is difficult to establish unambiguous relationships because of the many links between the nominal exchange rate regime and macroeconomic variables. To cite several examples from the burgeoning literature, fixed exchange rates have been argued to foster output and trade growth by reducing exchange rate uncertainty but also to reduce trade and output growth by impeding necessary relative price adjustments. These regimes have been argued to reduce inflation by creating a visible measure of discipline, but also to raise inflation thus making it easier to shift the costs of "cheating" to future governments (Boschee, 1996; Rolnick, Weber, 1989; Smith, 1996).

Ghosh and Gulde (1997) focusing on two key macroeconomic targets: inflation and growth used a data set covering nine regime-types for one hundred forty countries over thirty years to examine the link between the regime, inflation, and growth. The strongest results concern inflation. Countries with pegged exchange rates experienced significantly lower and less variable inflation rates. This anti-inflationary benefit of pegged exchange rates derives both from lower growth rates of the money supply (a *"discipline"* effect), and from slower growth of residual velocity (a *"credibility"* effect). While mean growth rates do not differ much across exchange rate regimes, the lower average inflation rate under pegged rates is associated with a higher volatility on the real side, with both output growth and employment shares less variable under floating rates. Pegged regimes are thus characterized by lower inflation but more pronounced output volatility.

Therefore a developing country like Ukraine should choose the priorities of macroeconomic policy and adopt effective, consistent and sustainable monetary and exchange rate policy. A fixed rate regime, where exchange rate serves as nominal anchor, is considered inappropriate for the transition economy

(Wickham 1995) because of lack of substantial official foreign exchange reserves and liberalized capital account transactions as well as high inflation differential as compared to trade partners. Nominal exchange rate is a bad anchor if further inflation is expected and cannot be controlled. Devaluation should not be postponed simply as a part of anti-inflationary strategy. By the time the devaluation is imminent, it is too late to use the exchange rate as a nominal anchor. A crawling peg is preferable to fixed exchange rate subject to disruptive devaluation (Fry, Nuti, 1992). Monetary policy and fiscal discipline should be assigned to stabilize domestic prices, while the exchange rate is used to promote export. Masson (1999) presents good discussion of options for the more advanced Central and Eastern European Countries (CEECs) in choosing exchange rate policies. In the early years of transition pegged exchange rates in these countries served a special, temporary role in anchoring price levels and relative prices to those in developed economies and in disciplining monetary and fiscal policies. With a considerable progress in market reforms some of these countries moved to a greater flexibility. EU membership become politically and economically desirable goal for most CEE countries, and with the launching of the Euro on January 1, 1999 there is an incentive for pegging the Euro or orienting their monetary policy around a Euro-based exchange rate target. On the other hand, increasing capital mobility imposes additional constraints on fixed-rate (pegged) regime. An alternative approach - inflation targeting - is concluded to have advantages over Euro peg, but is not possible to function successfully in present economic conditions. While the adaptation of Euro is likely long-run objective for these countries, in practice a hybrid strategy giving a weight to both the exchange rate and inflation is likely to emerge in the transition to EMU membership.

It is obvious that it is early for Ukraine to consider the prospective of entering European Monetary Union. The weakness of the Ukrainian economy along

with external crises caused the country to lose control over its exchange rate system in autumn 1998 and led to selective default on its domestic debt. The credibility of existing or any future exc hange rate regime in Ukraine depends greatly on economic institutions and character of structural reforms, overall macroeconomic policy and the positive resolution of external debt crisis. In Ukraine economic discussion has also centered on the "right" exc hange rate regime since the launch of the Hryvnia in 1996. The regime of horizontal exchange rate bands did not appear suitable to keep the currency externally or internally stable or to foster economic development. And the National Bank of Ukraine did not see further maintaining of Hryvnia within the pre-announced bands feasible and worthwhile. Now the Ukrainian currency floats more or less freely. There is still a room for discussion of the exchange rate policy for a longer perspective.

In this paper an attempt is made to address the question *what are the main determinants of the choice of an exchange rate regime for a transition economy.* The extensive literature on exchange rates focuses mainly on the economic factors which direct management of the exchange rates in the countries (Wickham, 1985 is a good survey of literature; Carrasquilla A., 1995; Kamas L., 1995; Salvastano M., 1992). Also many authors (Mundell, 1997; Köller, Wes, 1999; Masson, 1999) who study transition economies of the CEE which have concluded Europe Agreements with EU and negotiate accession to economic and monetary union (EMU) pay much attention to the Optimum Currency Area theory in the choice of exchange rate regime.

This analysis is scarcely sufficient because the choice by a government of exchange rate regime is also greatly affected by political and structural conditions in the economy. Cukierman, Edwards, and Tabellini (1992), Edwards (1996), Klein and Marion (1997), and Bussire and Mulder (1999) claim both

theoretically and empirically that structural variables and political variables also significantly affect the likelihood of devaluation and choice of exchange rate policy. The merits of these studies for of the CEE as well as FSU countries are unfortunately limited, because these economies were excluded from study. Instead, large sets of the developing countries of Latin America and Asia were chosen. Some statistical deficiencies of over-aggregation are also present.

In this paper the possible influence of both political and economic conditions of the CEE as well as FSU countries on their choice of exchange rate regimes is tested empirically by the series of probit models. Given the results of the regression it is possible to determine at what extent political instability of the country, along with economic and structural characteristics, affects the exchange rate regime choice.

Short-term political considerations may outweigh the political cost effect of devaluation and switch to the floating-rate regime. This implies that the authorities in these countries try to reap short-term credibility gains by committing to fixed rate regimes and do not pay much attention to future effects of the wrong exchange rate policy. There is a possibility that in this subset of countries the political cost of abandoning a peg is small or zero, because of underdevelopment of political system. Strong opposition to the leading party is seldom exist and there is no quite high danger for the party in power not to be re-elected.

Chapter 2

THEORY

2.1 Inflation and inflationary expectations

To study the determinants of exchange rate regime choice the standard model of long-run exchange rate behaviour may be useful for describing the expectations that actors in the market derive from particular government monetary policy. Theory of purchasing power parity (PPP) is a strong but convenient assumption to explain movements in the exchange rate between two countries' currencies (Sachs, Larrain 1992; Krugman, Obstfeld, 1997). The PPP theory states that the exchange rate between two countries' currencies equals the ratio of the countries' price levels. In symbols:

$$E_{H/\$} = \frac{P}{P_{US}} \quad \text{or} \quad P = E_{H/\$} \cdot P_{US},$$

where $E_{H/\$}$ - home currency/\$ exchange rate; P - home country price index (home currency price of a reference basket of goods); P_{US} – U.S. price index (dollar price of reference basket of goods sold in the United States). This *absolute* version of PPP asserts that all countries price levels are equal when measured in terms of the same currency.

