International Capital Markets and Exchange Rate Stabilization in the CIS[1]

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Abstract:

In this paper, we examine the rationale for dollar and euro pegging in Russia and the CIS. We consider macroeconomic stabilization and transaction costs for international trade as rationales for pegging to the euro. Dollarization of international assets and liabilities are examined as determinants of exchange rate stabilization against the dollar. The impact of network externalities from a common anchor for all CIS countries is explored. Tests on *de facto* exchange rate stabilization reveal that dollar pegging has been pervasive in the CIS.

JEL Classifications: F31, F32

Keywords: CIS, Exchange Rate Systems.

1. Introduction

The rising U.S. twin deficit and the sustained fall of the U.S. dollar have triggered significant increases of foreign reserves and the money supply in countries pegging their exchange rates to the dollar. Reflecting the dynamics of increasing international imbalances involving the U.S. currency, the Central Bank of Russia announced plans to give a higher weight to the euro in its daily exchange rate operations in early 2005. The chances of the euro becoming an anchor currency for the Russian ruble seem realistic from the perspective of macroeconomic stabilization and transactions costs for international trade. Since the euro has evolved into an international currency, it may qualify as a credible anchor for Russian monetary policy. Because the EU25 is Russia's most important trading partner, transaction costs for Russian trade would decline.

However, exchange rate stabilization against the dollar has persisted in Russia up to late 2004. Several papers elaborate the rationale for dollar or euro pegging in Russia and the CIS. Rautava (2004) examines the role of oil prices and the real exchange rate in Russia's economy using a vector autoregression framework and finds that Russian economic performance is influenced strongly by both factors. From this perspective large inflows of petro dollars may explain dollar pegging. Keller and Richardson (2003) identify the dollarization of Russia's international and domestic assets and liabilities as the motivation for stabilizing exchange rates against the dollar. If the CIS economies remain highly dollarized, reducing exchange rate volatility against the dollar is equivalent to enhancing financial stability.

Taking the increasing importance of international capital flows for exchange rate stabilization into account, we test for *de facto* exchange rate stability of the CIS currencies against the dollar and euro. The remainder of the paper is organized as follows. Section 2 provides the rationale for exchange rate stabilization in the CIS countries and identifies the euro as a candidate for the nominal anchor. Although exchange rate policy in these countries has followed dollar pegging for most of the period, de-dollarization pressures are identified. Section

3 considers the network externalities of using an informal common anchor for the CIS countries. Section 4 establishes the *de facto* exchange rate stability of the currencies in these countries before and after the Russian crisis. Section 5 concludes with some observations about the possibility of shifting from a dollar peg to a euro-based anchor.

2. Determinants of Exchange Rate Stabilization in the CIS

McKinnon and Schnabl (2004a, 2004b) provide the rationale for applying the fear of floating argument of Calvo and Reinhart (2002) to developing and emerging market countries. They argue that exchange rate regimes are not chosen exogenously based on specific targets of economic policy making, e.g., reducing the risk of a speculative crisis. Rather, the regime choice is endogenously determined by several inherent and interdependent factors, e.g., macroeconomic stabilization, dollar or euro invoicing of international trade, and dollar or euro denomination of international capital flows.

The euro qualifies as an anchor currency for the CIS for two reasons. First, the Euro Area constitutes a large closed economy having a large volume of international trade. Inflation is low and government debt in the Euro Area, which may be taken as a proxy for future inflation, is moderate on average. Since capital markets are highly developed, the EMU member states are able to lend and to borrow internationally in the domestic currency. Monetary policy is focused purely on the domestic economy and the euro is floating freely without noteworthy foreign exchange intervention. Hence, the euro qualifies as an anchor currency for the CIS.

Second, from the perspective of the CIS, the attractiveness of the euro as an anchor currency is enhanced by a high degree of economic integration with the EU25. As shown in Figure 1, trade with the EU25 ranged from 10% in the Kyrgyz Republic to 50% in Azerbaijan in 2003. As an arithmetic average, trade with the EU25 is 30% second only to intra-CIS trade at 38%. In addition, Russia, which is the largest economy in the region, transacts 50% of its

trade with the EU25 and only 18% with the smaller CIS economies. By contrast, trade with the U.S. is negligible. If the CIS currencies are re-pegged gradually from the euro to the dollar, a larger part of CIS trade would profit from lower exchange rate risk and this percentage will increase in the future as the euro zone expands.

Eichengreen and Hausmann (1999) and McKinnon and Schnabl (2004b) demonstrate that international capital flows have gained increasing importance as an explanation of exchange rate policies. The incentive for exchange stabilization arises from the fact that private and public agents in developing and emerging market countries are unable to borrow or to lend in their domestic currencies. Eichengreen and Hausmann argue that the rationale for exchange rate stabilization in emerging markets is due to underdeveloped capital markets. Because of a long tradition of inflation and depreciation, banks and enterprises in emerging market and developing countries cannot use their currencies to borrow abroad or to borrow long-term, even domestically.[2] International creditors lend in dollars or euros and, thereby, shift the exchange rate risk of open positions in foreign debt to the debtor countries. The consequence is either a currency mismatch, i.e., projects that generate domestic currency are financed with foreign currency, or a maturity mismatch, i.e., long-term projects are financed with short-term loans.

Dollar or euro liabilization creates an incentive for exchange rate stabilization at both high frequencies, i.e., day-to-day or week-to-week exchange rate fluctuations, and low frequencies, i.e., month-to-month or year-to-year exchange rate fluctuations. Most international short-term payment transactions of emerging market and developing countries are denominated in U.S. dollars or euros. The degree of dollarization of payment flows can be assumed to be even higher in dollarized regions such as the CIS, as Keller and Richardson (2003) demonstrate. Oomes (2003) observes domestic payment dollarization in Russia for large household transactions as well as for intra-CIS trade. Because domestic capital markets in emerging markets are underdeveloped and shallow, an active forward market in foreign exchange

against the dollar or euro is non-existent. If hedging instruments are available, individual owners of dollar liabilities consider the cost of forward cover, i.e. the premium on buying dollars forward with the domestic currency, to be too high. The foreign exchange risk of short-term capital transactions remains un-hedged typically.

