Currency Substitution in Ukraine:
Behavior of Households

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Abstract:

Liberalization of foreign exchange regime and instability of national currency are among the major factors that shaped the level and strength of currency substitution in Ukraine. In this paper, a problem of currency substitution is addressed from the point of view of households. It is argued that the most conventional measure of currency substitution, namely the ratio of foreign-currency denominated deposits to total deposits at a domestic banking system, is not obviously the best for households' currency substitution in Ukraine. Cash transactions on retail foreign exchange market are proposed as a complementary measure.

The paper presents a simply model of households' demand for various types of financial assets constructed on the basis of a portfolio-balanced approach. It is demonstrated that the choice of assets depends on real income of households, as well as stability and credibility of financial system. It is stated currently Ukraine enters in the shrinking phase of the currency substitution, and the elaboration of reforms, in particular in banking sector, could be crucial for a further reduction of usage of foreign currency by households.

1   Introduction

Ukraine's independence not only led to formation of a new state, but also created a new economic environment. Hyperinflation and a lost of personal deposits in Oschadbank, the only state bank that worked with population in the former Soviet Union, forced households to search for alternative stores of value. One of them became real assets, both durable and non-durable. Other was a foreign currency.

A use of foreign currency as a store of value became possible after a liberalization of foreign exchange regime in 1991-92, including a relaxation of criminal responsibility for holdings of foreign currency. Households, who lost a lion share of their savings have considered US dollar as a proper store of value alongside with real assets. Here are some of stylized facts from the economic history of Ukraine in 1991-1995:

- o   Monthly inflation in 1993 picked at a 47% level. Between 1992 and 1995 the consumer price index increased in more than two thousand times.

- o   Between 1992 and 1995 cumulative net purchases of foreign currency by households accounted to UAH 1.36 bn, or USD 1.6 bn.

- o   Between 1992 and 1995 the share of households deposits in foreign currency had increased from 0% to 20%, and they have continued to rise.

In 1996 it was the first period of macroeconomic stabilization in Ukraine. Then, inflation was reduced to a two-digit level, and a new national currency was introduced. However, at the same time wage arrears and barter in the economy started to grow. It leads to conclusion that observed inflation was substituted by hidden inflation in the form of non-monetary payments or arrears (Zhyliaiev and Movchan, 2000). Financial crisis of 1998 broke down process of economic recovery. National currency experienced more than twofold devaluation within several months, and households' trust was lost again. The second period of macroeconomic stabilization started in 1999, when nominal exchange rate of hryvnia to US dollar stabilized. In the second half of 1999 it was registered a slight growth in the real GDP and industrial output. That also affected real incomes of households. This study focuses on motives and dynamics of currency substitution after a period of the second stabilization.

If the major motive to keep foreign currency was "defensive", i.e. households attempted to preserve the value of their wealth and purchasing power, a monetary and economic stabilization in the country had to stimulate the reduction of foreign currency accumulation. That is expected to be a case in modern Ukraine. In the case of hysteresis, i.e. network effect when economic agents in the process of currency substitution learn to use foreign currency, and after stabilization they are not ready to give up developed patters of behavior

(Uribe, 1997), household would continue to hold foreign currency even long after stabilization. However, Piontkivsky (2000) did not find any proof of hysteresis in Ukraine.

Recently it was published several works devoted to currency substitution in transitional economies, including Ukraine. Bondarenko (2000), Budina & van Aarle (1995), Mongardini & Mueller (1999), Piontkivsky (2000), Sahay and Végh (1995, 1996), Volkov (2000), etc analyzed different aspects of this phenomenon. Alternative to above-mentioned works, this paper focuses on currency substitution using aggregate household data as basic point of reference.

The choice of households as only economic agents in focus was dictated by several reasons. First, households experience less legal limitation with cash transactions when enterprises do. It is important when currency substitution takes a form of cash substitution. Second, currency substitution in Ukraine reveals not only as bank deposits denominated in foreign currency, but also as accumulation of foreign cash. One of available sources of data on cash purchases is foreign exchange transaction in so-called kiosks, exchange points opened by companies that signed an agency contracts with a licensed banks (Curtis, Gardner and Waller, 2001). It is assumed that majority of transactions in these kiosks are conducted by households. Third, households are closer to "defensive" demand for foreign currency than enterprises that depend on their production structure (e.g. exports or imports orientation) choosing the currency. Fourth, households have almost the same access to financial assets as enterprises do. But the decision of households is less distorted by production or regulatory needs, and more likely based on opportunity costs of the assets. All these reasons make households a very attractive object for research.

The rest of the paper is the following. Section 2 discusses a definition of currency substitution that still remains not completely established, and Section 3 provides a short overview of currency substitution' studies in transitional economies. Next, Section 4 and 5 covers measurement questions of currency substitution in general and in Ukraine particularly. Model is presented in Section 6, and in Section 7 econometric results are discussed. Finally, Section 8 concludes the paper.

