Paper Title:

"Fear of floating": Is it justified in the case of primary commodities dependent country ?

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Abstract

One of the most popular arguments is that in the conditions of uncertainty on external and internal environment, the best choice for policy makers is to adopt a flexible exchange rate policy as an automatic stabilizer and shock absorber. But usually, many transition and developing countries pursue several goals that can contradict each other, forcing Central Banks to combine short-run exchange rate rigidity with long-run flexibility.

To determine the *de facto* exchange rate policy in Kazakhstan, the approach originally proposed by Frankel and Wei has been tested. The results confirm the findings of other research, that monetary authority in fear of floating actively intervene into the market to stabilize high-frequency exchange rate fluctuations to US dollar. The paper argued that this was a reasonable policy in view of the fact that "there are not enough hedging instruments to allow agents to insure fully against the abrupt changes in the exchange rate, to which their expectations are very sensitive".

Following this the paper attempts to distinguish some channels through which the exchange rate pass-through to consumer prices and eventually to real exchange rate works. The Friedman argument, that the choice of exchange rate system would be irrelevant if all prices adjusted instantaneously to shocks, inspired this analysis. The analysis of Real Exchange Rate variance decomposition supports the inference that the less the exchange rate pass-through to consumer prices, the stronger the choice is in favor of more fixed exchange rate. The results show that full explanation of the behavior of the real exchange rate requires modification to a dominant approach that considers only the role of changes in the relative prices of nontradables. The fluctuations in the relative prices of tradables has a significant impact on the real exchange rate variability, especially in the short-run. As prices tend to adjust to the equilibrium level as time goes by, the choice of monetary regime is irrelevant in the long run: competitiveness doesn't depend on short-run exchange rate fluctuations.

I. Introduction

Economic performance in Kazakhstan began to weaken in the 1980s, reflecting the deteriorating growth performance of the Soviet economic system as a whole. The unfolding disintegration of the Soviet Union in 1991 had an additional negative impact on economic activity. The economic downturn intensified during the yearly years of the transition and was most severe in 1994 when the end-year inflation climbed up to 1158% following the introduction of the national currency "tenge" in November 1993.

Following a sharp fall in output during the early transition period, estimated to be 40% of its 1990 level, the Kazakh economy started to recover in mid-1996. This positive trend was confirmed in 1997. At the start of 1998, the expectations were that output growth would not merely continue but even accelerate. In the event, the economic situation in 1998 turned out radically different from expectations, as Kazakhstan was hit by the series of large external shocks: a sharp real depreciation of the Russian ruble and a fall in the prices of oil and other primary commodities that are the main sources of country's foreign exchange earnings. As a result, in April 1999, the national currency was effectively devalued, by more than 50% in 3 months.

Achieved substantial real devaluation was accompanied by the recovery of oil and other primary commodities' prices that eventually contributed to 9.8% real GDP growth in 2000. In the environment of lower inflation and relatively stable exchange rate, the effect of real devaluation was not depleted in 2001 and continued to uphold further expansion. Economic growth accelerated to 13.2% on the shoulders of increased domestic investment and consumption, that compensated the less favorable external environment. Tables in the Appendix outline main vulnerability indicators that reflect the behavior of Kazakhstan both before the shocks and afterwards.

The Kazakhstan experience shows that the policy makers in transition countries should not only pay attention to the fundamental factors that fuel long-term economic growth but they should be prepared to deal with the challenges that are out of their direct control. The understanding of the nature of external shocks that the country is highly vulnerable to, their possible magnitude, and transmission channels is crucial to choosing the proper exchange rate policy and designing an efficient approach to correct misalignment.

The paper begins with an analysis of the degree of Kazakhstan's exposure to shocks originating in the world commodity markets and contagion from neighboring countries. It proceeds in Section III with an explanation of the magnitude of external shocks the country faced in 1998 and their economic impact.

The shocks forced the National Bank of Kazakhstan (NBK) to abandon the unofficial exchange rate peg and the subsequent float of the currency was associated with very sharp fluctuations in its value.

But further NBK policy raises doubts about post-devaluation exchange rate policy in Kazakhstan: in the wake of the shocks the Bank may be reverting to the practice in the pre-devaluation period in the sense that it has opted to stabilize the exchange rate against US dollar. The paper addresses this issue in Section IV. The objective is to determine the pre- and post-devaluation *de facto* exchange rate policy in Kazakhstan and evaluate the appropriateness of the policy in light of both contemporary external and internal conditions.

Following this I attempt to distinguish some channels through which the exchange rate pass-through to consumer prices and eventually to real exchange rate works. Section V uses the statistical variance decomposition approach to assess how much of the tenge – US dollar real exchange rate dynamic can be explained by the short-run fluctuations of relative prices of nontradables vs. relative tradables prices. The famous Friedman argument, that the choice of exchange rate system would be irrelevant if all prices adjusted instantaneously to shocks, inspired this analysis.