The CIS governments can provide an informal hedge for private short-term capital transactions by keeping the exchange rate stable on a daily or weekly, i.e., high frequency, basis. Then, private banks and enterprises can repay their short-term foreign currency liabilities with minimal exchange rate risk. Such an exchange rate policy compensates for the underdeveloped private market in forward exchange. Figure 2 shows day-to-day exchange variability of the CIS currencies against the dollar starting in January 1998 in comparison to the euro/dollar exchange rate, which is regarded as a benchmark freely floating rate. The daily exchange rate fluctuations of many CIS currencies, e.g., the Russian ruble, the Ukrainian hryvnia, the Kazakhstani tenge, and the Armenian dram, are considerably lower than the changes in the euro/dollar exchange rate.

Given that lower exchange rate volatility against the dollar in comparison to the euro is due to foreign exchange intervention[3], CIS governments appear to be providing an insurance mechanism for private short-term payment flows by reducing exchange rate volatility on a day-to-day basis. In contrast, European and U.S. enterprises rely on a well-developed domestic bond market to hedge the foreign exchange exposures. Long-term forward markets, with a well defined forward premium equal to the interest differential between the two national bond markets at each maturity, allow hedging at low cost.

At low frequencies, the rationale for exchange rate stabilization in debtor countries originates in long-term liability dollarization. If net debt is denominated in foreign currency, long-term exchange rate stability is equivalent to reducing default risk on balance sheets, as Eichengreen and Hausmann (1999) argue. Exchange rate fluctuations affect the servicing and repayment domestic currency costs of foreign currency debt. Sharp depreciations put balance

sheets at risk, possibly forcing indebted enterprises and financial institutions into default. Even low-frequency exchange rate fluctuations around a constant level generate risk for financial systems because increasing uncertainty is likely to be reflected in higher risk premiums on domestic interest rates. To shield domestic enterprises and financial institutions against such risk in their balance sheets, the government can control low-frequency exchange rate fluctuations to enhance the stability of the domestic financial system. Empirical estimations by Eichengreen, Hausmann and Panizza (2003) show that liability dollarization is prevalent in most emerging market and developing countries that tend to be international net debtors.

Accumulated current account balances can proxy for liquid international liabilities or assets which can be expected to react to changing exchange rate expectations. Many smaller CIS countries, e.g., Armenia, Azerbaijan, Georgia, and Moldova, have large current account deficits for more than a decade. These deficits lead to increasing international debt and result in increasing risk of depreciation. However, the risk of a reversal of short-term international capital inflows can be mitigated by FDI inflows. If current account deficits are financed mostly by foreign direct investment (FDI), as they are in Azerbaijan and Georgia, the threat of currency instability is mitigated. Net FDI inflows were substantial in some, but not all, smaller CIS countries. In general, FDI inflows tend to be less than current account deficits, which leads to a moderate built-up of liquid international liabilities.

In addition to dollarization of foreign liabilities, Keller and Richardson (2003) observe liability dollarization in domestic CIS capital markets in form of dollar bank loans or mortgages. Berg and Borensztein (2000) argue that CIS banks become even more vulnerable to exchange rate fluctuations.

Although liability dollarization provides a rationale for exchange rate stabilization in some smaller CIS debtor countries, this argument does not pertain to Russia (and the Ukraine). Russia and more recently the Ukraine have been running sustained current account

surpluses so that they are becoming large and growing international creditors. Nonetheless, both countries stabilize their exchange rates against the dollar.

McKinnon and Schnabl (2004b) explain the rationale for exchange rate stabilization in creditor countries that are not able to lend in their domestic currencies. Underdeveloped financial markets, capital controls or the fact that dollar assets are a more reliable store of value than domestic currencies cause private investors to prefer dollar assets rather than claims on foreigners denominated in the domestic currency. Conversely, the U.S. is the largest debtor country in the world yet it is not inclined to hold debts denominated in foreign currencies. The position of the U.S. dollar as the world's prominent international currency allows U.S. private and public agents to borrow in domestic currency and shift the exchange rate risk of international lending to the creditors.

By fixing exchange rates at high frequencies, governments in developing and emerging market countries can hedge the risk of private, short-term international lending. If capital markets are underdeveloped, forward transactions by risk-averse CIS traders wanting to hedge their open positions in foreign exchange are difficult. Potential market makers, e.g., banks, cannot cover transactions that involve buying the domestic currency forward for dollars because no convenient array of interest-bearing liquid domestic bonds liquid of differing maturities is available. The government can provide an overall hedge by minimizing exchange rate fluctuations on a daily or weekly basis. Specifically, Russia, the Ukraine, and Kazakhstan are large exporters of raw materials and crude oil. Revenues from these transactions are invoiced in dollars so that exchange rate stabilization provides a hedge for short-term income flows.

At low frequencies, the motivation for exchange rate stabilization by international creditor countries can be linked to the risk perceptions of private and public holders of net foreign currency assets. For example, Russia has run sustained current account surpluses over the decade leading to a build-up of liquid international dollar assets. Current account surpluses had accumulated to approximately 240 billion U.S. dollars by 2004. This stock of in-

ternational assets can be assumed to be held mostly in U.S. government bonds. In addition to international assets, domestic assets in the CIS are held partly in U.S. dollars. Keller and Richardson (2003) distinguish asset dollarization in the form of dollar-denominated bank deposits, i.e., deposit dollarization, from holdings of dollar cash, i.e., currency dollarization. Figure 3 indicates that, despite the recent decline, more than 50% of private deposits at Russian and Ukrainian banks are held in foreign currency.

If private Russian or Ukrainian investors accumulate their assets in U.S. dollars, appreciations of the domestic currency will result in their savings loosing value in terms of the domestic currency. This fear of appreciation may be compensated by higher interest rates in the debtor country, as suggested by open interest rate parity. However, with varying interest rates in the anchor country, the risk perception may change. Depreciation pressure on the anchor currency may be sustained if inflationary expectations in the anchor country rise. Because long-term investment is more or less un-hedged, individual or institutional holders of large dollar assets will be increasingly at risk. For the highly dollarized economies of Russia and Ukraine, Oomes (2003) argues that expected appreciation may cause runs into the domestic currency and result in de-dollarization. If private investors decide to repatriate their international assets, or decide to convert domestic dollar assets into domestic currency assets, the resulting appreciation of the domestic currency will erode the competitiveness of the domestic (export) industry and reduce the value of dollar assets in domestic balance sheets.