2   Note on Definition

Strictly speaking, currency substitution refers to a situation when foreign currency performs one or several functions of money in a row with domestic currency. In other words, economic agents can more or less freely choose between foreign and domestic currencies as means of payment, stores of value, and units of account. Switching only between foreign and domestic interest-bearing assets refers to "capital mobility" (Mizen & Pentecost, 1996). Other classifications include McKinnon's (1996) direct and indirect currency substitution, Giovannini & Turtelboom's in currency substitution and currency

substitutability (1994, as referred Mizen & Pentecost's, 1996), and Mizen & Pentecost's currency substitution as a process and as a state.

One of very discussible issues is a distinction between terms "currency substitution" and "dollarisation" that economists as well as policy analysts often use in parallel. However, some authors focus on differences. For instance, Calvo and Végh (1992) proposed to distinguish these terms in accordance with functions that foreign currency performs. The term "dollarisation" denotes the usage of foreign currency as a unit of account and a store of value, but not necessarily as a medium of exchange. The term "currency substitution" primarily indicates the replacement of domestic currency by foreign currency in everyday transactions, i.e., the usage of the foreign currency as a medium of exchange. Authors suggest considering a penetration of foreign currency as two-stage process when dollarisation comes first, and currency substitution follows. In this case, if country has only one legal tender, it cannot reach the stage of currency substitution, at least officially, because foreign currency is not allowed as a medium of exchange. Here, dollarisation and currency substitution are sequential terms.

Alternatively, Berg and Borensztein (2000) defined "dollarisation" as "the holding of foreign currency and foreign-currency denominated deposits at domestic banks". They make a distinction between two motives for the demand fore foreign currency assets: currency and asset substitution. In this case, dollarisation is more generic term than currency substitution. Bondarenko (2000) and Piontkivsky (2000) accepted this line of definition in their papers. Yet other, Sahay and Végh (1996) denotes medium of exchange function of foreign currency as currency substitution, and dollarisation captures both mean of exchange and store of value functions. Thus, this approach closer to Calvo and Végh (1992) in definition of currency substitution, but it uses generic nature of term "dollarization" in line with Berg and Borensztein (2000).

Here I stick to the term "currency substitution" and specifically refer to functions performed of foreign currency, whenever it is necessary. This approach should helps to avoid difficulties connected with defining foreign currency as medium of exchange in the country, where officially there is only one legal tender – national currency. Although anecdotic evidences suggest that shadow market is basically dollarized, there are numerous restrictions on using foreign currency as mean of payment in the official sector of economy.

3 Studies of Currency Substitution in Transitional Economies

Currency substitution in transitional economies had only recently captured attention of international economic circles. Main information on currency substitution in these countries could be found in analytical papers and reports of

international organizations[2]. Still, there are several interesting studies devoted to currency substitution in this region, including Ukraine.

Sahay and Végh (1996) analyzed dollarisation in 15 countries including Eastern Europe and several republics of the former Soviet Union. They concluded that both institutional environment and macroeconomic situation determine country-specific paths of dollarisation, and elaborated a classification of these countries in accordance with key features of dollarisation process. Dollarisation in transitional countries is considered as one of manifestations of system disequilibria "which are reflected in chronic fiscal deficits and accommodative monetary and exchange rate policy". In the case of Ukraine, which is classified as high-inflation country, reforms are considered as a cure for dollarisation. Curtis, Gardner and Waller (2001) support this conclusion.

In line with these works, Mongardini & Mueller (1999) studied currency substitution as a persistent phenomenon after the first shock of hyperinflation and liberalization of foreign currency markets was over. Although a ratchet variable was not significant for explaining patterns of currency substitution in Kyrgyz Republic, this idea could be very important for explaining currency substitution in other countries of the region. Also, authors emphasized foreign cash holdings as significant component of currency substitution. Bondarenko (2000) also used proxy of foreign currency in circulation together with foreign-currency denominated deposits at banks as a combined measure of currency substitution in Ukraine.

Among studies of currency substitution in Ukraine, Volkov (2000) focused on basic determinants of currency substitution in 1994-98. According to his findings, this period should be subdivided into two structurally different episodes. In 1994 – the first half of 1996 currency substitution was basically determined by expected depreciation, while in the second half of 1996 – 1998 foreign currency interest rate starts to dominate as a cause of currency substitution. These results confirmed the study conducted by Piontivsky (2000). Based on monthly data for 1998-99, he found that real return differential has a significant influence on the level of dollarisation in Ukraine.

Curtis, Gardner and Waller (2001) emphasize other important aspect of currency substitution in Ukraine, namely a use of foreign currency in shadow economy transactions. It is argued that two different national currency regimes in the country, that is "a ruble zone and its aftermath" (1991-1996) and a managed exchange rate regime (1996 – present), did not affect a demand for foreign currency due to extensive shadow economy. The question arises whether official statistics like purchases of foreign currency in kiosks and bank deposits is relevant for study of shadow transactions.

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[2] That refers, first of all, to publications in English that are widely available in libraries or on the web. I believe that there is a bunch of literature on this topic written in native languages of these countries. Unfortunately, international economic community has limited access to these resources.