PPP is very convenient assumption, but of course it oversimplifies reality. Less restrictive version of PPP (*relative PPP*) allows the domestic price index P to deviate from the foreign price index (multiplied by exchange rates) because of natural and artificial barriers (transport costs, tariffs). But if these barriers are stable over time, percentage changes in exchange rate between two currencies

over any period equals the difference between the percentage changes in national price levels (inflation rates). Relative PPP between home country and USA would be

$$\frac{(E_{H/\$,t} - E_{H/\$,t-1})}{E_{H/\$,t-1}} = \pi_{H,t} - \pi_{US,t}, \text{ where } \pi_t = \frac{P_t - P_{t-1}}{P_{t-1}} \text{ denotes inflation rate.}$$

Concept of PPP combined with liquidity theory of money demand (demand for real money balances) gives the theory named *monetary approach to the exchange rate* (because only factors influencing money supply and money demand in the economy play explicit role in the theory). This is long-run theory because it does not allow price rigidities – rather prices adjust quickly to maintain full employment as well as PPP. The general prediction of the monetary approach is that the exchange rate (relative price of two currencies) is fully determined in the long run by the relative supplies of those currencies and relative real demands for them. Shifts in interest rates and output levels affect the exchange rate only through their influences on money demand. Changes in monetary growth may cause ongoing inflation at the same rate. This expected price level inflation will eventually affect long run interest rates via *Fisher Effect*:

$$R_H - R_F = \pi^e_H - \pi^e_F$$

A rise in difference between home and foreign interest rates occurs only when expected home inflation π^e_H rises relative to expected foreign inflation π^e_F. In other words, real rate of return on assets in home currency remains unchanged – in the long run, purely monetary developments have no effect on an economy relative prices. Monetary approach predicts that rise in money supply growth provokes *expectations* of higher future inflation and future devaluation of the

currency. These expectations in turn cause a rise in interest rates (Fisher effect) and a sharp depreciation of the currency.

Rate of M^S growth - → P^e -, E^e - (PPP)→ R_H- (Fisher effect)→ M^{D-} → P -→E -

The strong influence of exchange rate on prices suggests that exchange rate policy can play a direct role in anti-inflation policy beyond the indirect role of the exchange rate on aggregate demand and the overall level of unemployment. It is quite plausible to use this approach in studying the government exchange rate policy, which is usually set for certain time periods during which prices indeed may change in response to developments in monetary sector of the economy. Hence on the ground of monetary approach it is possible to expect the negative impact of inflation on the choice of fixed exchange rate regime – countries with a history of rapid inflation will tend to have a greater propensity to devalue.

On the other hand, governments in countries with high inflation rates (for instance, Bolivia in 1985) try hard to *reduce inflationary expectations* by choosing more fixed exchange rate regimes. If most prices are linked to the exchange rate and it is stabilised (with cuts in government deficit), the hyperinflation in the economy ends (Sachs, Larrain 1992). Policy makers in countries with unstable price levels suffer a larger political cost when devaluation is undertaken. A central bank that wants to fight inflation can commit more credibly by fixing the exchange rate, or even giving up its currency. Workers, firm managers, and others who set wages and prices then perceive that inflation will be low in the future, because the currency peg will prevent the central bank from expanding even if it wanted to (without soon jeopardizing the viability of the exchange rate peg). When workers and firm managers have low expectations of inflation, they set their wages and prices accordingly. The result is that the country is able to attain a lower level of inflation, for any given level of output.

The major assumption of the PPP is that non-monetary factors do not affect long run (equilibrium) exchange rates – real exchange rates remain the same over the period of time in question. In real life changes in world relative demand for domestic products or change in relative output supply will alter real exchange rates (relative prices of domestic goods to the foreign goods) and affect nominal exchange rates. In this work it is assumed that real exchange rates between the countries' currencies are at their long-term equilibrium levels, or just slightly undervalued. When PPP does not hold, fixing the exchange rate can be dangerous if it is not accompanied by other policies. Wage indexation causes inflation to persist, further rising domestic price level P above EP* and deteriorating international competitiveness of the economy. The balance of payments situation soon becomes unsustainable, and the exchange rate has to be devalued, eventually leading to renewed inflation. The amount of misalignment of the real exchange rate measured as the difference between actual and equilibrium real exchange rate over the course of peg represents an important cost of maintaining the peg and is a good predictor of the probability that the peg will be abandoned. Under the assumption that the equilibrium real exchange rate is stable, the actual real exchange rate may approximate the degree of misalignment (Klein, Marion, 1997). It is possible that appreciation of the real exchange rate will have negative impact on the pegged exchange rate.

2.2 Shocks to the economy

The main impulses or shocks that cause economic fluctuations may come from three sources: supply shocks; policy shocks; private demand shocks. *Supply shocks* (advances in technology, nature conditions, raw material prices, changes in nominal wages) directly affect the production side of the economy. *Policy shocks* follow the decisions of macroeconomic authorities (changes in fiscal policy; money supply, interest rates, budget deficit – money demand shocks;) and mostly affect the demand side. *Private demand shocks* (shifts in investment or

consumption spending) come from the changing expectations about the future development of the economy.

The Mundell-Fleming model of the open economy assumes that differences in interest rates among countries are eliminated by rapid capital flows after the technological advances and dismantling of capital controls (Mundell 1963; Fleming 1962 ct. in Sachs, Larrain 1992). Therefore, interest rate in the home country must be equal to the interest rate in the rest of the world, if no capital control is imposed (***i=i****). This assumption normally does not hold (for example, uncovered interest rate parity condition: $i = i^* + \frac{(E^e - E)}{E}$), but is useful in analysing different exchange rate policies for the open economy. Assumption of free capital mobility can be relaxed to allow for the capital controls on capital account transaction – the usual situation for transition economies of Central and Eastern Europe studied in this paper.

The impact of both aggregate demand and money demand shocks on the economy is illustrated by Poole (Poole, 1970) who uses conventional IS-LM model developed by John Hicks in 1937. The policymaker minimises social losses from the deviation of output from the targeted level by picking one of the two available instruments, but not both. Assuming open economy with free capital mobility the monetary authority has two policy instruments: 1) controlling money supply (choice of the floating exchange rate); 2) controlling the exchange rate (fixed). In the case of fixed exchange rates LM curve moves endogenously, like IS does in case of floating regime so that equilibrium output level take place along the capital mobility (CM) line where ***i=i****. Price levels, government spending, taxes, investment, expected marginal productivity of capital, future disposable incomes are fixed. Random shocks to aggregate demand are reflected by shifts in IS schedule, while money demand shocks cause shifts in LM.

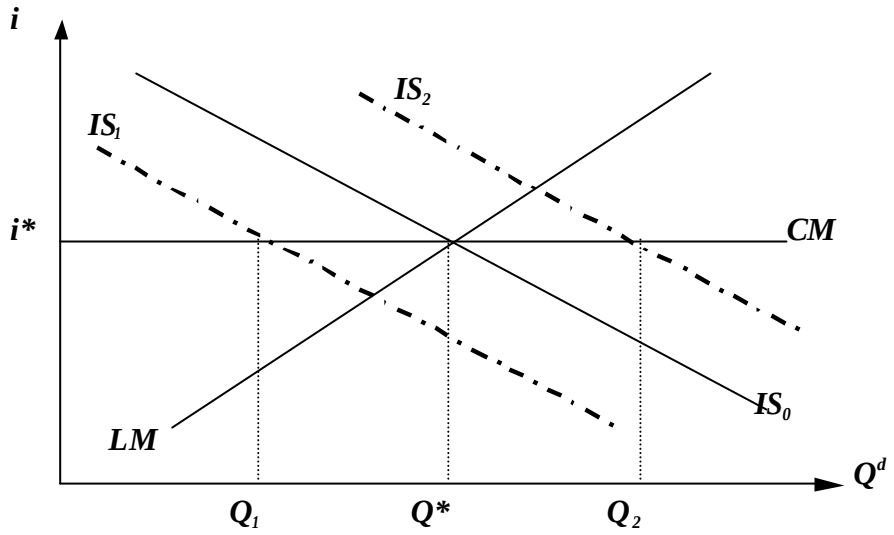


Figure 1. Aggregate Demand Shocks

Under fixed exchange rate regime Central bank intervenes to support the nominal exchange rate. Money supply changes as economic agents buy/sell the domestic currency for foreign assets from the Central Bank until capital inflows and outflows equate domestic and foreign interest rates. LM curve shifts while it intersects IS schedule on CM line. Output fluctuates greatly, from Q_L to Q_H. Conversely, with floating exchange rates, money supply remains unchanged. Differences in interest rate between home country and the rest of the world lead to appreciation or depreciation of domestic currency and equilibrium is restored via trade balance (TB). Appreciation of the currency leads to deterioration of TB and IS shift back to the left; depreciation improves TB, IS moves to the right. As the result, aggregate demand remains the same at Q^*. *The analysis predicts that the economy subject to aggregate demand shocks is better to adopt floating exchange rate regime to stabilise output.*