Such a process of de-dollarization is observable in Figure 3. In both Russia and Ukraine, de-dollarization began in the new millennium when the dollar came under worldwide depreciationary pressure. The conversion of dollar assets into ruble assets puts pressure on the ruble to appreciate. The governments in Russia and Ukraine may attempt to dampen this pressure by foreign exchange intervention. In Figure 3, this intervention is observable by the rapid build-up of foreign reserves in the Russian central bank. A similar pattern is found in the Ukraine. Private foreign assets are replaced by public foreign assets through official dol-

lar purchases. In this situation, the exchange rate is kept at levels that are perceived to be safe for domestic (export) enterprises and financial institutions.

In summary, liability and asset dollarization provide a strong incentive for any individual country in the CIS to peg its exchange rate to the dollar. The small CIS debtor countries may fear dollar appreciation; the large CIS creditors, specifically Russia, fear dollar depreciation. Frankel (1999) argues that no single currency regime is appropriate for all countries at all times. Hence, we expect to find different exchange rate strategies for the two groups of countries. Nevertheless, Figures 4 and 5 demonstrate that both low frequency exchange movements and the trends of foreign reserves in most small CIS countries exhibit similar patterns to those found in Russia. Sharp depreciations and declining reserves during the Russian crisis and fast rising reserves and appreciation in the new millennium characterize all countries. The smaller CIS countries follow the Russian exchange rate policy to sustain intra-regional trade relations and achieve macroeconomic stability.

3. Network Externalities of Common Informal Anchors

Oomes (2003) attributes the persistence of dollarization in the CIS to domestic and international network externalities in the use of U.S. dollars. Since trade flows in all CIS countries are denominated in dollars, trade invoicing in dollars reduces the transaction costs for intra-CIS trade. Figure 1 shows the regional composition of CIS trade with the U.S., with the EU25, and for intra-CIS trade. For the smaller CIS countries, the motivation for dollar pegging does not depend on strong trade ties with the U.S. Trade with the U.S. as a percentage of overall trade ranges from close to 0% for Tajikistan to only 8.5% for Armenia. In contrast, intra-regional trade accounts for an average of almost 40% of the total trade of the CIS countries. Intra-regional trade is particularly high for the smaller CIS countries. By pegging to the same anchor as Russia, the smaller CIS countries create a zone of intra-regional exchange rate stability that reduces transaction costs for intra-CIS trade and payment flows.

Intra-regional exchange rate stability, which can be achieved by either exchange rate stabilization to a regional anchor currency, i.e., the Russian ruble, or to a common informal external anchor, can be assumed to contribute to macroeconomic stability in the region. Since Russia is the dominant economic power in the region, the smaller countries may avoid sharp exchange rate fluctuations against the Russian ruble. Given close economic linkages among the CIS countries and competition in third markets, e.g., the EU25, secular depreciations of individual currencies contribute to deflation in the neighboring countries. This action provides an incentive for these other countries to allow their currencies to depreciate. If such beggar-thy-neighbor depreciations spread in a highly economically integrated region, macroeconomic stability is affected adversely, as McKinnon and Schnabl (2003) argue. The effect will be more pronounced the larger are the countries that choose to depreciate, the larger is the number of the depreciating currencies, and the more open are the smaller countries that are affected by the neighbors' depreciation policies.

During the Russian crisis the collapse of the Russian ruble in August 1998 was followed by sharp depreciations of most small CIS currencies including the Ukrainian hryvnia, as Figure 4 indicates. If the small CIS countries would have sustained their pegs to the dollar, the depreciation of the Russian ruble would have put substantial deflationary pressure on them. Only Armenia and Azerbaijan, for which trade is focused on the euro area, were able to avoid sharp depreciations. To this end, all smaller CIS countries that are still strongly integrated with Russia or compete with Russia in third markets have an incentive to follow the depreciations of the ruble.

Although competitive depreciations originate within a regime of a stable anchor currency and macroeconomic instability at the periphery, the inverse case may apply if monetary expansion in the anchor country accelerates. Even if monetary expansion does not translate immediately into increasing consumer price inflation, it may affect inflationary expectations. Hence, private capital flows may be redirected towards the periphery. The resulting pressure

on the domestic currencies to appreciate can lead to different policy reactions at the periphery. The monetary authorities of large countries with deep capital markets may allow appreciation of their currencies. Smaller, more open, economies or countries in which growth depends strongly on exports may resist the pressure to appreciate. Large international creditors, e.g., Russia, may be attempting to absorb some part of the domestic currency purchases to shield holders of international assets against losses in their balance sheets.

During the 1990s, Russia accumulated considerable amounts of international reserves through foreign exchange intervention, as Figure 5 shows. This build-up of official dollar reserves has accelerated beginning in early 2002 when the dollar came under sustained depreciation pressure. As a result, inflation may emerge in different sectors of the economy. At an earlier stage, stock and real estate markets may react strongly and asset price bubbles may occur. At a later stage, consumer price inflation is likely to increase as observed recently in Russia[4] Faced with the danger of inflation, the governments at the periphery have two options. If the government is committed to a hard peg, as is the currently the case in the Ukraine, the build-up of foreign reserves will be rapid. Under a fixed peg, the scope for sterilization is limited so that it may be easier for other countries to let their currencies appreciate in a controlled fashion, as Russia is doing. Such a policy may reduce the risk of overheating.

However, once one country using the informal dollar standard chooses to allow its currency to appreciate, all others have an incentive to follow. With the appreciation of the Russian ruble, the exports of Georgia, Kazakhstan, Moldova, and Ukraine either to Russia or to third markets become more competitive. Although the increase in exports may be beneficial to these countries initially, the additional growth stimulus may not be appropriate at a time of accelerating inflation. Hence, these countries may decide to counteract inflation by allowing their currency to appreciate. Since 2002, patterns of such competitive appreciations have emerged in the CIS. As Figure 4 indicates, the Georgian lari, the Kazakhstani tenge, the Kyrgyz som and the Tajik somoni started to appreciate against the dollar in line with the apprecia-

tion of the Russian ruble. In contrast, the Ukraine adhered to its hard dollar peg and now faces inflationary pressures.