To summarize, authors emphasized an initial stages of transition process in the countries, including Ukraine, as a source of development of the currency substitution phenomenon. However, these studies do not consider the next stage of the process, namely its steady shrinking. This paper is devoted to this period in the currency substitution in Ukraine, continuing studies initiated by Volkov (2000) and Piontkivsky (2000).

4   Measurement Question

One of the most important questions in the study of currency substitution is what categories of financial assets are included in the research. The answer determined both a reported scope of currency substitution in the country and results of any econometric estimates. Following the logic proposed by Goodhart, and Angeloni, Cortarelli & Levy (as referred in Mizen & Pentecost, 1996), I constructed a diagram classifying households' holdings of financial assets (Table 1):

Table 1.
Holdings of Financial Assets by Households

	Holdings in domestic financial system [N]		Holdings in foreign financial system [M]		Currency in circulation [C]
	Bank deposits [B]	Securities [I]	Bank deposits [B]	Securities [I]	
In national currency [D]	DBN	DIN	DBM	DIM	DC
In foreign currency [F]	FBN	FIN	FBM	FIM	FC

It is assumed that households can choose between two categories of currencies: domestic [D] and foreign [F], and two financial systems: national [N] or foreign [M]. Moreover, they choose between bank deposits [B], securities [I], and cash [C]. Actual structure of agents' holdings depends on technological, institutional, and economic environment of the country, as well as their accessibility.

For the study of currency substitution, there are several types of assets that have a particular importance. They are foreign-currency denominated holdings in domestic financial system and currency in circulation. It is presumed that assets abroad refers more to a capital mobility, while to the currency substitution.

The most conventional measure of currency substitution, frequently associated with studies of the International Monetary Fund (IMF), is the ratio of foreign currency deposits (here, FBN) to broad money, denoted a common dollarisation index (Feige and Dean, 2002). This index could be also estimated as the ratio of

foreign-currency denominated deposits to total deposits at the domestic banking system (Piontkivsky, 2000).

However, the conventional measure of currency substitution is not obviously the best. Currency substitution in the economy is often associated with economic instability, e.g. a history of bank confiscations (Feige and Dean, 2001). It means that households are often more than reluctant to hold their money in banks. This effect could be also caused by poor development of the banking system or legal restrictions, associated with holdings of foreign currency in banks. That makes bank deposits inappropriate as a measurement instrument of the level of the currency substitution in the country. Moreover, hyperinflation makes foreign cash not only a store of value and a unit of account, but also a medium of exchange. Definitely, the choice depends on costs of exchange transactions, i.e. its easiness, availability, and transaction fee. But if these costs are not prohibitively high, economic agents could keep foreign currency and exchange it in the case of need. That also underlines a role of cash substitution as an important part of the currency substitution.

In this case, a better measure of currency substitution will be an augmented index of currency substitution calculated as a ratio of foreign currency deposits in banks plus foreign cash over total bank deposits and currency in circulation. This index reproduces an unofficial dollarisation index, proposed by Feige and Dean (2002).

5   Currency Substitution in Ukraine

In the case of Ukraine, currency substitution arises through both banks deposits and foreign cash holdings. Securities' holdings of households (categories DIN and FIN) could be safely excluded from the study. There is no developed stock market in Ukraine. Mass privatization created a very dispersed, but not effective ownership structure. According to official statistic, dividends play a minuscule role in formation of households' income.
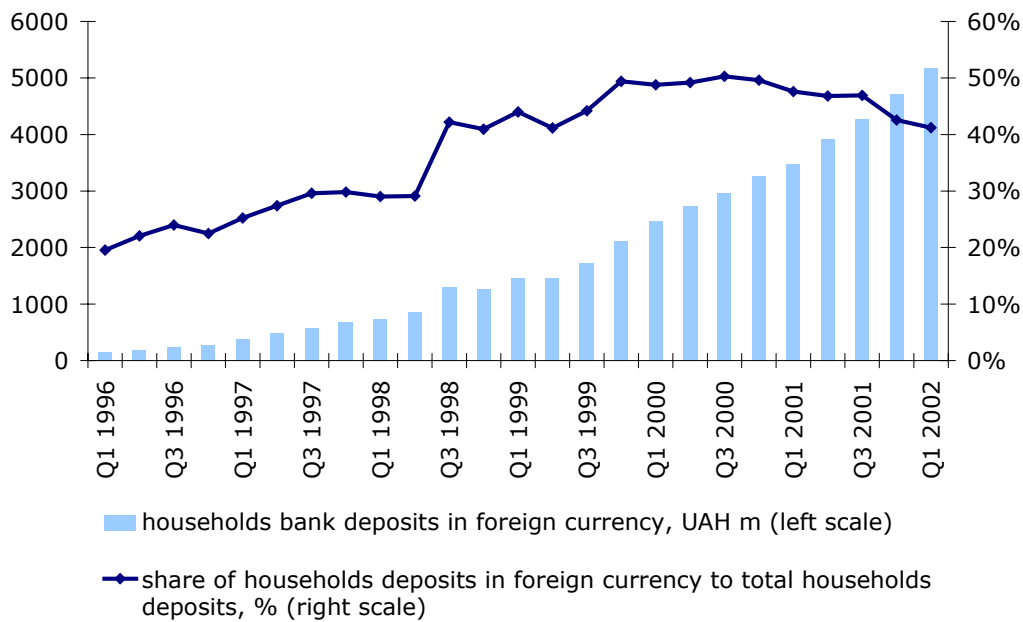
The share of foreign currency deposits at domestic banks has been increasing both for households and in aggregate. Their growth was very significant in the early 90th, when the share of foreign currency deposits in total commercial banks deposits increased by four times between 1992 and 1994. Households had also reoriented their bank savings from national currency of denomination to foreign (Figure 1). The pick was reached in 2000, when a half of all households deposits was foreign-currency denominated, and afterwards the trend reverts. By the end of 2001, the share of deposits in foreign currency in all household deposits reduced to 43%. It means, if we consider this share as a measure of currency substitution in the country, that Ukraine' households started to return to national currency.