II. Vulnerability to external shocks

1. World commodity markets volatility

The degree of economy's exposure to commodity prices fluctuations is highly dependent on (i) the extent of trade structure diversification, (ii) the persistence of the shock and whether it is anticipated.

(i) In Kazakhstan, commodity diversification of exports is very limited: the share of oil exports to total customs exports steadily increased from 15.1% in 1995 to 49.3% in 2001. Exports of ferrous and non-ferrous metals contribute about half of total non-oil exports. As the main consumer of Kazakhstan's primary commodities are non-CIS countries (oil – 70%, metallurgy – 94% in 2001), domestic producers faces exogenously given world prices and prices fluctuations significantly influence foreign exchange inflow, real sector profitability and fiscal stance. Accordingly, government revenues from oil sector are estimated to be about 20% of tax receipts, and, in total, about 30% comes from enterprises with foreign direct investment.

(ii) *How persistent are shocks to world commodity prices?*

Cashin, Liang and McDermott (1999) estimated that, on average, shocks to commodity prices are very long lasting. The results of the research imply that the commodity prices cycles are asymmetric – price slumps are longer in duration than price booms. The length of a typical slump in prices of oil (that contribute almost 50% to country's export earnings) is in excess of 4 years.

The average decline during commodity price slumps is, in most cases, slightly larger than the average price rise during commodity price booms. At the same time, the monthly amplitude of commodity price rises in booms is slightly faster than the monthly amplitude of commodity price declines in slumps.

Finally, authors pointed out that for the majority of world traded primary commodities, the probability of a slump in prices ending is independent of the time already spent in the slump. This fact is also holds for boom periods. This means that *first,* there is no evidence that the longer adverse movements in prices continue, the more likely it is that this period of falling prices is about to end; *second* it is a mistake to believe that because prices have been in a boom period for a long time, that there is a new paradigm, in which cycles are no longer relevant.

For countries like Kazakhstan, a large prolonged decline in prices is of greater concern as a long-lived low average level of prices, as the economy can gradually adjust to the new environment. Cleary, the average duration of commodities price declines is very long, while oil prices slumps are the most persistent among the primary commodities and, overall, the slumps are of large amplitude. This makes Kazakhstan highly vulnerable to unanticipated large negative external price shocks in view of the uncertainty as to how long they will last. Therefore, the cost of any stabilization program is higher.

2. Trade and financial contagion from other countries

When a country experiences a financial crisis marked by a significant depreciation of its currency, other countries may suffer from *trade spillovers*, owing to the improved price competitiveness of the crisis country. If the exchange rate crash is accompanied, as is typically the case, by a downturn in economic activity and a compression of imports in the crisis country, the associated income effect will further depress the exports of trade partners.

Kazakhstan's external trade turnover is not only concentrated on exports of a few goods but also is highly dependent on the economic condition of Russia. The share of bilateral official trade amounted 30% in 2001 (47% in 1996). The Russian Federation is the principal consumer of Kazakhstan's agricultural exports; iron ore, alumina and fuels (coal, natural gas), while consumer goods and intermediate inputs are main imported commodities.

Moreover, considering that Russia and Kazakhstan export a broad list of homogenous products on world markets, the price and income effect operates not only trough direct bilateral trade linkages, but also through price competition and income repercussion in third markets.

Financial linkage can be another channel for spillover and contagion effects. The occurrence of a crisis in one or more countries might induce investors to rebalance their portfolios for risk management, liquidity, or other reasons. Hence, a strong financial linkage with the major lender to a crisis country would increase the country's financial vulnerability. Some countries, therefore, may experience capital outflow independently of their macroeconomic fundamentals, simply because their assets are viewed as relatively more risky, more liquid, or highly represented in the portfolio of creditors to the crisis country.

Shifts in investor sentiment might also play a role in the spread of a crisis. A crisis in one country can serve as a "wake-up call", inducing financial markets to reassess other countries' fundamentals. The risk of a crisis precipitated by a sudden change in expectations is likely to be greater the larger the country's share of short –term obligations and the larger the maturity mismatch between assets and liabilities, because the economy will then be more vulnerable to a run by a fairly modest share of lenders. Low levels of international reserves in relation to the stock of short-term debt or to domestic banking liabilities may therefore signal financial vulnerability.

In comparison with Russia, where capital, especially before August 1998 devaluation, was mainly in the form of short-term portfolio investment, government borrowing, and investment into government bonds (with artificially high interest rate) to finance budget deficit, capital inflows in Kazakhstan are largely foreign direct investment of Multinational Corporations or their affiliated branches, mainly from the US, the EU and until recently, South Korea. The net inflow of FDI was sufficient to cover the existing current account deficit.