4. *De facto* Exchange Rate Stability against Dollar

Based on the rationale for exchange rate stabilization against the dollar or the euro, we test for *de facto* exchange rate stability against the dollar and the euro in the CIS countries. In general, these countries are regarded as highly dollarized economies pegging their exchange rate to the dollar. However, in February 2005 Russia announced plans to give a greater weight to the euro in its daily exchange rate operations.[5] Testing for exchange rate stability against the dollar and the euro nests a test for *de facto* exchange rate stability, versus *de jure* exchange rate stability, as Calvo and Reinhart (2002) undertake for a worldwide sample.[6]

To examine exchange rate stabilization against the dollar and the euro for CIS countries, different degrees of exchange rate stabilization are treated as pegging policy. While one group of countries, including the Ukraine, may choose a hard peg to the dollar, others may opt for a soft peg, i.e., more exchange rate flexibility while reducing sharp exchange rate fluctuations at the same time on a daily, monthly, and yearly basis. To assess such *de facto* exchange rate stability, we use three criteria: monthly percentage exchange rate changes (ε), monthly percentage changes of official foreign reserves (φ_1), and monthly absolute changes of foreign reserves normalized by the monetary base (φ_2). These criteria are defined in Table 1 accompanied by their assigned probability limits. [7]

Nominal exchange rate volatility (ε) is a robust indicator of exchange rate stabilization. In a world of free international movements of goods and capital, exchange rate volatility, e.g., the volatility of the euro/dollar rate, is high. As Calvo and Reinhart (2002) assert, if the probability (P) is low, alternatively high, that monthly exchange rate changes fall outside an arbitrary band, e.g., ±2.5%, the currency can be considered to be fixed, alternatively freely

floating. We assume that standard deviations (σ) of the nominal exchange rates indicate exchange rate stabilization if they are significantly lower than those for the euro/dollar rate.

Governments stabilize exchange rates by intervening in foreign exchange markets. To prevent the domestic currency from appreciating (depreciating), the monetary authorities sell (buy) domestic currency in exchange for dollars, euros, or yen. The stronger are the efforts to stabilize the exchange rate, the higher is the probability that monthly percent changes in official foreign reserves (φ_1) fall outside the predetermined band of ±2.5%.[8] Since percentage changes of foreign reserves may be affected by the accumulated stock of foreign reserves,[9] an alternative measure for exchange rate stabilization is added by normalizing the absolute changes of foreign reserves by the monetary base (φ_2).[10] We set the arbitrary band width at ±5.0%.

We estimate the indicators of exchange rate stabilization for two periods. The first period runs from January 1995 to July 1998 and the second period goes from January 2000 to June 2004. Hence, the first is before and the second is after the Russian crisis. The crisis period is excluded from the sample to eliminate any excessive volatility in both exchange rates and foreign reserves due to the crisis. As a benchmark for the degree of exchange rate stabilization, we take the euro/dollar because it is widely acknowledged to be a freely floating rate. Following Calvo and Reinhart (2002), we assume that exchange rate volatility of the CIS currencies that is lower than the volatility of the euro/dollar rate indicates foreign exchange intervention by these governments.[11]

Table 2 reports the estimation results. The CIS countries pursued dollar pegging before the 1998 Russian crisis. Although exchange rate volatility for some CIS countries, e.g., Belarus, Kazakhstan and Tajikistan, is high, both indicators for the volatility of foreign reserves indicate exchange rate stabilization. The fluctuations of foreign reserves in all CIS countries are clearly higher than those for the benchmark free floaters, i.e., the U.S. and the Euro Area countries. In addition, the volatilities of the nominal dollar exchange rates are significantly

lower than for the euro/dollar in Armenia, Azerbaijan, Georgia, Moldova and Russia. Higher exchange rate volatility in Belarus, Kazakhstan, the Kyrgyz Republic, Tajikistan and the Ukraine can be attributed to downward crawling pegs because the volatility of reserves is high in these countries. Fully flexible rates would imply high exchange rate volatility in combination with low volatility of reserves.

During the Russian crisis, which started in August 1998, all CIS currencies except for the Armenian dram and the Azerbaijan manat experienced sharp but controlled depreciations. The large increase in the volatility of both nominal exchange rates and foreign reserves corroborates this point.[12] As Table 2 indicates, we observe less nominal exchange rate volatility after than before the crisis for eight out of ten currencies: the Armenian dram, the Azerbaijan manat, the Belarusian ruble, the Kazakhstani tenge, the Kyrgyz som, the Russian ruble, the Tajik somoni, and the Ukrainian hryvnia. Only the Moldovan lei and the Georgian lari exhibit more *de facto* exchange rate volatility after the Russian crisis than they did before the crisis, although their volatility is still considerably less than the euro/dollar rate. The high volatility of foreign reserves in all countries corroborates with this finding. All CIS countries fix their exchange rates more or less tightly to the dollar, with multiple pegs in Turkmenistan and Uzbekistan, so that the CIS countries have adopted an informal dollar standard.

A complementary test for exchange rate stability against the euro does not yield any evidence in favor of exchange rate pegging. As shown in Table 3, exchange rate variability of the CIS currencies against the euro is high. Hence, we conclude that the CIS countries constitute a pure informal dollar zone. This finding confirms the strong impact of capital flow dollarization on CIS exchange rate policies, which seems to be more important to the choice of the anchor currency than strengthening trade linkages with the Euro Area countries.

5. Conclusion

In this paper, we investigate the role of macroeconomic stabilization, international trade, and underdeveloped capital markets in determining exchange rate policy in the CIS countries. We find a strong rationale for dollar pegging of the CIS currencies originating in capital markets and strong intra-regional trade linkages, which is confirmed by tests for *de facto* exchange rate stability. Nevertheless, as dollar pegs have contributed to higher inflationary pressure recently, the Central Bank of Russia has announced a revision of its exchange rate strategy. Due to underdeveloped capital markets, a freely floating ruble is not a feasible policy option. Although the Russian economy is large and closed enough to provide an anchor currency for the smaller CIS economies, fear of floating is likely to persist because Russian capital markets will remain relatively underdeveloped in the near future.

Theoretically, the euro qualifies as an alternative anchor for the CIS countries due to strengthening trade relations with the EU25. The ongoing process of de-dollarization in these economies will facilitate a shift toward the euro. To this end, Russia may adopt a currency basket with a considerable weight placed on the euro. Once this process has proven to be sustainable, the smaller CIS countries are likely to follow this policy to maintain intra-regional trade relations and macroeconomic stability. How smoothly the transformation of the exchange rate systems toward more exchange rate stability against the euro will proceed may hinge on Russia's oil and raw material exports. Since dollar invoicing of these primary products is prevalent, the incentive remains to sustain exchange rate stability against the dollar.