An important sign of foreign currency penetration in the economy became a development of foreign cash market. Starting 1992, the State Committee of

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Statistics collects information on sales and purchases of foreign currency by households. It is based on data about operations with foreign currency at cash market (exchange kiosks) that presumably reflects households' non-commercial transactions. Small entrepreneurs, shuttle traders whose operations are not officially registered, as well as part of shadow economy transactions are also incorporated in this statistics (Figure 2).

Figure 1.
Households Foreign Currency Deposits at Commercial Banks in Ukraine

households bank deposits in foreign currency, UAH m (left scale)

share of households deposits in foreign currency to total households deposits, % (right scale)

Source: NBU

At this market, purchases of foreign currency dominated sales till the end of 1999. By the end of 2003, aggregate net purchases of foreign currency by households constituted approximately USD 4.8 bn. This stock was accumulated in the period between 1992 and the first half of 1999. Since then its growth has fairly stopped. For comparison, total deposits of households at banking system (both in domestic and foreign currencies) at the end of 2001 were USD 2 bn. Thus, in Ukraine households' currency substitution took a form of cash substitution, in the first place. It is also evident from the data that the process of currency substitution stabilized by the end of 1999, and has started to decrease afterwards.

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[3] The sum includes years 1992-2000 for which data are available. The plausible assumption is that stock of foreign currency held by households before 1992 was small enough not to have any significant influence on magnitude of the numbers. The reason for this assumption is that (a) in the Soviet Union keeping foreign currency at home was a crime, (b) access to foreign currency was very limited because of severe restriction on trip of citizens of the SU abroad, and (c) controlled foreign trade that was conducted through specially designated state agencies.
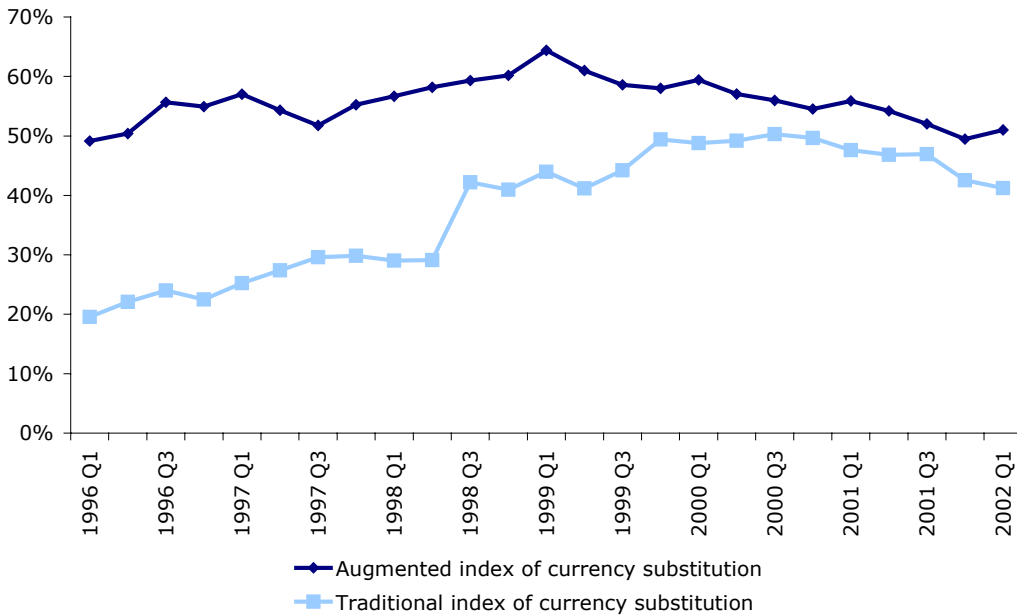
Figure 2.
Foreign Cash Market in Ukraine, USD m
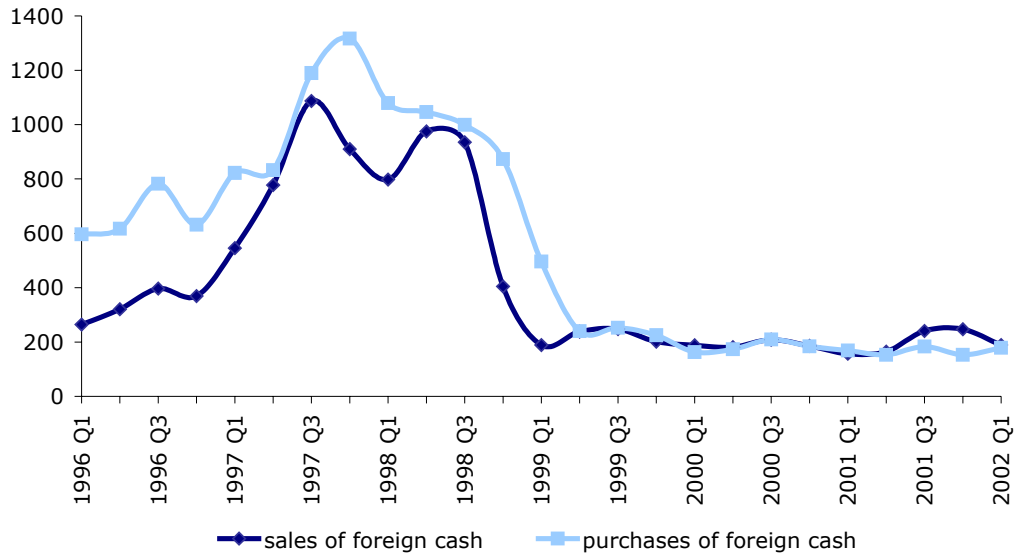
Source: UEPLAC