The share of short-term term debt gradually declined and amounted 8.6% in total external debt as of December 31, 2001, in comparison with 30% at the end of 1997. The main purpose of short-term borrowing is the financing of working capital, while the main lenders for non-financial private sector are mother companies.

Due to the underdeveloped stock market, the flow of portfolio investment into Kazakhstan is relatively insignificant. As portfolio investments are mainly short-term and subject to sudden changes in investors' sentiments, their minor role in total inflow is not regarded as a drawback for Kazakh economy, especially after the East Asian and Russian crises.

Therefore, the structure of capital inflow in Kazakhstan, where long-term investment dominates, resulted in less degree of vulnerability to the dramatic outflow of capital due to a sudden shift in foreign investor sentiments. Moreover, the probability of an increase in capital flight during the positive shocks through underinvoicing is larger than as a result of negative shocks.

Overall, the contagion of crisis effect through financial linkages in the case of Kazakhstan is not so severe compared to East Asian countries and even Russia, and can be viewed as the consequence of shocks originating in commodity market and trade spillover that cause the fundamentals to change.

III. The magnitude of external shocks in 1997 – 2001 and the policy response of Kazakhstan authorities

January 1997 – June 1998. There were no serious concerns: the influence of the financial markets' turbulence seemed to be small, as the capital inflow was mainly long-term direct investment, the world price decline, seemed temporary, and Russia's problems - not so severe. The period is characterized by real GDP growth averaging 3.5% (year on year basis). The tenge raised by about 11% during January-June 1998 in real terms. Nevertheless, dramatic devaluation after the introduction of the national currency in November 1993, resulting in some real exchange undervaluation, plus preceding export price liberalization and FDI inflow into exportables, created a certain safety margin that allowed an increasing export volume by 9% (y-o-y), on average, despite the falling prices environment and real appreciation.

Current account deficit was easily financed by foreign capital inflow that fueled a gross international reserves stock sufficient to defend the exchange rate.

July 1998 – March 1999. Increased pressure on the Russian foreign exchange market that finally lead to the collapse of the ruble in mid-August 1998, resulted in a significant loss of competitiveness, which was aggravated as the Kazakh authorities continued to follow a policy aimed at preventing nominal devaluation. This was accompanied by a further decline of 12% in primary commodity prices in world markets. Average year on year Real GDP contraction amounted to 4%. As a result of lower export earnings due to the price decline, plummeting demand for domestic industrial

goods from Russian producers, and an increased flow of cheaper Russian consumer goods, the current account deficit became unsustainable.

As the increase in devaluation expectations became more severe, the National Bank allowed gradual devaluation of the currency while tightening monetary policy (the money supply decreased by 21% and the refinance rate increased from 18.5% to 25%), and heavily intervened on the foreign exchange market. Bank intervention amounted to 840 mln. USD in total during the 8 months before the decision to devalue was finally taken. To support the monetary policy, fiscal policy was tightened: government expenditures were reduced to 12.6% of GDP in the first quarter of 1999, compared to 16% the year before. Nevertheless, these policy measures were not sufficient to absorb the existing imbalance caused by the accumulated 64% tenge appreciation to the Russian ruble (14% on a weighted basis), and persistently falling world commodity prices.

April 1999 – June 1999. On April 4, 1999, the Government and the Central Bank officially announced the abandonment of the crawling peg and adoption of a freely floating exchange rate policy. The volatility of the foreign exchange market dramatically increased, and, overall, the tenge lost half its value in 3 months. At the same time, achieved real depreciation, as consumer prices increased 5 times less than the rate of depreciation, was sufficient to adjust the preceding exchange rate overvaluation and created the necessary fundamental conditions for economy recovery.

To compensate the shortage of foreign exchange for dollars fueled by devaluation expectations, and while the central bank no longer covered the GAP between supply and demand, a compulsory 50% surrender requirement on export proceeds was introduced. To prevent the banks from massive deposit withdrawals in fear of spreading the crisis throughout the banking sector, resident natural and juridical persons were given a onetime opportunity to exchange their tenge deposits, if held until October 5, 1999 (for juridical persons) or until January 5, 2000 (for natural persons), into dollar-denominated deposits at the prevailing exchange rate.

July 1999 – December 2000. The situation on the foreign exchange market stabilized and allowed the National Bank to abandon the previously introduced exports' proceeds surrender requirement in mid-November 1999, avoiding FX market disturbance. Even though inflation accelerated, this didn't contribute to significant real effective exchange rate appreciation, as the situation in Russia and other CIS countries had stabilized, while appreciation to non-CIS countries didn't erode the previously-achieved real effect after April 1999.