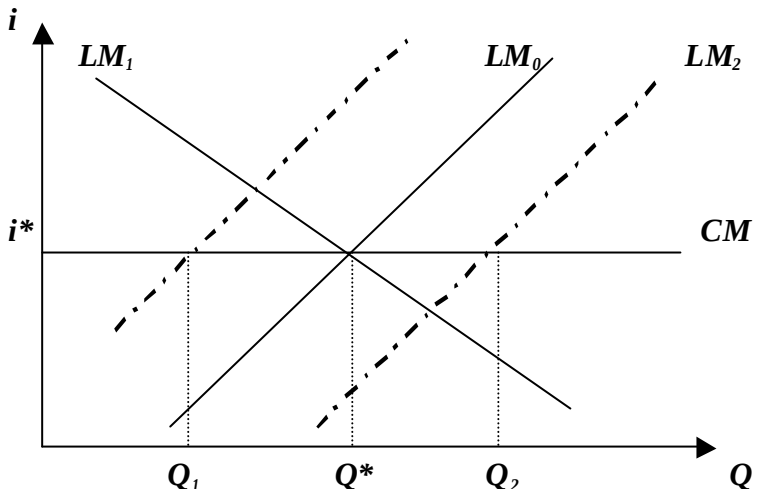


Figure 2. Money demand shocks

Under fixed exchange rate regime Central bank intervenes to support the nominal exchange rate. LM curve shifts back to the initial position. Aggregate demand remains the same at Q^*. Only international reserves of the central bank change as the result of capital inflows and outflows. Under flexible exchange rates changes in money demand cause fluctuations in exchange rates and TB changes, inducing endogenous shifts in IS schedule. Output fluctuates greatly, from Q_L to Q_H. *In the economy subject to money demand shocks the fixed exchange rate is a better stabiliser.*

2.3 Theory of optimum currency area

Theory of optimum currency area (OCA) developed first by Robert Mundell shows how such structural factors as size, openness, and geographic trade concentration may affect the choice of exchange rate policy of a country. The general prediction is that *fixed exchange rates are most appropriate for areas closely integrated through international trade and factor movements* (Mundell, 1961). "A high degree of economic integration between a country and a fixed exchange rate area reduces economic stability loss due to output market disturbances and

magnifies the monetary efficiency gain the country reaps when it fixes its exchange rate against the area's currencies" (Krugman, Obstfeld, 1997).

The gains from joining the OCA (fixing exchange rates) depend on the *openness* of the economy. If traded goods constitute a large proportion of the economy output, then exchange rate uncertainty is a more serious issue for the country than ability to withstand aggregate demand shocks with independent monetary policy. In other words, such an economy is too small and too open to have an independently floating currency (Frankel, 1999). If such criteria of openness as marginal propensity to import and high labor mobility are taken into account, variability of output and employment under fixed exchange rate is relatively low. Openness acts as automatic stabilizer. OCA criteria include the intensity of trade links and magnitude of income correlations (To what extent are the shocks to the economy in question and those in OCA correlated?).

All the kinds of shocks may originate within the economy or be transmitted form abroad. In the last case the *openness of the economy* is what matters in determining the optimal the exchange rate regime in the sense of external shock resistance. A more open economy will experience larger impact on national price levels and thus the exchange rate. The effect of the openness on the choice of exchange rate regime may be twofold (Klein, Marion, 1997). The openness measured by ratio of exports and imports to the total output of the economy may increase the probability of devaluation because of misalignment of real exchange rate. But the large political cost of the devaluation due to greater impact on domestic price level may influence government decision to adopt more fixed exchange rate regime.

High *variability of external shocks*, that is the frequency and magnitude of economic disturbances affecting real sector of the economy, is expected to be compatible with flexible exchange rate regime.

2.4 Currency crisis theories

Theory of speculative attacks and exchange rate crises (Krugman, 1979; Obstfeld, 1984, 1996; Obstfeld, Rogoff, 1995; Radelet, Sachs, 1999) stresses the importance of international reserve levels (international liquidity) as one of the factors for the maintaining the pegged exchange rates and creating the credibility of the Central Bank policy. The inconsistency between internal and external policies (first generation theories) or even if such inconsistencies are absent, but fundamentals are vulnerable (second generation theories) make market actors anticipate the exhaustion of foreign reserves in the future and "attack" the currency well before reserves are run out. Depletion of reserves, usually in combination with devaluation, triggers a panicked outflow by foreign creditors holding short-term claims. The panicked outflow of short-term capital leads to macroeconomic collapse, characterized by a sharp economic downturn, soaring interest rates, depressed equity prices, and a plummeting currency. Large initial stock of reserves may prevent devaluation. In the absence of money-financed budget deficits and with large foreign reserves Central Bank may maintain fixed exchange rate regime. Hence it is likely that higher international liquidity reduces the probability of abandoning the peg. On the other hand, countries with higher growth of domestic liquidity (credits) have lower ability to maintain the peg. The major assumption in the theories of the currency crisis is perfect capital mobility. The countries studied in this paper are usually characterised by capital controls, at least at the capital account transactions. As the result, the policy makers have greater control over the exchange rate. But the assumption of the positive link between level of international reserves and the probability of maintaining a pegged exchange rate regime is still valid. Central Bank needs the reserves to support the domestic currency in case of current account imbalances.

Chapter 3

METHODOLOGY

In this paper the probit models are used to test the influence of both political and economic variables on choice of exchange rate regimes for the set of transition economies empirically. For the analysis I would use the political economy framework adopted by Edwards (1996), where monetary authority minimizes a quadratic loss function that captures the trade-off between monetary variable (inflation) and real variable (unemployment).

The basic model proposed by Edwards (1996) assumes that two alternative regimes are a permanently fixed or a flexible regime. Here under fixed exchange regime the nominal exchange rate would never be altered. But in reality governments always have the choice of abandoning the peg. In any time there is a positive probability that the pegged rate will be altered. Therefore the analysis is extended by possibility of the pegged regime adjustment, but this imposes a *political cost* on the government. Normally stepwise devaluation has resulted in serious disturbances and, in many cases, in the fall of the government. The degree of political instability is claimed to be essential in the determination of the magnitude of this cost as well as the government's discount factor (how much does the government cares about the future).