Figure 3.
Indexes of Households' Currency Substitution for Ukraine

Source: UEPLAC, NBU, own calculations

An augmented index of currency substitution for households, calculated on the basis of both holdings of foreign-currency bank deposits and foreign cash (Figure 3), was much more stable in the period between 1996 and 2002, than a traditional one. While the traditional index, namely the share of bank deposits in foreign currency, continued to rise in 1996-1998, a significant part of the foreign currency stock was created in 1992-1995. Also it is clearly seen that the level of currency substitution in Ukraine started to decrease in 1999. This trend could be attributed to macroeconomic stabilization and economic recovery, also started at that time.

6 Model

It is assumed that each period of time households receive their endowment (income) that they consume and save holding either money or interest-bearing assets. In the case of Ukraine, the role of interest-bearing assets performs bank deposits. Households also have a choice between national and foreign currency both for cash and deposits. Thus, the proposed model goes in line with unrestricted portfolio balance approach presented by Cuddington (1983), Mizen & Pentecost (1996), etc. The choice of households is as follows:

- o Domestic currency (cash) at the end of each period – M
- o Foreign currency (cash) at the end of each period – M^*
- o Domestic-currency bank deposits at the end of each period – D
- o Foreign-currency bank deposits at the end of each period – D^*

Households are subject to the Clower cash-in-advance constraints (Blanchard and Fisher, 1993), thus required to keep at the beginning of each period a balance of national currency sufficient to finance purchases of consumer goods. In this case, foreign cash, alongside with bank deposits, is assumed to perform a store of value function during each time period. An exchange of deposits and foreign cash against national cash is costly. Costs of switch from deposits to national cash are related to foregone interest rates profits. The cost of using foreign currency for transaction purposes is assumed to be equal to the spread between exchange rate on purchase and on sale of foreign currency. It is also presumed that households receive income in national currency.

The choice of assets, expressed in real terms, depends on real income of households, the rate of return on each of these assets, as well as specific variables associated with each asset (Mizen & Pentecost (1996)), that is:

$$\frac{M}{P} = m(y, r, r^* + x, x, h)$$
$$\frac{D}{P} = d(y, r, r^* + x, x, h)$$

$$\frac{EM*}{P} = n(y, r, r*+x, x, h)$$

$$\frac{ED*}{P} = f(y, r, r*+x, x, h)$$

Here P is a price level, E is a nominal exchange rate, y is real income of households, and h incorporates asset specific variables. The income constraint is $m_y + d_y + f_y + n_y = 1$ (if estimated as a system of equations). The rate of return on bank deposits in national currency is equal to their interest rate r. For foreign-currency denominated deposits, the rate of return is equal to an interest rate r^* plus an expected depreciation of the national currency x. In the case of zero inflation, the rate of return on both national and foreign cash should be zero (Mizen & Pentecost, 1996). However, in real world inflation is non-zero, and the rate of return on cash holdings is represented by an expected depreciation of exchange rate x. In this case the expected depreciation of national currency vis-à-vis foreign currency leads to drop in demand for this currency relative to foreign currency, and *visa versa*.