World commodity prices increased by 36%, and this, in addition to real depreciation, stimulated export growth and resulted in a current account surplus averaged 3% to GDP. Led by expansion of the exportables' industrial production, year-on-year real GDP growth soared to 10% on average during the period. In fear of appreciation, the Central bank intervened to purchase the excess supply of dollars causing an increase in the money ratio to 15.3% at the end of the period comparing to 7% right before the devaluation.

Recent development: 2001

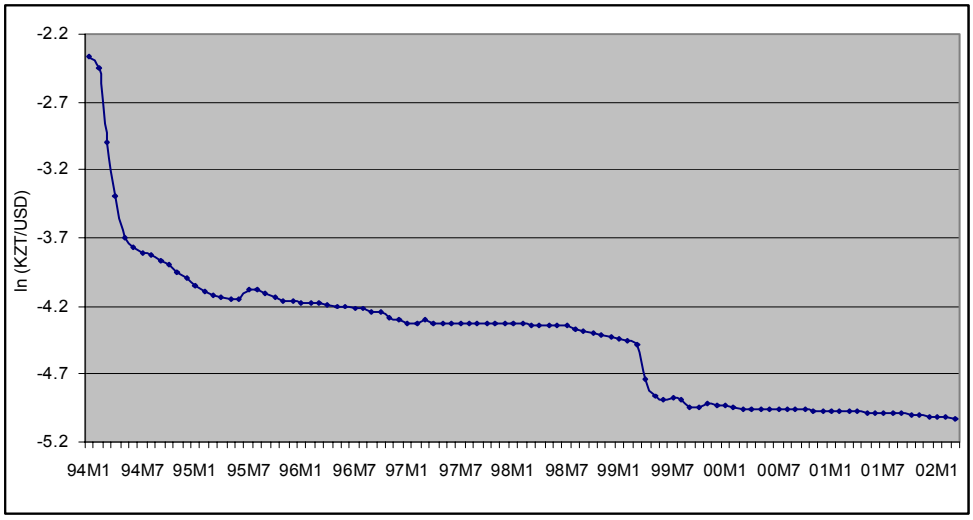
In order to constrain government consumption, lower cost of capital inflow sterilization and adjustment to possible external shock the National Fund have been created to accumulate extra revenues from natural resources exports. High world prices in 2000 and first part of 2001 allowed to accumulate about 1.2 bln. USD in it at the end of 2001. But, the favorable external environment drastically changed in the second half of the year. As the result, due to the average decline in world prices on Kazakh exports by 9.4% and growth of imports, sustained by investment increase, CAB turned into deficit amounted 7.8% to GDP comparing to the surplus of 2.3% in 2000. Nevertheless, on the wave of higher FDI inflow no financing GAP had appeared, thus allowing Central Bank even to purchase excess supply of dollars on domestic FOREX market to sterilize capital inflow and prevent real exchange rate appreciation. Relatively stable exchange rate and increased money demand helped to constrain inflation at the level of 6.4% at the year end. Real GDP growth at the same time soared up to 13.2%.

Although in the case of Kazakhstan it is difficult to separate the influence of shocks originating from the world commodity markets and the effect of real exchange rate in 1998, as they occurred almost simultaneously, one obvious conclusion is that it may have been possible to make an adjustment to the commodity price shock alone in the smoother way, although this doesn't preclude the necessity of gradual exchange rate devaluation. Similarly, without the oil price rise, the Kazakh economy would not have been able to recover so quickly. Moreover, as well as during the period before devaluation, when the rate of depreciation had been forcibly kept within a certain range to dampen devaluation expectations and lower the inflation rate, after the FX market correction, the exchange rate volatility significantly decreased. In 2000 and 2001 the tenge depreciated only by 5.2% and 3.8% respectively. The next two Sections provide some analysis of the National Bank exchange rate policy and its implication on the prices behavior and the real exchange rate.

IV. Exchange rate policy during 1995 – 2001 period: Comparison of pre- and post-devaluation periods

High-frequency exchange rate pattern. The Kazakhstan Monetary authorities never publicly announced the official pegging or the targeted level of the exchange rate to the dollar. Nevertheless, the National Bank of Kazakhstan (NBK) often intervenes to smooth the fluctuations and/or to defend the certain value of the tenge (KZT). Figure 1 shows the monthly KZT/USD exchange rates on the FX market since the introduction of the national currency in November 1993 until March 2002.

Figure 1. Monthly KZT/USD exchange rates[1], 1993-March 2002 (log scale)



That was the case in 1996, 1997, and when the Russian crisis occurred in 1998. Since the market had adjusted the exchange rate towards equilibrium, and Kazakhstan enjoyed favorable world commodity market conditions, followed by massive capital inflow in 2001, the NBK purchases the excess supply of dollars to defend the tenge from appreciation.