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Table 1: Indicators for Exchange Rate Stabilization

	Exchange Rate	Foreign Reserves (1)	Foreign Reserves (2)
Criterion	$\varepsilon = \frac{e_{t+1} - e_t}{e_t}$	$\varphi_1 = \frac{F_{t+1} - F_t}{F_t}$	$\varphi_2 = \frac{(F_{t+1} - F_t) * e_{t+1}}{M_{t+1}}$
Probability Limit	±2.5%	±2.5%	±5.0%

Table 2: Pre- and Post-Crisis CIS Exchange Rate Stabilization

	Exchange Rate ($)				Foreign Reserves ($)				Foreign Reserves / Monetary Base			
	P		σ		P		σ		P		σ	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**
Armenia	9.30%	6.90%	1.36%	1.14%	83.72%	36.21%	17.21%	3.45%	67.44%	37.93%	17.44%	7.55%
Azerbaijan	2.33%	0.00%	2.00%	0.21%	72.09%	56.90%	235.7%	8.01%	53.49%	55.17%	17.03%	17.45%
Belarus	42.86%	26.32%	4.59%	2.17%	86.05%	71.93%	17.23%	12.62%	34.88%	42.11%	12.36%	9.06%
Georgia	0.00%	6.90%	0.61%	1.33%	81.82%	60.34%	11.08%	6.93%	67.65%	22.41%	32.10%	4.82%
Kazakhstan	23.26%	1.72%	2.21%	0.76%	74.42%	74.14%	10.06%	5.91%	46.51%	74.14%	9.81%	11.64%
Kyrgyz Republic	18.60%	5.17%	2.95%	1.32%	82.86%	46.55%	19.87%	5.48%	48.57%	39.66%	8.68%	10.28%
Moldova	0.00%	6.90%	0.64%	1.33%	67.44%	58.62%	15.25%	5.56%	51.16%	32.76%	14.94%	5.86%
Russia	5.41%	0.00%	1.18%	0.82%	88.37%	70.69%	19.56%	5.33%	36.84%	46.55%	6.06%	4.92%
Tajikistan	55.81%	21.05%	15.18%	2.05%	77.78%	60.34%	20.16%	9.48%	n.a.	53.45%	n.a.	14.74%
Ukraine	23.26%	0.00%	3.37%	0.26%	76.74%	86.21%	21.33%	8.30%	46.51%	32.76%	9.85%	4.88%
US ($/€)	25.58%	34.48%	2.19%	2.53%	32.56%	31.05%	4.37%	2.38%	0.00%	0.00%	0.04%	0.12%
Euro Area (€/$)	25.58%	34.48%	2.19%	2.53%	n.a.	10.34%	n.a.	1.64%	n.a.	0.00%	n.a.	0.90%

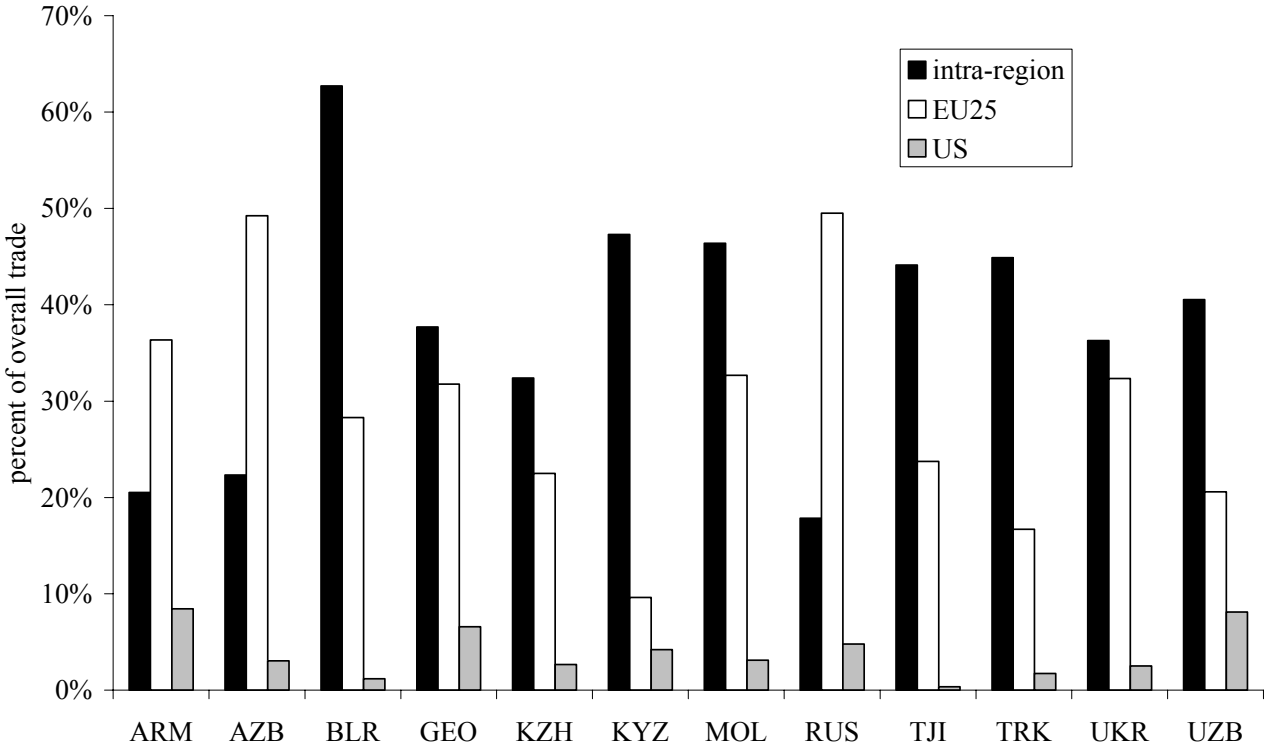
Source: IMF/IFS. Indicators as outlined in Table 1. P marks the probability that the respective criterion falls outside the predetermined band. σ marks the standard deviation of the respective indicator. "**Pre**" indicates the Russian pre-crisis period from January 1995 up to July 1998. "**Post**" indicates the Russian post-crisis period from January 2000 up to December 2004. For Turkmenistan and Uzbekistan no data are available.