Expected signs of partial derivatives are the following:

- o In general, increase in real income is expected to rise in demand for all types of financial assets. Thus, signs are expected to be positive: $m_y > 0, d_y > 0, n_y > 0, f_y > 0$.

- o Increase in rate of return on domestic currency deposits makes them more attractive ($d_r > 0$), and, correspondently, reduces demand for alternative financial assets ($m_r < 0, n_r < 0, f_r < 0$).

- o Increase in rate of return on foreign currency deposits is symmetrical, thus the expected signs are the following: $m_{r^*+x} < 0, d_{r^*+x} < 0, n_{r^*+x} > 0, f_{r^*+x} < 0$.

- o The expected depreciation of national currency makes both holdings of cash and deposits denominated, in national currency less attractive than foreign currency holdings. The expected signs are: $m_x < 0, d_x < 0, n_x > 0, f_x > 0$.

The demand for each asset is constrained by demand for other three assets because of households' financial constraints. Therefore, specific variables influencing demand for one of the assets may influence also demand for others. In this paper, the following specific (institutional) variables are incorporated:

- o *Expected stability of the economy* h^{stab} that is to directly and positively influence the demand for both domestic cash and bank deposits in domestic currency, as well as to indirectly increase the attractiveness of

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any deposits at banking system assuming that its stability is correlated with stability in the economy $m_{h^{stab}} > 0, d_{h^{stab}} > 0, n_{h^{stab}} < 0, f_{h^{stab}} > 0$;

o *Credibility of banking system* h^{bank} that is expected to positively influence the demand for any kind of banking deposits: $m_{h^{bank}} < 0, d_{h^{bank}} > 0, n_{h^{bank}} < 0, f_{h^{bank}} > 0$;

o *Transaction costs of switching from foreign to national cash* h^{tr} that is expected to negatively influence the demand for foreign currency, and positively the demand for national currency. Demand for bank deposits is expected to be indifferent for these costs: $m_{h^{tr}} > 0, d_{h^{tr}} \approx 0, n_{h^{tr}} < 0, f_{h^{tr}} \approx 0$.

Dynamics of all above-mentioned variables in Ukraine is presented in Appendix 1.

7   **Empirical Evidences**

In the framework of this study I estimated separate demand functions for all four types of financial assets, i.e. national and foreign cash holdings, as well as bank deposits in both currencies. A list of dependent variables includes households' demand for national cash, taken as a monetary aggregate M0; households' demand for foreign currency, approximated by purchases of households at the foreign cash market; and households' demand for bank deposits in national and foreign currencies taken from the National Bank of Ukraine (NBU) statistics. All dependent variables are in real terms.

Traditional independent variables, used in regressions, include interests rate of households' deposits in national currency (ID), and the rate of return of households' deposits in foreign currency (RF), measured as a sum of interest rate of households' deposits in foreign currency and expected depreciation of national currency. Also there is a real income of households (RI), estimated by weighting nominal households monetary income on consumer price index and expected depreciation of the exchange rate in kiosks in Kyiv (EDEP), allowing better reconstruction of conditions, in which households make the choice. Expected depreciation is assumed to be equal to previous period depreciation of national currency.

Institutional independent variables include expected stability of the economy (ECST), measured by growth of the real GDP; credibility of the banking system (BST), estimated as a ratio of total deposits in the banking system to the GDP, and transactions costs (TR), calculated as a difference between ask and bid exchange rate on Kyiv foreign cash market

This paper presents interim results of study of households' demand for various financial assets. Estimations in Table 2 are done with the least squares

technique. Result of the LM test on serial correlation (Table 3) demonstrates that null hypothesis of zero serial correlation cannot be rejected; therefore, no AR parameters were added to equations.

Table 2.
Estimation of households' demand for various financial assets in 1998-2002, seasonally adjusted (least squares)

	Demand for foreign cash	Demand for national cash	Demand for foreign currency deposits	Demand for national currency deposits
LBST	-0.73 (2.20)	0.32 (3.62)	0.62 (4.04)	0.58 (3.77)
ECST	-0.05 (-2.54)	-0.00 (-1.95)	0.03 (4.92)	-0.00 (-1.66)
LTR	-0.18 (-4.72)	0.02 (0.62)	0.17 (3.82)	-0.01 (-0.14)
ID	-0.04 (-5.84)	0.00 (0.84)	0.00 (1.71)	-0.00 (-1.49)
RF	0.07 (4.50)	-0.00 (-1.00)	0.00 (0.42)	0.01 (1.31)
EDEP	0.95 (1.57)	-0.25 (-1.38)	-0.27 (-0.86)	-0.33 (-1.05)
LRI	-0.86 (-1.65)	1.00 (6.63)	0.81 (3.06)	1.32 (5.02)
R^2	0.94	0.93	0.95	0.90
SEE	0.19	0.06	0.10	0.10
D-W	1.70	1.44	1.58	1.65
Number of observations	49	49	49	49

Note: t-statistics in brackets
L denotes natural logarithm

Expected depreciation of national currency (Table 2) did not affect behavior of households in the studied period (1998 to the present), although the expected signs are correct for all equations, excluding the demand for foreign currency deposits in commercial banks. That confirms the result obtained by Volkov (2000) who claimed that a dynamics of exchange rate had lost its importance as a motive for currency substitution since 1996. However, it contradicts *ex-ante* expectations, built into the unrestricted portfolio balance model. This model states that an expected depreciation of national currency is a key variable for determination of the currency substitution in the country (Mitzen and Pentecost, 1996). It should be emphasized, however, that the sign of the expected

depreciation in demand for money (national cash) is negative, i.e. coincides with an expected sign proving the presence of currency substitution.