Frankel-Wei approach. To investigate the relative importance of the USD and other major currencies in the exchange rate policy of Kazakhstan, the approach originally proposed by Frankel and Wei has been tested (Table 1):

$$\text{dln(KZT/SWF)} = \beta 1 + \beta 2 * \text{dln(USD/SWF)} + \beta 3 * \text{dln(EUR/SWF)} + \ldots + \varepsilon$$

The regressions allow us to estimate the implicit weights assigned to various currencies. The coefficient of the USD closed to unity with the small standard error indicates that the monetary authorities strictly targeted the USD as the anchor for their exchange rate policy. The estimation covers the period 1995-2001, and the coefficients are estimated for each year separately.

The first estimated equation includes only the US dollar and the EUR/DM (plus a constant to pick up any trend depreciation) as explanatory variables, while the second incorporates the Japanese Yen and the Russian Ruble.

During the whole period, the coefficient of the USD is statistically significant and close to 1. There is no evidence that other major world currencies (EUR and JPY) play significant roles. The significance of the constant term shows the existence of a long-term depreciating trend in 1996, 1998, 1999 (second half) as well as in 2000 and 2001.

Inclusion of the Ruble into the regression has the drawback that the existence of multicollinearity between the Russian Ruble and the US dollar cannot be rejected. This means that the coefficients are unstable. This is indicated by the large standard error of USD and RUR coefficients in 1995 and 1997, when the second regression showed that coefficient of the RUR is significant at a 95% level. The multicollinearity problem arises when there is a perfect or less than perfect linear relationship between the explanatory variables of the regression model, namely the USD and the RUR. More formally, the relationship could be expressed as follows:

$$\text{dln(RUR/SWF)} = \lambda 1 * \text{dln(USD/SWF)} + \ldots. + \varepsilon$$

So the simplest way to detect the severity of the multicollinearity is to run the regression of one explanatory variable on the other.

The results of this test proved the above assumption - the estimated $\lambda 1$ is not significantly different from 1 in 1995 and 1997, and the regressions' estimation power is higher 0.90. This is consistent with the crawling band exchange rate policy in Russia that targeted the US dollar's value as an anchor currency.

The same test for 2000 and 2001 showed similar results with the highest degree of RUR fixity to USD in 2001, which means that Central Bank of Russia (CBR) also returned to its previous policy aimed at smoothing exchange rate variation to the USD.

Overall, since the adverse effect of Russian financial crisis had been overcome NBK didn't opt for targeting tenge/ruble real exchange rate to ensure competitiveness against main trade partner. *Following the announcement of the floating exchange rate regime in April 1999 and in view of the common to both countries external shocks in 2000 and 2001 National Bank of Kazakhstan, as well as Russian monetary authority, continued to pursue the policy of anchoring the national currency to the US dollar.*

[1] Downward movement in the exchange rate means depreciation to US dollar.

Table 1.

Period of estimation: 1995 – 2001
Frequency: Daily
All exchange rates are converted to express the value of the currency in terms of the Swiss Franc.