Table 3: Exchange Rate Variability against the Euro

	Exchange Rate €			
	P		σ	
	Pre	**Post**	**Pre**	**Post**
Armenia	25.38%	34.48%	2.34%	2.69%
Azerbaijan	30.23%	32.76%	3.40%	2.56%
Belarus	60.47%	43.86%	5.49%	2.87%
Georgia	21.88%	44.83%	1.90%	2.86%
Kazakhstan	27.91%	31.03%	3.52%	2.56%
Kyrgyz Republic	41.86%	25.86%	3.68%	2.48%
Moldova	27.91%	41.55%	2.46%	3.02%
Russia	24.32%	31.03%	2.24%	2.54%
Tajikistan	65.12%	42.11%	14.77%	2.69%
Ukraine	44.12%	39.88%	4.49%	2.65%
US ($/€)	25.58%	34.48%	2.19%	2.53%
Euro Area (€/$)	25.58%	34.48%	2.19%	2.53%

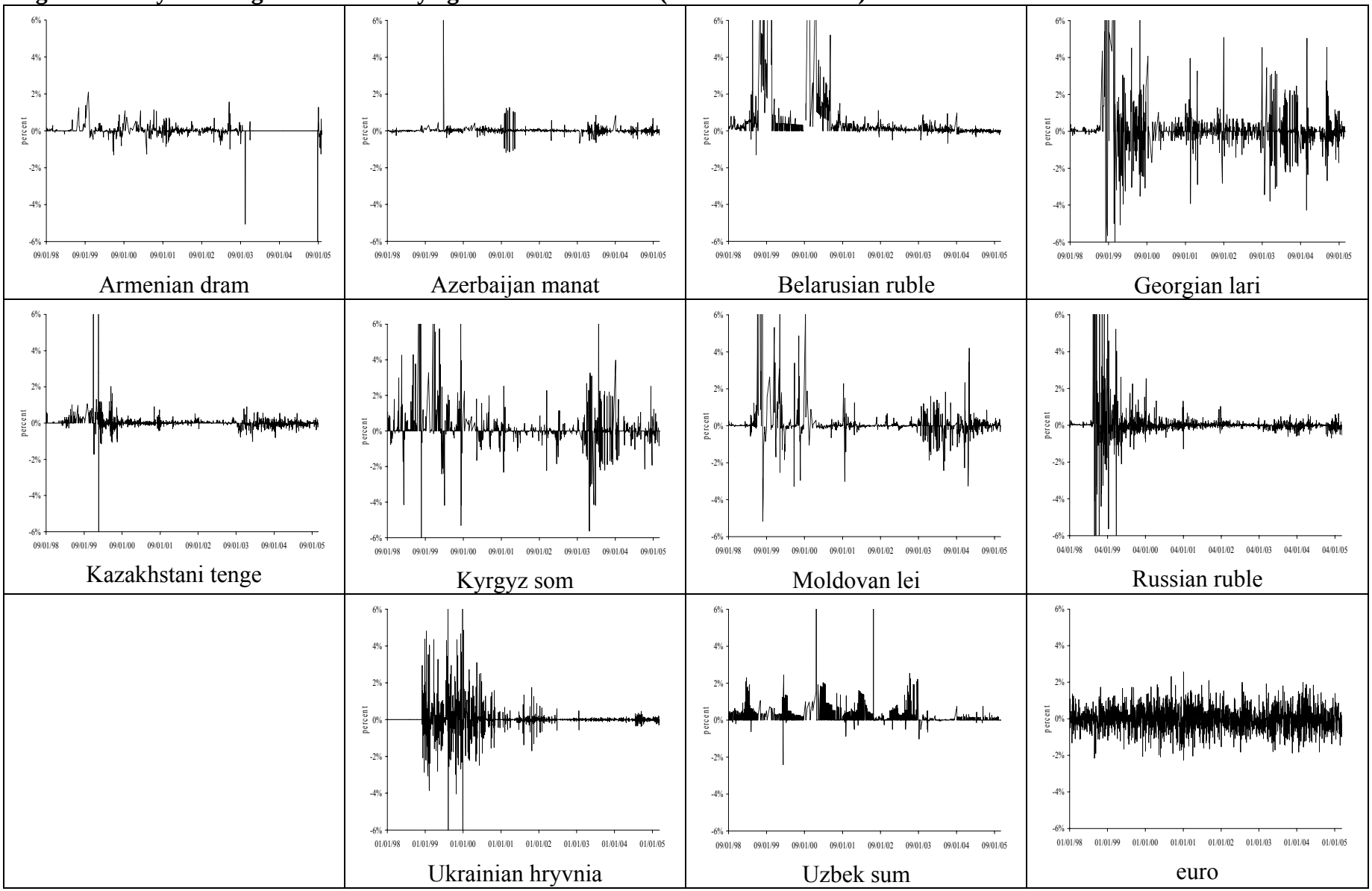
Source: IMF/IFS. P marks the probability that the respective criterion falls outside the pre-determined band. The coefficient σ marks the standard deviation of the respective indicator. "**Pre**" indicates the Russian pre-crisis period from January 1995 up to July 1998. "**Post**" indicates the Russian post-crisis period from January 2000 up to December 2004.

Figure 1: CIS Trade by Region (2003)