3.1 The political economy of exchange rate regimes

This part closely follows the model of Sebastian Edwards (1996). Lets assume simple case of a small open economy where authorities minimize a quadratic loss function defined over the nominal variable (inflation, π) and deviations of real variable (unemployment, U) from their target (U^*). The authorities have distaste for both inflation and deviations of unemployment from a target level. Ex ante country may choose between two regimes: flexible nominal exchange

rates (f) or pegged but adjustable rates (p). In making the decision the authorities face an important trade-off: under pegged exchange rate inflation will be lower, but the deviations from a given unemployment target will be higher than under flexible rates. In two-period economy there is a positive probability (***q***) that pegged regime will be abandoned at the end of the first period. So if the authorities fix the exchange rate at the beginning of the first period there still an "escape clause" can be exercised at the beginning of the second period. When the pegged rate is abandoned, the country adopts a flexible rate, but authorities incur a political cost (***C***). The magnitude of this cost depends on the political and institutional characteristics of the economy, including its degree of political instability (**ρ**). Usually the political consequences of such economic disturbances as abandoning the peg are more pronounced in politically unstable societies. The latter also affects a government's discount factor (**β**). In more unstable countries, the authorities will tend to be more impatient, discounting the future more heavily. C and β can be expressed as a functions of political instability ρ:

$$C = C(\rho); \quad with \quad C' > 0$$
$$\beta = \beta(\rho); \quad with \quad \beta' < 0$$

In this two-period economy the loss functions under flexible rates is:

$$L^F = \gamma (\pi^F)^2 + \mu (U^F - U^*)^2 + \beta (\gamma (\pi^F)^2_{t+1} + \mu [(U^F)_{t+1} - U^*]^2).$$

The loss function under pegged exchange rate regime is:

$$L^P = \gamma (\pi^P)^2 + \mu (U^P - U^*)^2 + \beta ((1-q) \cdot (\gamma (\pi^P)^2_{t+1} + \mu [(U^P)_{t+1} - U^*]^2) +$$
$$+ q \cdot (\gamma (\pi^D)^2_{t+1} + \mu [(U^D)_{t+1} - U^*]^2) + q \cdot C),$$

where γ, $\mu > 0$ - are parameters that capture the degree of distaste for inflation and deviations from U^* in the government loss function;

π^F, π^P - is an inflation rate under flexible and pegged exchange rates correspondingly.

Superscript D denotes the value of a specific variable in the second period under the devaluation scenario. As was said above, if the peg is abandoned (with probability q), the country moves into a flexible regime. Inflation and unemployment in the 2nd period will be determined as under the flexible rate system.

The choice of the exchange rate regime is based on ex ante comparison between loss functions:

$$K = E\{L^F - L^P\},$$

where L^F and L^P are loss functions under flexible and fixed exchange rate regimes as defined above. If $K > 0$, then a pegged regime is chosen, otherwise flexible alternative is preferred.

Putting the expressions for L^F and L^P into decision rule function it is possible to write K as:

$$K = \gamma (\pi^F)^2 + \mu[(k^F)^2 - (k^P)^2] + \beta(1-q)\gamma (\pi^F)^2_{t+1} +$$
$$+ \beta(1-q)\mu[(k^F)^2_{t+1} - (k^P)^2_{t+1}] - q\beta C$$

where $(k^F)^2=(U^F-U^*)^2$ and $(k^P)^2=(U^P-U^*)^2$ and $\pi^P=0$.

Edwards (1996) shows that if government sets the unemployment target U^* below natural level, inflation under flexible rates will exceed its equilibrium level under fixed rates (authorities are tempted to "over inflate"). Additionally, unemployment under flexible rates will be higher (lower) than under fixed rates

if there are negative (positive) external shocks, defined as composite of terms of trade and world interest rate shocks. That's why for both periods $[(k^F)^2 - (k^P)^2]<0$ (deviation of unemployment from target is higher under fixed exchange rate regimes).

3.2 Hypotheses

On this stage it is possible to make some suppositions as to likelihood of a country's choosing a particular kind of exchange rate regime.

1. A higher rate of inflation under flexible rates as well as greater society distaste to inflation (higher γ) will both increase the likelihood of pegged regime choice.
2. However, increased external shock volatility causes greater unemployment fluctuations under fixer exchange rates and increases the likelihood that a flexible regime will be selected. Greater distaste to unemployment deviations (μ) positively affects the probability of flexible regime.
3. An important question relates to the relationship between political cost, degree of political instability and the selection of the exchange rate regime. A higher political cost C will reduce the probability of selecting a pegged rate, while effect of political instability q is ambiguous. It is difficult to obtain clear theoretical results on importance of political instability for the choice of exchange rate regime.

All these hypotheses are commensurate with basic theories of PPP and IS-LM analysis presented in the theoretical section. This fact is a partial motivation for this paper. Only estimation based on the developed theory may give answer on the importance of different factors of the choice of exchange rate regime by the studied subset of countries.

Edwards (1996) used several specifications for probit models with various set of independent variables and binary exchange rate regime index as dependent

variable. My intention is to test the same hypotheses for the subset of the Central and Eastern European as well as former Soviet Union countries (i.e. countries of former "Soviet block") for the period of 1990s. The developing countries of Latin America, Asia and Africa are excluded from the analysis because they are likely to have different preconditions and the strategies of reforms and different attitude to "political risk". Specifically, it is quite possible that in CEE and FSU countries the political cost of abandoning peg is small or zero, because of underdevelopment of political system. Strong opposition to the leading party is seldom exist and there is no quite high danger for the party in power not to be re-elected. This assumption is supported by the Ukrainian experience, when four exchange rate corridors were abandoned since May 1997 without considerable political costs for the ruling government. That is why it is important to revise the meaning of "political cost" in the model to capture the particularities of these countries. One way to surmount this problem is to re-define the political cost variable. For Central and Eastern European countries seeking the accession to EU, "the cost of abandoning the peg" may mean the failure to comply with EU convergence criteria and be an obstacle on their way to EU membership (as discussed in Masson, 1999).

Chapter 4

EMPIRICAL RESULTS

In this paper I use a cross-country, time series data set from 1994-1999 for 13 CEE and FSU countries[1]. The primary sources of the row data are IMF's International Financial Statistics, World Bank's World Development Indicators, IMF staff country reports. When data were missing from these sources, central bank bulletins and other country-specific sources were used as supplements. I estimate several binary probit regressions to investigate to what extent country's political and economic structure, including its political instability, openness, and variability of export earnings, help explain the selection of exchange rate regime.

A dependent variable (FLOAT) is an exchange rate index, which takes the value of 1 for countries with independent floating and managed floating regimes (following IMF classification), and 0 for countries with the other "limited flexibility" regimes. Therefore, the model estimates the probability that the authorities will choose floating-rate regime as opposed to the other (more rigid) exchange rate arrangements. Of course, this division is very limited, because it does not capture all the range of the regimes according to IMF classification. This problem maybe could have been surmounted by more advanced statistical models (multinomial logit/probit), had the appropriate statistical software been available.

4.1. Data

In this section quarterly data for 13 CEE and FSU countries are used. The period analysed is 1994:1-1999:3, with the last two quarters of 1993 included where data are available. The sample includes 305 quarterly observations.

[1] These countries are: Albania, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Moldova, Poland, Romania, Russian Federation, Slovakia, Slovenia.

The empirical analysis poses some data challenges. The major ones are: (a) measuring political instability; (b) measuring the degree of external shock variability; (c) availability and reliability of the data for the transition economies.

While some multicollinearity between explanatory variables is not very big problem in time-series cross-sectional (pooled) data (Gujarati, 1995), this may create problems of interpretation. This technique is appealing to the situations where cross-sectional estimates do not vary substantially from one cross section to another. I assume that countries in the sample are identical in the sense that they exhibit similar variability in the key indicators. The differences in inflation rates, real export and real exchange rates are eliminated by specific construction of the explanatory variables. Namely, I assume that "individual" reacts more to deviations from the pattern that is normal relative to its own reality. Of course, this assumption may be quite strong as it neglects country-specific effects. But the in-sample countries are all belong to ex-Socialist transition economies with almost similar initial conditions and economy structure. Additionally, inclusion of country dummies may consume many degrees of freedom. Therefore, I will retain this assumption for my model. Appendix 4 presents correlation coefficients for the explanatory variables as they appear in specifications.