Table 3.
Breusch-Godfrey Serial Correlation LM Test for Least Square Estimates of Households' Demand for Financial Assets, Two Lags

	Demand for foreign cash	Demand for national cash	Demand for foreign currency deposits	Demand for national currency deposits
F-statistics	0.38	1.87	0.33	1.68
Probability	0.68	0.18	0.72	0.21

One of possible explanations of insignificancy of the expected depreciation is a specification error. In calculation, it was taken a nominal exchange rate in kiosks in Kyiv that may differ from exchange rates in other regions of Ukraine. Another source of misspecification could be a formulation of households' expectations towards exchange rate depreciation.

According to obtained results, households' demand for foreign cash is negatively and significantly related to all thee institutional variables, i.e. to bank credibility, economic stability and transaction costs. That means households still consider cash holdings as important substitution of bank deposits. It also means that growing bank credibility and general economic stability should reduce a demand for foreign cash in Ukraine. Indeed, we observe the augmented currency substitution index in Ukraine has been decreasing since 1999. At the same time, bank credibility and economic stability have been steadily increasing in the same period.

Unexpected (negative) sign was received for the variable "real income" in the case of demand for foreign cash. *Ex-ante* it was anticipated that high real income creates more demand for all types of considered financial assets. One of possible explanation is a close association between real income of households and a confidence in national currency. In this case, a relationship between real income and purchases of foreign currency is indeed negative, because higher income means more trust in stability of national currency, and, consequently, less demand for foreign currency.

Demand for cash holdings in national currency is determined by a real income of households. The relationship has a positive significant sign. Bank credibility variable is also positively and significantly related to demand for national cash, contradicting prior expectations. It could reflect a situation that households link a credibility of banking system with confidence in national currency. However, remained unclear why demand for national cash is negatively (although insignificantly) related to economic stability in the country.

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Demands for bank deposits in both national and foreign currency does not statistically significantly depend on rate of returns on respective assets. Probably, we again observe here a case of specification error. As a measure of interest rates, it was taken a weighted average interest rate on household's deposits in commercial banks that may not accurately reflect a reality. Otherwise, it could be problems embodied in econometric estimations themselves. However, both deposits' demands are statistically significantly and positively related to bank credibility in line with expectations.

Economic stability has a positive influence on demand for foreign currency deposits in line with *ex-ante* expectations. Higher real income of households led to higher demand for bank deposits in both currencies, indicating that people started to save more in a form of conventional interest-bearing assets.

To summarize, the currency substitution in Ukraine came to a shrinking phase, characterized by low significance of the rate of expected depreciation of national currency, but high attention to institutional variables like the credibility of the banking system and economic stability. Moreover, real income of households is positively and significantly associated with demand for all types of bank deposits and with demand for national currency emphasizing a growing confidence of households together with improvements in their financial status. However, further research is necessary to explain several unexpected signs, obtained in the framework of this study.

8 Final Remarks

Worsening of the households' living conditions together with the liberalization of foreign exchange marked provoked a sharp rise of demand for a foreign currency in Ukraine soon after a declaration of independence in 1991. Studies by Sahay and Végh (1996), Volkov (2000), Bondarenko (2000), etc. confirmed that high depreciation of national currency (both in form of "kupono-karbovanets" (temporary currency in 1992-1996) and hryvnia (1996 to the present)) and general macroeconomic instability led to the currency substitution, primary in the form of a cash substitution.

High level of currency substitution in the country entails several negative consequences, including a lost of seigniorage, lower efficiency of monetary policy, and deterioration of economic system transparency. The latter also supports a development of a shadow economy (Curtis, Gardner and Waller, 2001). Moreover, a high amount of bank deposits and credits written in foreign currency makes it more vulnerable to financial crisis (IER, 2002). All these facts make a high currency substitution undesirable.

Currently Ukraine seems to enter in a reverse process of decrease in the rate of currency substitution in the country, sometimes also called "de-dollarisation". The augmented index of currency substitution had reduced to the level of 1996 after a peak in 199, and we may expect that it continue to go down under

favorable conditions. These conditions incorporate institutional variables, especially bank credibility. It not only positively influences a demand for bank deposits, but also increases a demand for national currency. That may be a sign that households perceive stability of banking system as stability of national currency. We can conclude that development of Ukraine's financial system is crucial for further reduction of the level of currency substitution in Ukraine, at least at the level of households.