Regression results for KZT *(standard errors are in parenthesis)***:**

Year	*Constant*	*USD*	*DM/EUR*	*YEN*	*RUR*	*R2 adj.*	*S.E.*	*DW*	*N.O.*
1995	**0.0008**	**0.99****	**-0.0007**			**0.63**	**0.00829**	**1.63**	**196**
	(0.0006)	*(0.0693)*	*(0.0815)*						
	0.0006	**0.74****	**0.04**	**-0.11**	**0.25***	**0.64**	**0.00818**	**1.68**	
	(0.0006)	*(0.1410)*	*(0.0823)*	*(0.0886)*	*(0.1087)*				
1996	**0.0006****	**0.94****	**-0.06**			**0.83**	**0.00235**	**1.96**	**223**
	(0.0002)	*(0.03629)*	*(0.0413)*						
	0.0006**	**0.92****	**-0.06**	**0.003**	**0.029**	**0.83**	**0.00235**	**1.94**	
	(0.0002)	*(0.04999)*	*(0.0415)*	*(0.0359)*	*(0.0303)*				
1997	**0.0001**	**0.96**	**0.041**			**0.84**	**0.00282**	**1.82**	**228**
	(0.00019)	*(0.03342)*	*(0.03582)*						
	0.0000	**0.64****	**0.05**	**-0.048#**	**0.34***	**0.85**	**0.00278**	**1.91**	
	(0.0002)	*(0.15859)*	*(0.0355)*	*(0.0258)*	*(0.1501)*				
1998	**0.0005****	**1.01****	**0.02**			**0.98**	**0.00108**	**1.93**	**227**
	(7.1E-05)	*(0.0120)*	*(0.016)*						
	0.0004**	**1.006****	**0.02**	**0.01**	**0.002**	**0.98**	**0.00107**	**1.81**	
	(7.1E-05)	*(0.0124)*	*(0.0165)*	*(0.0165)*	*(0.0012)*				
1999[2]	**0.0005#**	**0.99****	**-0.02**			**0.80**	**0.00315**	**2.01**	**139**
	(0.0003)	*(0.0466)*	*(0.0568)*						
	0.0005#	**0.97****	**-0.01**	**0.02**	**0.012**	**0.80**	**0.00321**	**2.02**	
	(0.0003)	*(0.0809)*	*(0.058)*	*(0.035)*	*(0.0596)*				
2000	**0.0002****	**1.02****	**-0.003**			**0.99**	**0.00083**	**1.32**	**230**
	(5.5E-05)	*(0.00784)*	*(0.00713)*						
	0.0002**	**0.96****	**-0.003**	**0.002**	**0.05****	**0.99**	**0.00082**	**1.36**	
	(5.4E-05)	*(0.02017)*	*(0.00704)*	*(0.0082)*	*(0.0168)*				
2001	**0.00018****	**1.003****	**-0.008**			**0.99**	**0.00071**	**1.61**	**223**
	(4.78E-05)	*(0.00737)*	*(0.00832)*						
	0.00015**	**0.92****	**-0.008**	**0.009**	**0.07#**	**0.99**	**0.00071**	**1.68**	**223**
	(4.88E-05)	*(0.03816)*	*(0.00836)*	*(0.0076)*	*(0.0362)*				

** Statistically significant at the 99 percent level
* Statistically significant at the 95 percent level
# Statistically significant at the 90 percent level

Other statistical measures of the degree of the exchange rate fixity. Montiel and Hernandez (2001), point out that the prevalence over the sample period of symmetric shocks affecting the countries, or the presence of strong channels of transmission of economic shocks (contagion), would tend to magnify the size of the correlation and the magnitude of the coefficient. While this is not the case between USA and Kazakhstan, Kazakhstan and Russia have very close economic ties and were faced with a similar external shock in 2000 – the rise in world oil prices.

To prove the conclusion that after devaluation the Kazakhstan monetary authorities didn't allow greater exchange rate flexibility, the exchange rate and foreign reserves volatility were estimated. As described by Calvo and Reinhart (2000), if the government is committed to defending the existing parity in the face of shocks to the foreign exchange market, it can do so by intervening in the foreign exchange market. The volatility of the exchange rate will be reduced and that of foreign exchange reserves increased.

Table 2 presents statistical measures of exchange rate volatility for the Kazakh tenge and the Russian ruble, Japanese yen, EURO (DM): the range of variations in daily percentage changes[3], as well as their standard deviations. Also, following Calvo and Reinhart (2000) I compared the percentage of changes that lie within a narrow band to what is observed among the "pure" floaters.

For Kazakhstan and Russia, the periods are defined as those before and after devaluation. In Kazakhstan the post-devaluation period corresponds to June 1999 till December 2001 and to assure compatibility, the same was applied to Russia.

The data shows that both the Kazakhstan and the Russian monetary authorities smoothed the exchange rate variations both before and after devaluation. Moreover, Kazakhstan substantially reduced foreign exchange market volatility after declaring the switch to a floating exchange rate regime on April 4, 1999.

[2] Estimation for June – December 1999 after FX market adjusted the exchange rate following the announcement of devaluation on April 4.
[3] The percentage changes are calculated as $NER_t / NER_{t-1} - 1$, where NER is nominal exchange rate of currency to US dollar.

Table 2. Daily Volatility in Nominal Exchange Rate

	Period	*Range*	*St. dev.*	*+/- 0.1% band*	*+/- 0.5% band*
US$/EUR (DM)	Jan 73- Dec 01	0.10667	0.00695	15.8%	63.8%
	Jan 95 – Dec 01	0.07343	0.00660	14.7%	61.1%
US$/JPY	Jan 73- Dec 01	0.11930	0.00650	23.3%	70.0%
	Jan 95 – Dec 01	0.08768	0.00780	14.8%	57.9%
US$/RUR	Jan 95 – Aug, 14, 98	0.10730	0.00361	61.2%	93.5%
	June 99 – Dec 01	0.03247	0.00298	50.6%	93.2%
US$/KZT	Jan 95 – Mar 99	0.08417	0.00405	58.7%	93.8%
	June 99 – Dec 01	0.02420	0.00161	77.5%	98.1%

The second indicator is the volatility in a country's foreign exchange reserves. Intervention in the foreign exchange market involves changes in the stock of foreign exchange reserves held by the central bank, so it could be expected that if the country intervenes less, allowing the market exchange rate to absorb the effect of shocks, it will have more stable reserve stocks than if shocks were allowed to be reflected in reserve stocks. Table 3 shows the mean absolute monthly percentage changes in reserves[4], the standard deviations, and percentage of reserves changes contained in certain bands.