Degree of political instability (PRISK). Edwards (1996) uses several measures of political instability, such as estimated frequency of government change for the previous period; index which captures the transfer of power from the leading party to an opposition, and several proxies of the degree of political weakness of the government in office (usually dummies). Unfortunately it is hardly possible to collect such extensive data for the sub-sample of transition economies, because they are rather qualitative and are usually not published. I use the methodology of Euromoney Magazine (www.euromoney.com). Political risk is defined as the risk of non-payment or non-servicing of payment for

goods or services, loans, trade-related finance and dividends, and the non-repatriation of capital. Risk analysts give each country a score between 25 and zero - the higher, the better. This does not reflect the creditworthiness of individual counterparties. This index captures many factors concerning the political risk and it is highly standardized and available.

Also the model captures a set of structural variables that may well influence the selection of exchange rate system. There are three types of measures of external shock variability:

1. **Coefficient of variation in real export growth** (V_REXGR). This is constructed from the row data on nominal country exports (proxy for real exports) obtained from the IMF's International Financial Statistics. This coefficient is constructed as the difference of the export growth rates from 4-element moving average of the rates. I experiment with the absolute value and squares of this difference, because what matters is not the direction, but the magnitude of deviations.
2. **Coefficient of real exchange rate changes** (V_RERGR) is constructed using the same approach. Index constructed from the corresponding indices of real bilateral exchange rate between the home currency and U.S. Dollar as well as Deutschmark (Euro). In constructing the overall index, these two indices were given equal weights, under assumption that the country's external trade is conducted with USA and Euro area in approximately equal proportions. The exchange rate is constructed such that a decrease means depreciation. These measures would also capture the effect of real exchange rate misalignments on the choice of exchange rate regime.
3. **Degree of economy openness** (OPEN) (more open countries are more vulnerable to external shocks). This variable is measured in percentage as trade to GDP ratio, interpolated from the yearly values.

Historical rate of inflation (INFL) is constructed as the percentage CPI changes over corresponding period of previous year. In regressions this measure appears as two-period lag. **International Liquidity** (RESMONEY) is the ratio of total country's reserves minus gold (IFS line 1L.d.) to monetary aggregate M2 (IFS lines 34 plus 35 converted into dollars using line ae).

Before turning to the description of obtained results, it is worth to emphasize one more point. Differences between statistical and economic significance could be considerable in the analysis with binary dependent variables. It is seldom possible to expect a perfect explanatory power of this kind of models. Also some problems with significance of the coefficients are quite possible. The aim of this paper is to estimate the direction of the impact of the key economic and structural variables on the exchange rate regime. Consequently, I feel that a priori expected signs of the coefficients (as suggested by theory) and their relative significance are more important than statistical significance or perfect goodness of fit.

4.2. Estimation results

In this paper I experiment with several specifications of the model depending on the included explanatory variables that capture political and economic/structural characteristics. Basically, I have chosen three different specifications (numbered (I) – (III)), which include squared indices of external shock variability. In additional three variants these measures were constructed as absolute value (they have numbers (IV) – (VI)). Table 1 (Appendix 1) contains the main results form the probit analysis as well as important summary statistics.

Specification (I) has the form:

$$FLOAT = 1\text{-}@CNORM\ \{-[CONSTANT + \beta_1 * PRISK + \beta_2 * (V\_RERGR\hat{}2) + + \beta_3 * (V\_RERGR(-1)\hat{}2) + \beta_4 * INFL(-2) + \beta_5 * RESMONEY(-1)]\}$$

where @CNORM{.} is the cumulative distribution function of the standard normal distribution. Specification (IV) includes absolute values of variation of real exchange rate changes (V_RERGR). Estimated results of the probit regression for specification (I) and (IV) are:

FLOAT = 1-@CNORM {-[2.516 - 0.151*PRISK - 0.00014*V_RERGR^2 - 0.00045*V_RERGR(-1)^2 - 0.179*INFL(-2) - 0.008*RESMONEY(-1)]}

FLOAT = 1-@CNORM {-[2.328 - 0.142*PRISK + 0.016*ABS(V_RERGR) - 0.003*ABS(V_RERGR(-1)) - 0.196*INFL(-2) - 0.007*RESMONEY(-1)]}

In these specifications coefficients of PRISK and RESMONEY are statistically significant and have the expected negative signs. This means that more politically stable and high-reserve countries have the greater probability of fixed-rate regime. Coefficient before INFL is significant, but contrary to the theory negative in both specifications. Coefficients before V_RERGR and its 1-period lag are both negative in Specification (I), and level of this measure of external volatility changes sign in Specification (IV). These results are opposite to the prediction of the theory, and their interpretation is meaningless because both coefficients are insignificant (see Appendix 1).

In Specification (II) and (V) I experiment with alternative measure of the external shock, namely coefficient of real exchange rate changes (V_RERGR). Also the degree of openness (OPEN) is included. Specification (II) has the form (Specification (V) includes V_REXGR in absolute values):

FLOAT = 1-@CNORM {-[CONSTANT + β_1*PRISK + β_2*(V_REXGR^2) + +β_3*(V_REXGR(-1)^2) + β_4*OPEN+β_5*INFL(-2) + β_6*RESMONEY(-1)]}

Estimated results of the probit regression for specification (II) and (V) are:

FLOAT = 1-@CNORM {-[2.163 - 0.138*PRISK + 0.00058*V_REXGR^2 + 0.00035*V_REXGR(-1)^2 + 0.0035*OPEN - 0.2243*INFL(-2) - 0.012*RESMONEY(-1)]}

FLOAT = 1-@CNORM {-[2.038 - 0.140*PRISK + 0.016*ABS(V_REXGR) + 0.011*ABS(V_REXGR(-1)) + 0.003*OPEN - 0.217*INFL(-2) - 0.012*RESMONEY(-1)]}

In these specifications coefficients of PRISK and RESMONEY are statistically significant and have the expected negative signs. Coefficient before INFL is significant, but again puzzling negative sign in both specifications. Coefficients before V_REXGR and its 1-period lag are both positive. Hence, countries experiencing higher volatility in real export and/or subject to external aggregate demand shocks is rather to adopt floating exchange rate regime to stabilise output. The only significant is the effect of variation of real export growth in the current period. Positive sign of the coefficient before openness (OPEN) suggests that more open countries are more likely to adopt flexible-rate regime, but this coefficient is significant only at 20% level.

Just to complete the picture I tried the Specification (III) and (VI). They are similar to specifications (I) and (IV), but additionally contain the degree of openness (OPEN). Specification (III) has the form (Specification (VI) includes V_RERGR in absolute values):

FLOAT = 1-@CNORM {-[CONSTANT + β_1*PRISK + β_2*(V_RERGR^2) +
+β_3*(V_RERGR(-1)^2) + β_4*OPEN+β_5*INFL(-2) + β_6*RESMONEY(-1)]}

Estimated results of the probit regression for specification (III) and (VI) are:

FLOAT = 1-@CNORM {-[2.332 - 0.1589*PRISK - 0.00016*V_RERGR^2 -
0.00046*V_RERGR(-1)^2 + 0.003*OPEN - 0.160*INFL(-2) - 0.011*RESMONEY(-1)]}

FLOAT = 1-@CNORM (-(2.148 - 0.149*PRISK + 0.016*ABS(V_RERGR) -
0.0029*ABS(V_RERGR(-1)) + 0.003*OPEN - 0.178*INFL(-2) - 0.009*RESMONEY(-1)]}

It turns out that inclusion of interactive variable OPEN does not improve the picture with the significance of coefficients and add a lot of information into the model. The coefficient before OPEN has the correct sign suggesting that in more open economies there is a greater probability of floating-rate regime. But it is not significant in the statistical sense. As in the previous specifications, here the coefficients of PRISK and RESMONEY are statistically significant and have the expected negative signs. Coefficient before INFL is significant, but again

puzzling negative sign in both specifications. Coefficients before V_RERGR are insignificant.