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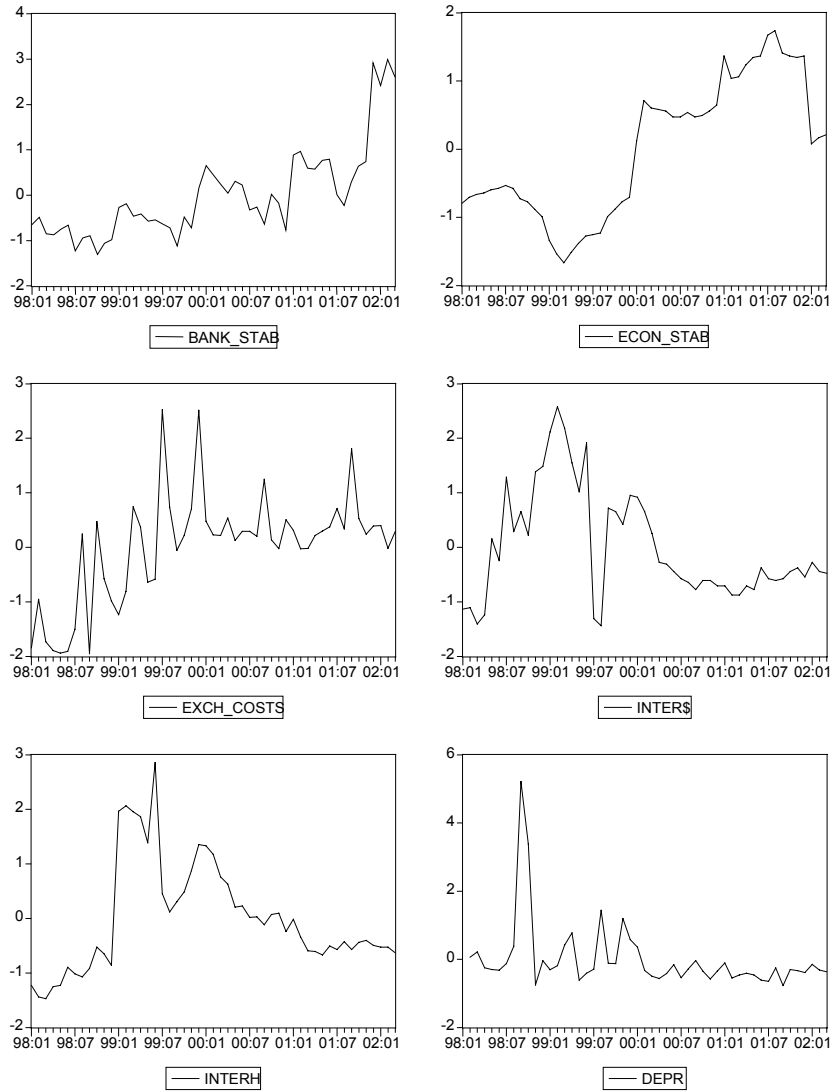
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Appendix 1

Dynamics of Variables Used in Regressions, normalized

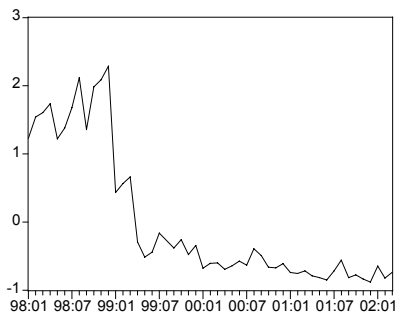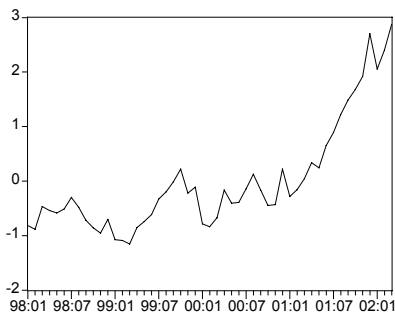*Sources: State Statistics Committee of Ukraine, National Bank of Ukraine*
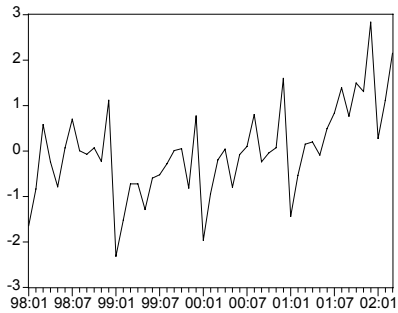
REAL_INCOME

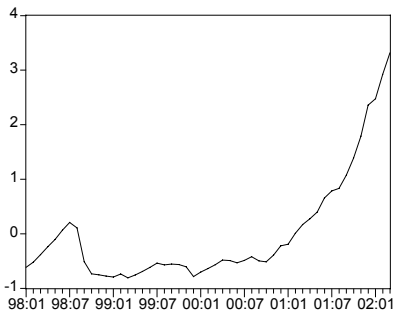HS_F_TOTDEP/CPI

PURH/CPI

M0/CPI

HS_N_TOTDEP/CPI