Table 3. Monthly Volatility in International Reserves

	Period	*Mean Abs. ch.*	*St. dev.*	*+/- 1% band*	*+/- 2.5% band*
Germany	Jan 73- Dec 01	0.0347	0.0702	21.6%	56.2%
	Jan 95 – Dec 01	0.0223	0.0351	36.1%	71.1%
Japan	Jan 73- Dec 01	0.0259	0.0432	42.9%	73.2%
	Jan 95 – Dec 01	0.0188	0.0308	65.1%	81.9%
Russia	Jan 95 - Aug 98	0.1467	0.1928	0%	11.6%
	June 99 – Dec 01	0.0674	0.0700	9.7%	25.8%
Kazakhstan	Jan 95 – Mar 99	0.0796	0.1085	8%	22%
	June 99 – Dec 01	0.0646	0.0708	9.7%	22.6%

Consistent with the results for exchange rate volatility, Kazakhstan and Russia actively intervened to defend an exchange rate target, both before and after devaluation: accommodation of devaluation expectations changed to appreciation pressure absorption.

Overall, although Kazakhstan officially announced "de jure" the independent floating in April 1999, the exchange rate pattern became "de facto" even less volatile with the strict anchoring to the US dollar. The fact that Russia chose similar response to the primary commodity prices' shocks, i.e. to stabilize RUR/USD exchange rate irrespective of the high inflation rate, allowed Kazakhstan to target US dollar irrespective of the threat to lose competitiveness in respect to its major trade partner.

Furthermore, the choice of exchange rate policy depends critically on how nominal prices react to exchange rate changes. For example, as the tenge depreciates, the tenge cost of imported goods increases, and should benefit Kazakhstan competing producers. This conclusion implies that the law of one price fails in the short-run. Nominal exchange rate changes are associated with real exchange rate changes for consumers. In this respect, the next Section addresses the issue of exchange rate pass-through on consumer prices and the factors that influence their growth in Kazakhstan.

V. The Real Exchange Rate and Consumer Prices

The theoretical and empirical studies of exchange rate management in emerging markets regularly places great emphasize on the fluctuations in the domestic prices of nontradables relative to tradables as the main determinant of the real exchange rate. However, Engel and later Mendoza suggested that a full explanation of the behavior of the real exchange rate is likely to require modification to the dominant approach, which considers only the role of changes in the relative prices of nontradables.

For example, Engel (2000), found that the fraction of the variance of peso – dollar real exchange rate accounted for by the variance of the Mexico-US ratio of tradable goods adjusted by the nominal exchange rate is in excess of 0.9. Although, Mendoza pointed out that Engel's findings are consistent with the period in which Mexico did not have an explicit policy of exchange rate management, whereas during managed exchange rate regime the variability of non-tradables relative to tradable goods accounted for up to 70% of the variability of the peso-dollar real exchange rate, he argues that the overwhelming role of movements in the prices of tradable goods and nominal exchange rates found in industrial countries, or even in developing countries with floating exchange rates, is sharply diminished.

Moreover, Asea and Mendoza (1994) found that while the data support the prediction that cross-country differences in the relative prices of non-tradable goods in the long-run reflect differences in productivity across sectors that

[4]To assess the volatility of International Reserves the IMF data on Foreign Exchange Stock of the Monetary Authorities have been used.

produce tradables and nontradables, measures of the long-run relative price of non-tradables do poorly in explaining cross-country differences in CPI-based measure of the real exchange rate.

Following these conclusions, the Section provides some broad statistical measures of the tenge-US dollar real exchange rate variance decomposition to assess how much it can be explained by the short-run fluctuations of relative prices of nontradables versus those of relative tradables.

First, the log of consumer prices can be expressed as a weighted average of traded and non-traded goods prices:

$$p_t = (1-b_t)p_t^T + b_t p_t^N,$$

where p_t equals the log of the consumer price level, p_t^T is the log of traded goods prices, p_t^N is the log of non-traded goods prices, and b_t is the weight on non-traded goods.

In Kazakhstan, the data on consumer prices are broadly decomposed into three categories: food, non-food, and services. The non-food goods are treated as tradables. Taking into consideration that food goods are mostly not traded on the world market, but rather reflect the domestic supply/demand conditions and terms of trade with neighboring CIS countries, for example Russia, this category, together with services, was included in non-traded goods[5].