Overall the results provide broad support for the political economy model presented in the previous chapter. The estimates in Table 1 (Appendix 1) indicate that political instability plays an important role in regime selection: more politically stable countries have less probability of selecting a floating exchange rate regime. The political cost of adaptation a fixed-rate system and then abandoning it plays a more important role in these countries than short-term government considerations captured by discount factor. Therefore the coefficient of PRISK is consistently negative at 1-% significance level in all the specifications.

The coefficients associated with economic and structural characteristics of economies in the sample are more interesting, since some of them give the results opposite to those predicted by economic theory.

The effect of the real exchange rate volatility has an ambiguous effect on the choice of exchange rate regime in studied sample of countries. Where included into regressions the coefficient of variability of the real exchange rate (V_RERGR) is statistically insignificant, both in the same period and with 1-quarter lag. This implies that real exchange rate misalignment in current and previous time period does not have an impact on the government decision of adopting the particular exchange rate regime. The sensitivity of coefficient sign to the model specification invokes the suspicion about any effect of the variability in real exchange rate changes on exchange rate regime.

Coefficient of variation of real export growth (V_REXGR) is significant at 5-% level both when squared (Specification (II)) and in absolute value (Specification (V)) and has positive sign. This corresponds to the theory, implying that

countries experiencing higher volatility in real export and/or subject to external aggregate demand shocks is rather to adopt floating exchange rate regime to stabilise output. It is interesting to note that the only significant is the effect of variation of real export growth in the current period. If we pay more attention to economic meaning we observe that lagged value of V_REXGR does not affect the adopted regime as much. This may mean that the suddenness and unexpected character of external shocks is what really matter for the authorities' decision about the appropriate exchange rate policy.

The degree of economy openness (OPEN) was added to the regressions as the additional factor measuring the importance of external shocks. As was discussed in the theoretical section, more open countries are more vulnerable to external disturbances. Positive sign of the coefficient of this measure suggests that more open countries are more likely to adopt flexible-rate regime, but this coefficient is significant only at 20% level.

The coefficients of the variables that capture the ability to maintain the pegged regime are generally significant at the conventional levels. The lagged coefficient of country international reserves to M2 (RESMONEY) is significant in all the regressions and has the expected negative sign. This indicates that countries with lower holdings of international reserves will have a lower probability of adopting the regime, which is characterised by some degree of fixity.

On the other hand, the coefficient of lagged (historical) inflation is negative and this result is statistically significant and robust to various specifications. These negative coefficients of inflation are rather puzzling from the point of view of standard economic theory. They seem to indicate that for countries experiencing higher historical levels of inflation the probability of adaptation flexible exchange rate regime declines. But this inconsistency may be interpreted as the sign of dis-inflation attempts of these countries' monetary authorities. As was

discussed in the theoretical section, countries with historically high levels of inflation try hard to raise the credibility of anti-inflationary policy by implementing strictly fixed exchange rate regime. Introduction by Bulgaria in September 1997 and Lithuania in April 1994 of the currency board arrangement was the major part of their program to fight inflation (Sweeney et al., 1999) Several transition economies, which have concluded Europe Agreements with EU and negotiate accession to economic and monetary union (EMU), pay much attention to the Optimum Currency Area theory in the choice of exchange rate regime. To be eligible to EU membership in the future, these economies must comply with EMU "convergence criteria", which, among other factors, presume low inflation and stable currency. One of the Maastricht convergence criteria requires that inflation be no more than 1.5 percentage points above that of the best-performing EU members (Masson, 1999; Mundel, 1997). As Masson (1999) says, "even if inflation is the result of equilibrium relative price movements, it will be important for policy not to ignore it because one of the qualifying criteria for EMU membership is convergence to EU inflation". There also may be pressures for limiting exchange rate fluctuations relative to the Euro, as countries negotiating accession want to prepare for membership in ERM2 and eventual EMU membership. Therefore, such countries as Poland, Czech Republic, Hungary, Estonia try to achieve this strategic goal by adopting more fixed exchange rate regimes. Despite these countries faced a considerable inflation in the early years of transition, they managed to decrease the inflation significantly and stabilise their currencies by combining institutional reforms and appropriate monetary and exchange rate policy (which assumed various types of fixed-rate regimes).

4.3. Goodness of Fit

There are several summary statistics available (Appendix 1). McFadden R-squared is an analogue to the R^2 reported in linear regression models. As was

noted above, the explanatory power of such kind of models is not very high. Based on this criterion specifications (II) and (V), which include coefficients of variation in real export growth as the measure of external volatility, perform better than the other ones. However the difference is not substantial. Specification (II) and (V) have McFadden R-squared equal to 15.44% and 14.6% correspondingly. These two specifications also have advantages on the basis of Akaike information criterion. Using this information criterion as a model selection guide, I select the model with the smallest information criterion: this measure has the value of 1.218 and 1.229 for the Specification (II) and (V) – the smallest among the six estimated models.

Likelihood Ratio (LR) statistics also reported in Appendix 1 tests the null hypothesis that all slope coefficients except the constant are zero. This is the analogue of the F-statistic in linear regression models and tests the overall significance of the model. It turns out that in all the specifications the regressors add a lot of information to the model, and the null hypothesis can be rejected at all conventional significance levels (as it is shown the p-value of the LR test statistic).

To check the predictive power of the model it is possible to use Expectation-Prediction Table computed by E-views 3.0 (Appendix 2). In the left-hand table, a discrete classification is performed using the predicted probability $\hat{P}$. Observations are classified as having predicted probabilities that are above or below the cut-off value of 0.5. In the right-hand table, observations are classified using the predicted probability given by the sample proportion of FLOAT=1 observations. This probability, which is constant across individuals, is the value computed from estimating a model that includes only the intercept term, C. In the Regression (II), 115 of the Dep=0 observations and 86 of the Dep=1 observations are correctly classified by the estimated model. The chosen model

specification correctly predicts 66.56% (74.19% of the Dep=0 and 58.5% of the Dep=1) observations. The gain in the number of correct predictions obtained in moving from the right table to the left table provides a measure of the predictive ability of the model. The gain measure is reported in absolute percentage increases (Total Gain). For the specification (II), the restricted model predicts and all 302 observations will have FLOAT=0. This prediction is correct for the 155 FLOAT=0 observations, but none of the 147 FLOAT=1 observations. Regression (II) improves on the Dep=1 predictions by 58.50%, but does more poorly on the Dep=0 predictions (by 25.81%). Overall, the estimated equation is 15.23% better at predicting responses than the constant probability model.

4.4 Application to Ukraine

It was shown that empirical results generally correspond to the prediction of the economic theory and experience of the transition economies of CEE. An interesting application of the developed model is to apply it to the off-sample economy with relatively similar characteristics – Ukraine. The process of transformation from centrally planned to market-oriented economy has begun in this country in the same period. But after a decade of transition the success of the economic reforms is still under question here. It is not the goal of this paper to analyse specific features of Ukrainian economy and economic policy that caused such a lag behind more successful neighbours. Instead, it is interesting to check, based on several model specifications, the correspondence of Ukrainian exchange rate policy to the regime suggested by economic, structural and institutional characteristics.