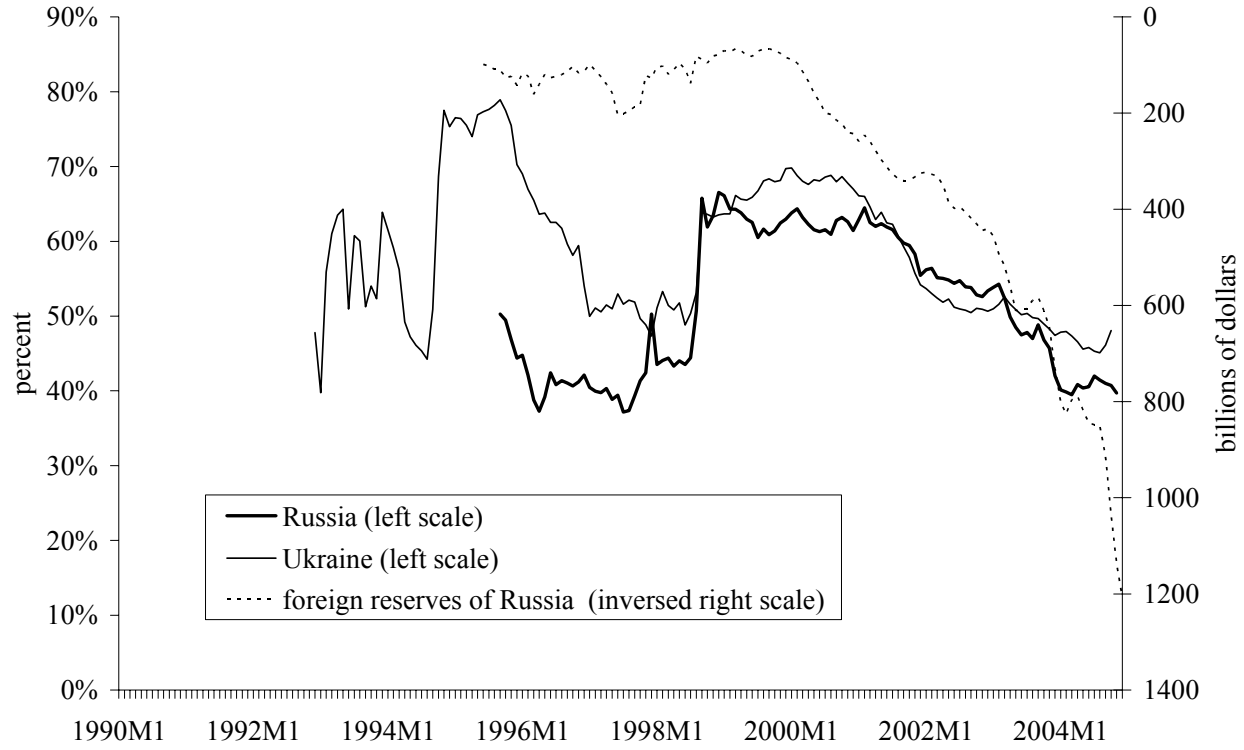
Source: IMF/IFS. ARM = Armenia, AZB = Azerbaijan, BLR = Belarus, GEO = Georgia, KZH = Kazakhstan, KYZ = Kyrgyz Republic, MOL = Moldova, RUS = Russia, TJI = Tajikistan, TRK = Turkmenistan, UKR = Ukraine, UZB = Uzbekistan. Trade is defined as exports plus imports.

Figure 2: Daily Exchange Rate Volatility against the US Dollar (1.1.1998–28.2.2005)



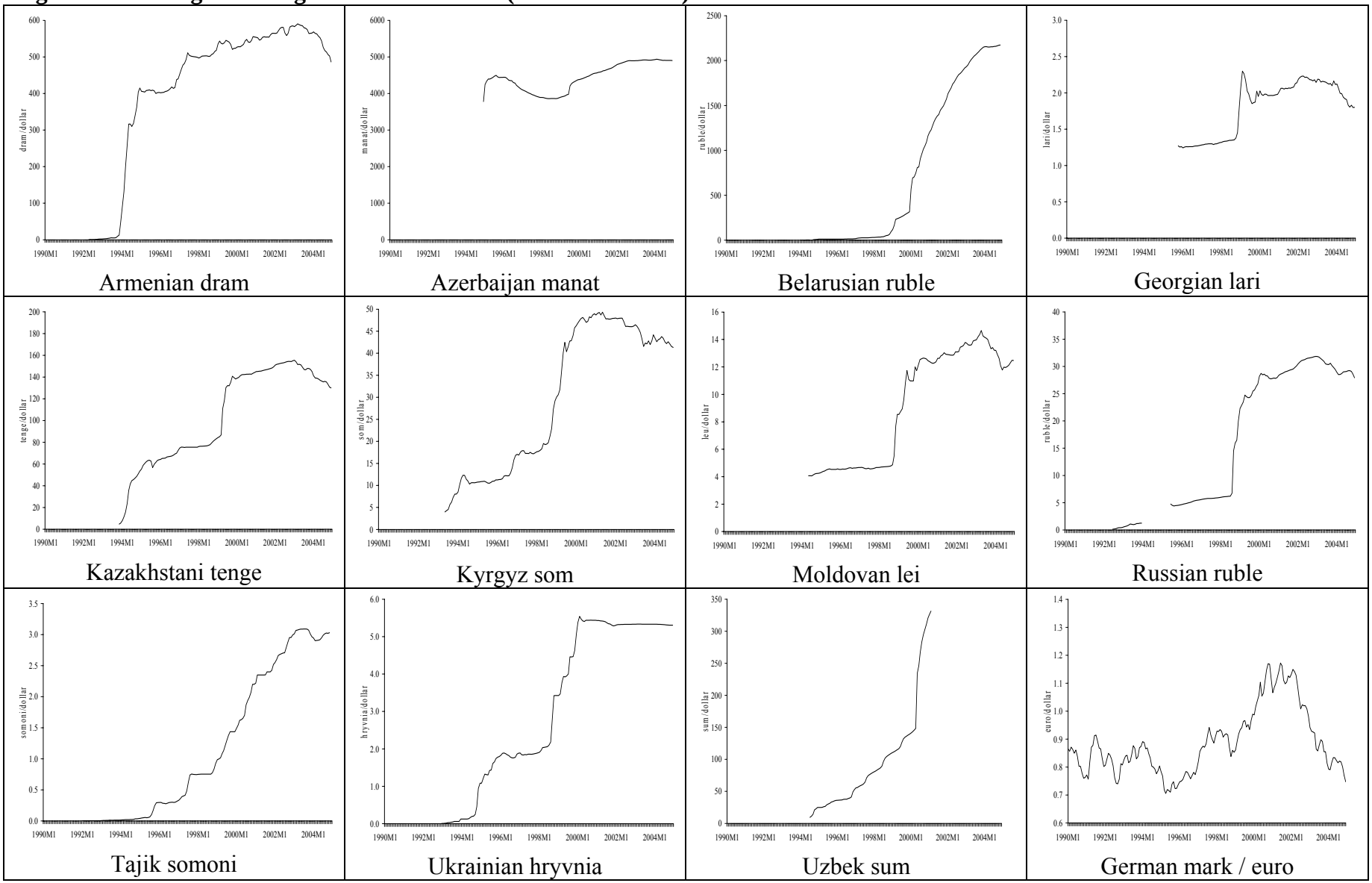
Source: Bloomberg. Data for the Tajik somoni are not available. Volatility defined as daily dollar returns.