Without going into details, there was floating exchange rate regime in Ukraine in the early years of transition. Then, after some stability at the foreign exchange market was achieved and new currency (Hryvnia) was introduced, the regime of horizontal bands was chosen (since May 1997). The National Bank of Ukraine

(the NBU) up until the end of 1999 pursued this exchange rate policy. During this period 5 horizontal bands were introduced, each time when the pressure on domestic currency resulted in the breach of the upper limit of exchange rate corridor (Markiewicz et al., 1999). While officially the NBU abandoned this exchange rate arrangement only in December 1999, de facto there was a managed float regime since the end of 1998. These developments are reflected in the Figure 3.

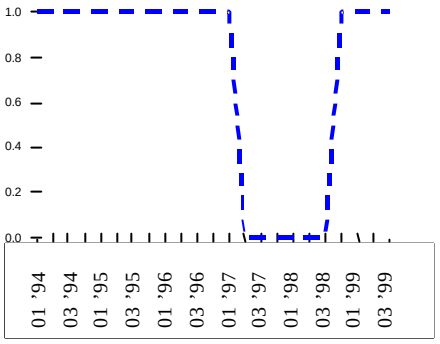
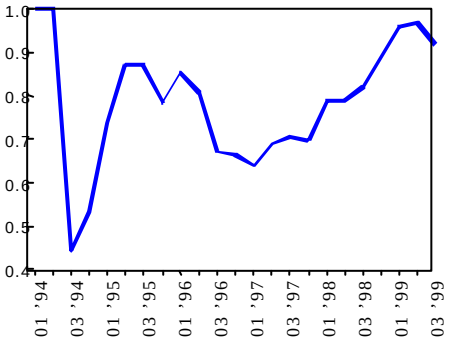


Figure 3. Actual Exchange Rate Regime Adopted by Ukraine in 1994:1-1999:3

Eviews 3.0 reports the fitted probability calculated by the formula:

$$\hat{P} = \Pr(Y_i = 1 \mid x_i, \hat{\beta}) = 1 - \Phi(-x_i'\hat{\beta}) = \Phi(x_i'\hat{\beta})$$

where Ô is the cumulative distribution function of the standard normal distribution.



Summary statistics:

Number of observations:	23
Root mean Squared Error	0.4860
Mean Absolute Error	0.3861
Mean Abs. Percent Error	10.307
Bias Proportion	0.1340
Variance Proportion	0.5095
Covariance Proportion	0.3563

Figure 4. Fitted Probability of Adaptation of a Floating Exchange Rate Regime from Specification (II)

By comparing actual exchange rate policy pursued by the NBU in 1994-99 with the predicted probability of adaptation of floating-rate regime we may draw the inference about the descriptive power of the model.

The regression predicts quite well that the probability of the floating-rate regime was high initially, because country had a period of hyperinflation in 1993-94. When stabilisation measures were begun the fitted probability decreases and is minimal from the currency reform in the third quarter of 1996 to the third quarter 1998 – the period of relative stability of Ukrainian economy. But the absence of the structural reforms coupled with the major external shock – Russian currency and banking crisis in August 1998 – made the weaknesses of the Ukrainian economy evident. The NBU had difficulties with stabilizing the Hryvnia exchange rate, and consequently abandoned the practice of exchange rate corridors.

Appendix 4 represents the actual exchange rate regime adopted by Ukraine during the period 1994:1 to 1999:3 and fitted probability of adaptation of the floating exchange rate regime, calculated from Specifications (I) – (VI) (Figures 5-10). While the performance of various specifications is different, all the regressions show the high probability of floating-rate regime initially, then after the adaptation of the new national currency some decline and bottoming out in this measure. A sharp increase in the probability of the floating-rate regime after the Russian crisis of 1998 is predicted by all the specifications.

Testing the various specifications on Ukrainian data leads to a general conclusion that the political economy framework of exchange rate regime determination is applicable to a transition economy of the FSU. Of course, the use of the model to describe real-world situation is limited. Time series data on the economies in question is short and not very reliable, the sample of countries to estimate equations is small (13 countries were used), and specifications themselves are far from perfect. Question of the real world application is still

open and should be explored in further research. But in general, the political economy framework developed in this paper seems to perform quite well for the description of the forces influencing the choice of exchange rate regime for economies in transition.

Chapter 5

CONCLUSIONS

With the emergence in the Central and Eastern Europe and former Soviet Union of new independent states, each of which introduced their own convertible currencies, there has been increasing interest in the relationship between exchange rate regimes and macroeconomic stability. This issue is ultimately related to political economy and institutional considerations. This paper addresses the question of the selection of exchange rate regime from the political economy prospective.

The applied methodology was used by Edwards (1996) in the study of exchange rate arrangements for a large set of countries during the period 1980-92. The model allows analyze the role of various factors, including political instability, on the choice of exchange rate regime. In the present paper an attempt was made to estimate the political economy model of exchange rate regime choice for transition economies of Central and Eastern Europe and former Soviet Union during the period 1993-99. Several general conclusions are worth emphasizing.

First, when a government is considering the choice of exchange rate policy, its decision is more influenced by the political costs of the possible abandoning the pegged-rate regime than by short-term considerations. As was noted in methodology section, high political cost of abandoning the peg increases the probability of applying to the floating regime. However, higher discount factor decreases the authorities concern about the future and the probability of the pegged regime may grow. The consistent negative coefficient of the political risk in regressions indicates that a higher political cost of devaluing after pursuing fixed-type regimes does offset the effect through discount factor. This empirical result may imply that governments in these countries are more concerned with

long-term consequences of their policies and do not pursue immediate populist goals.

Second, structural and economic variables have significant influence on the regime choice. The external shocks when measured by the volatility of real export increases the probability of the flexible-rate regime, the effect is significant than the shock occurs in the same period. The lagged value of external volatility also has the right sign, but coefficient turns out to be insignificant. The influence of variation in real exchange rate is under question in these countries, because the significance of the coefficient depends on the construction of the real exchange rate index. Higher international liquidity measured by the ratio of international reserves to M2 increases the possibility of adaptation of a fixed-rate regime. Results of the regressions also show that those countries in the chosen sample that experienced high historical rates of inflation will tend to adopt more fixed regime for their currencies. In my opinion, this fact is explained by the efforts of countries to discipline monetary policy in the early years of transition. The attempts of the more advanced countries of CEE to comply with EU convergence criteria of low inflation and stable domestic exchange rates also can describe this effect.

Third, this paper is an attempt to fill the gap in the empirical literature on the economics of exchange rates. The model estimated is flexible enough to jointly estimate the impact of the political, economical and structural factors on exchange rate regime. The estimated model turns out to be statistically successful and generally in line with the predictions of the theory. The explanatory power of the obtained model is quite good in describing exchange rate policies of the off-sample economy (Ukraine).

Finally, the work has shown that the study of transition economies poses some specific challenges. Availability and reliability of the data is the major problem

for the empirical study of this subset of developing economies. The relatively short history of these economies may influence the reliability of results. Further research should be aimed at the working out more fundamental theory, which explains the influence of the political factors on exchange rate regime choice. The study of the role of the real exchange rate misalignment, use of alternative measures of political instability, and applying more sophisticated models (multinomial probit/logit) which allows the precise classification of exchange rate regimes can reinforce understanding of the factors guiding the choice of exchange rate policy.

BIBLIOGRAPHY

Aghevli, Bijan B; Khan, Mohsin S; Montiel, Peter J. 1991. Exchange Rate Policy in Developing Countries: Some Analytical Issues, *IMF Occasional Paper, No. 78*

Atish R. Ghosh, Anne-Marie Gulde. 1997. Does the Nominal Exchange Rate Regime Matter? *NBER Working Paper No. 5874,* Cambridge, MA: National Bureau of Economic Research, January

Berg, Andrew; Catherine Pattillo. 1999. Are Currency Crises Predictable? A Test. *IMF Staff Paper*. Volume 46, Number 2, June

Berg, Andrew; Eduardo Borensztein The Choice of Exchange Rate Regime and Monetary Target in Highly Dollarized Economies. *IMF Working Paper WP/00/29,* Washington, IMF

Boschee, Elizabeth M. 1996. *Floating Exchange Rates: The Only Viable Solution.* Federal Reserve Bank of Minneapolis 1995-1996 Essay Contest

Bussire, Mattieu; Mulder, Christian. 1999. Political Instability and Economic Vulnerability. Policy Development and Review Department. *IMF Working Paper WP/99/46,* Washington, IMF

Canavan, C. and Tommasi, M. 1997. On the Credibility of Alternative Exchange Rate Regimes. *Journal of Development Economics,* October, 54(1), pp. 101–22.

Carrasquilla, Alberto. 1995. Exchange Rate Bands and Shifts in the Stabilization Policy Regime: Issues Suggested by the Experience of Colombia. *International Monetary Fund Working Paper: 95/42*, April

Chang, Roberto, Andres Velasco. 1998. Financial Fragility and the Exchange Rate Regime, *NBER Working Paper No. 6469,* Cambridge, MA: National Bureau of Economic Research, January

Clark, Peter B; MacDonald, Ronald 1998. Exchange Rates and Economic Fundamentals - A Methodological Comparison of BEERs and FEERs. *IMF Working Paper WP/98/67,* Washington, IMF

Clark, Peter B., Leonardo Bartolini, Tamim Bayoumi, and Steven Symansky. 1994. Exchange Rates and Economic Fundamentals: A Framework For Analysis. *IMF Occasional Paper No 115*, Washington, IMF,

Corden, Max W. 1993. Exchange rate policies for developing countries. *The Economic Journal*, Vol.103, Issue 416 January, pp.198-207

Currency Board Arrangements. Issues And Experiences. *The IMF Occasional Papers No 151*, August 1997

Edwards, Sebastian. 1996. The Determinants of the Choice Between Fixed and Flexible Exchange Rate Regimes. *NBER working paper series; working paper 5756*. Cambridge, MA: National Bureau of Economic Research

Eichengreen, Maason. 1998. Exit Strategies: Policy Options for Countries Seeking Greater Exchange Rate Flexibility. *The IMF Occasional Papers No 168,* Washington

Exchange-rate Assessment. A Macroeconomic Balance Approach. *The IMF Occasional Papers No 167,* 1998

Flood, Robert; Nancy Marion. 1994. The Size and Timing of Devaluations in Capital-Controlled Developing Economies. *NBER working paper series; working paper 4957*. Cambridge, MA: National Bureau of Economic Research. December

Frankel, Jeffrey A. 1995. *On exchange rates.* The MIT press, Cambridge, Massachusetts

Frankel, Jeffrey A. 1999. No single currency regime is right for all countries or at all times. *NBER working paper series; working paper 7338*. Cambridge, MA: National Bureau of Economic Research. September

Fry, Maxwell, Nuti, Mario. 1992. Monetary and Exchange-Rate Policies During Eastern Europe's Transition: Some Lessons From the East. *Oxford Review of Economic Policy*, Vol. 8, No.1

Ghosh, Artish R., Annie-Marie Gulde, Jonathan D. Ostry, Holger C. Wolf. 1997. Does the nominal exchange rate regime matter? *NBER working paper series; working paper 5874.* Cambridge, MA: National Bureau of Economic Research, January

Ghosh, Atish R; Gulde, Anne-Marie; Wolf, Holger C. 1998. Currency Boards: The Ultimate Fix? Policy Development and Review Department, *IMF Working Paper WP/98/8*

Gujarati, Damodar N. 1995. *Basic Economietrics.* –3rd ed. McGraw-Hill, Inc.

Hopper, Gregory P. 1994. The Dynamics Of The Exchange Rate Under A Crawling Peg Regime: A Game Theory Approach. *Federal Reserve Bank of Philadelphia Research Working Paper 95/5*, October

International Financial Statistics. International Monetary Fund, Washington, various issues

Isard Peter, 1995. *Exchange Rate Economics (Cambridge Surveys of Economic Literature).* Cambridge Univ. Press

Kamas, Linda 1995. Monetary Policy and Inflation under the Crawling Peg: Some Evidence from VARs for Colombia. *Journal of Development Economics*; 46(1), February

Kamulainen, Tuomas. 1999. Currency Crisis Theories - Some Explanations for Russian Case. *BOFIT Discussion Papers No 1*, Bank of Finland. Institute for Economies in Transitions.

Köller, Horst; Wes, Marina. 1999. Implications of the Euro for the integration process of the transition

economies in Central and Eastern Europe. *European Bank for Reconstruction and Development Working Paper No.38*, March

Krugman, Paul R. 1997. *International economics: theory and policy* / Paul R. Krugman, Maurice Obstfeld. – 4th ed. Addison-Wesley

Markiewicz, M., Dekhtiarchuk, M., and Gorski, U. 1999. *Monetary Policy in Ukraine in 1996-1999*. Center for Social and Economic Research, Warsaw.

Masson, Paul. 1999. Monetary and Exchange Rate Policy of Transition Economies of Central and Eastern Europe after the Launch of EMU. *IMF Policy Discussion Paper: PDP/99/5*. July

Montiel, Peter; Ostry, Jonathan D. 1991. Real Exchange Rate Targeting Under Capital Controls: Can Money Provide a Nominal Anchor? Research Department, *IMF Working Paper WP/91/68*

Mundel, Robert. 1997. The International Impact of the Euro and its Implications for Transition Countries. In *Central Banking, Monetary Policies, and the Implications for Transition Economies*, Mario I Blejer, Marco Skreb eds.

Obstfeld M. A Model Of Currency Depreciation And Debt-Inflation Spiral. *NBER working paper series; working paper 1498*. Cambridge, MA: National Bureau of Economic Research

Rolnick, Arthur J., Weber, Warren E. 1989. A Case For Fixing Exchange Rates. Federal Reserve Bank of Minneapolis Annual Report.

Savastano, Miguel A. 1992. Collapse of a Crawling Peg Regime in the Presence of a Government Budget Constraint. *IMF Staff Papers; 39(1)*, March

Sachs, Jeffrey. 1992. *Macroeconomics in the global economy* / Jeffrey D. Sachs, Felipe B. Larrain. Prentice-Hall, Inc. New Jersey

Smith, Michael C. 1996. *A Modified Float: The Clear Choice*. Federal Reserve Bank of Minneapolis. 1995-96 essay contest.

Svensson, Lars E.O. 1994. Fixed Exchange Rates as a Means to Price Stability:What Have We Learned? *NBER Working Paper No. 4504*. September

Sweeney, Richard; Whilborg, Clas and Willet, Thomas eds. 1999 *Exchange-rate policies for emerging market economies. The political economy of global interdependence.* Boulder, Colo.: Westview Press

Taylor John. 1995. Exchange Rate Economics. *Journal of Economic Literature*, Vol. XXXIII, Issue 1, March

Velasco, A. 1997. When Are Fixed Exchange Rates Really Fixed? *Journal of Development Economics*, October, 54(1), pp. 5–25.

Wickham, Peter. 1985. The Choice of Exchange Rate Regime in Developing Countries. A Survey of Litereture. *IMF Staff Papers; 32(2)*, June