Figure 3: Foreign Currency Deposits as Percent of Overall Deposits



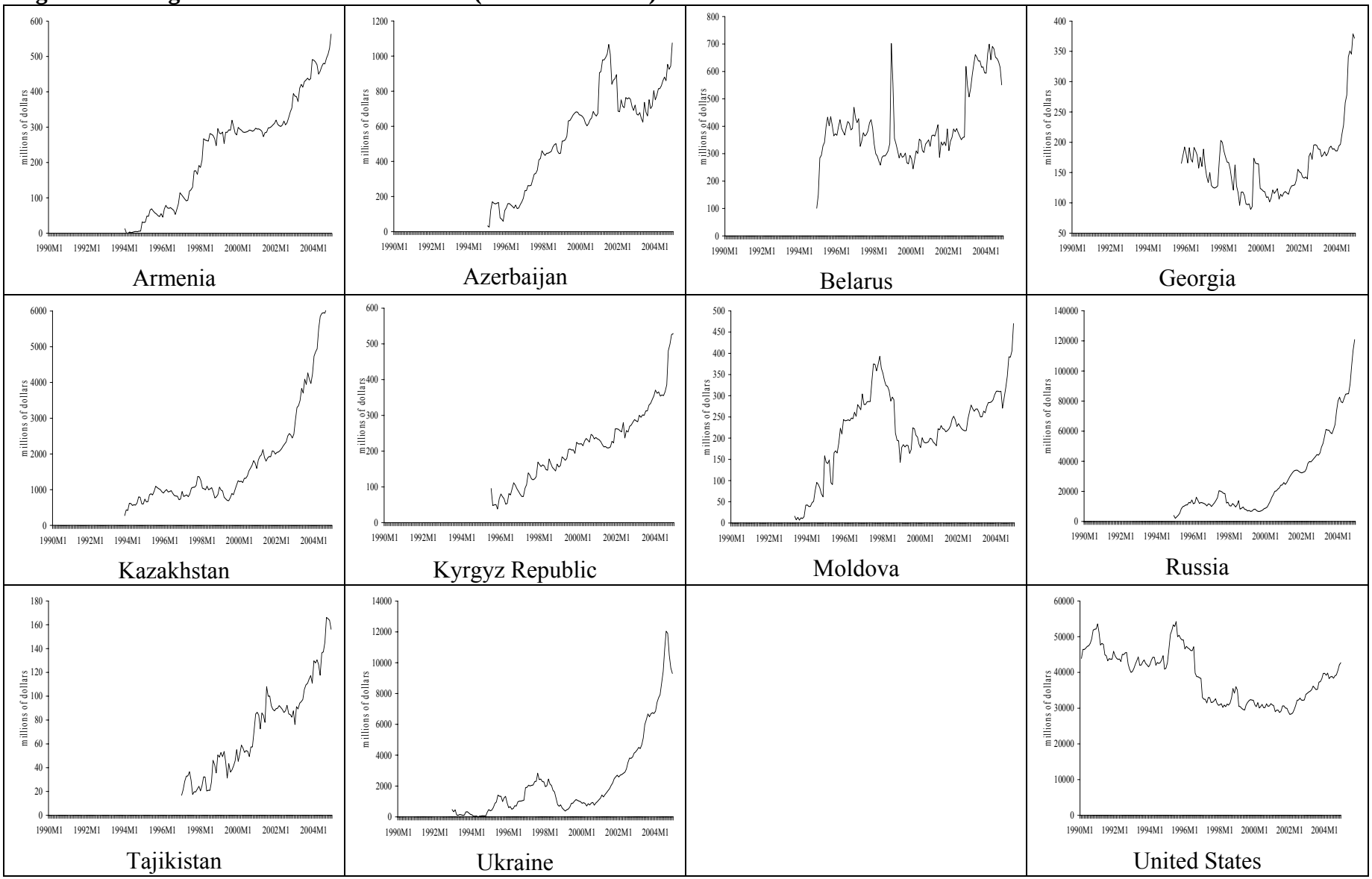
Source: IMF/IFS.

Figure 4: Exchange Rates against the US Dollar (1990:01-2004:12)



Source: IMF/IFS. Note different scales.

Figure 5: Foreign Reserves of CIS Countries (1990:01-2004:12)



Source: IMF/IFS. Note different scales. Data for Uzbekistan and are not available.

[1] I thank Boris Kisselevsky, Vesa Korhonen, Nienke Oomes, Lúcio Vinhas de Souza, Adalbert Winkler and two anonymous referees for useful comments.

[2] Recently, in the new Central and Eastern European EU member states, long-term bond markets in domestic currencies have developed because the new EU members have the unique opportunity to import the reputation of the European Central Bank by anticipating EMU membership. From a worldwide perspective, sustained appreciation expectations against the dollar have favored the issuance of more long-term bonds in some emerging markets, e.g. Brazil.

[3] This assumption is described in more detail in section 4.

[4] During the years 2002 and 2003, Russian inflation continued to decline despite the considerable build-up of foreign reserves and the resulting expansion of reserve money. This missing inflation puzzle can be explained by both price rigidities and de-dollarization, which increased the demand for domestic currency (Ohnsorge and Oomes, 2004).

[5] http://www.cbr.ru/pwa.asp?file=050204_1027_bivalut.htm.

[6] Most CIS currencies are *de jure* classified as free or managed floaters.

[7] Interest rates may serve as an additional tool for exchange rate stabilization, but they may be subject to considerable bias due to official interest rate controls.

[8] Official foreign exchange reserves change not only through foreign exchange intervention but also for other reasons, such as government payments in foreign currency and interest receipts on foreign exchange reserves. Furthermore, the dollar value of foreign exchange reserves is altered if the dollar exchange rate of third reserve currencies changes. Nevertheless, high volatility of reserves is a clear indication of exchange rate stabilization.

[9] With high stocks of foreign reserves, percentage changes tend to decline.

[10] For this purpose, foreign reserves must be reconverted from dollars into domestic currency, which introduces a bias due to changes in the dollar exchange rates of other reserve currencies.

[11] The less developed foreign exchange markets of the smaller countries may be not fully comparable with the much deeper euro and dollar markets. However, we can assume that the volatility of the CIS currencies would be even higher than the euro/dollar volatility without intervention due to shallow foreign exchange markets. Hence, our benchmark of comparison should be robust.

[12] The estimation results are not reported for the sake of brevity but are available from the author upon request.