For the US, the consumer price of «commodities» is used as the price of traded goods (consumer prices in the US are split into commodities and services).

Following Engel (2000), a simple algebraic manipulation of the definition of the real exchange rate is used to decompose its natural logarithm into the following form:

$$rer_t \equiv x_t + y_t$$

The first RHS variable is the exchange rate adjusted price ratio of tradables across countries: $x_t \equiv p_t^T - e_t - p^{*T}_t$ (* - denotes foreign prices). If a strong assumption for law of one price to hold in this context were satisfied, x_t should be a constant and should not contribute to explain variations in rer_t.

The variable y_t is calculated as the difference $rer_t - x_t$ and includes the term that reflect domestic prices of nontradable goods relative to those of tradables:

$$y_t \equiv b_t (p_t^N - p_t^T) - b^*_t (p^{*N}_t - p^{*T}_t),$$

The results of the variance decomposition of the tenge-US dollar real exchange rate during the 1997 – March 1999 and June 1999 – March 2002 when, as was shown before, National Bank implicitly managed exchange rate are summarized in Table 4.

It shows the correlation matrix and the standard deviation of *rer, x, y*, computed over three time frequencies, in which each variable has been transformed using 1-month, 6-month and 12-month differences. The table represents 3 variance ratios proposed by Engel that measure the contribution of fluctuations in *x* to explain the variance of *rer*:

1. The basic ratio *Var(x) / Var(rer).* This ratio ignores covariance terms in the elements that make up the real exchange rate; it is true only when the *x* and *y* are independent.

The second and third ratios are alternatives that consider covariance terms.

2. The second is simply *Var(x) / [Var(x) + Var(y)].* This ratio includes a covariance term because when *x* and *y* are not independent random variables *Var(x) / [Var(x) + Var(y)] = Var(x) / [(Var(rer) – 2 Cov(x,y)].*
3. The third ratio measures the contribution of *x* to the variability of *rer* by assigning to *x* half of the covariance term in the equality that links the variance of *rer* with its two elements *Var(rer) = Var(x) + Var(y) + 2 Cov(x,y).* Thus the third ratio variance ratio is *[Var(x) + cov(x,y)] / Var(rer)*[6].

The table also reports the correlation between relative prices of tradables and the bilateral exchange rate.

First, the estimation made for the period 1994-2001 proved Engel's conclusion: the basic variance ratio and the one adjusted for covariance exceed 0.9 at all frequencies.

However, the picture for the period when the National Bank pursued a policy of managing exchange rate before and after the devaluation is different. The contribution of *x* to the variability of the real exchange rate reaches a minimum of 0.52 at the 12-month frequency.

Therefore, although during the period of the managed exchange rate the relative prices of non-tradables plays quite important role in driving the real exchange rate, there is still a nontrivial fraction accounted for by movements in relative prices of tradables (ranging from 0.52 to 0.79 when adjusted for covariance). The importance of *x* tends to decline over longer time horizons.

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[5] More precise classification requires the analysis of each separate commodity at a more disaggregated level. Due to the lack of information the definition of tradables and non-tradables, used in the analysis, is quite rough and should be interpreted carefully.

[6] The ratio can be written as:

$$[\mathrm{Var}(x) / \mathrm{Var}(rer)]\{1+\mathrm{Cor}(x,y)\sigma(y)/\sigma(x)\}.$$

The basic ratio that disregards the covariance of *x* and *y* approximate well this adjusted variance ratio when the correlation between the two variables is low and/or the standard deviation of *x* is large to that of *y*.

Table 4

Sample:1997-1999M3; 1999M6-2002M3
Dollar-Tenge Real Exchange Rate

Correlation matrix at 1 month

	Rer	*X*	*Y*
Rer	1.0000	0.8580	0.3961
X	0.8580	1.0000	-0.1317
Y	0.3961	-0.1317	1.0000
St.dev	0.0135	0.0125	0.0070
No.obs	60	60	60

Correlation matrix at 6 month

	Rer	*X*	*Y*
Rer	1.0000	0.7626	0.4930
X	0.7626	1.0000	-0.1868
Y	0.4930	-0.1868	1.0000
St.dev	0.0424	0.0375	0.0279
No.obs	55	55	55

Correlation matrix at 12 month

	Rer	*X*	*Y*
Rer	1.0000	0.5623	0.5024
X	0.5623	1.0000	-0.4325
Y	0.5024	-0.4325	1.0000
St.dev	0.0525	0.0504	0.0482
No.obs	49	49	49

Variance ratios

	1 month	**6 month**	**12 month**
Ratio 1	0.8579	0.7843	0.9196
Ratio 2	0.7617	0.6440	0.5223
Ratio 3	0.7947	0.6754	0.5392
Cor (x,e)	-0.8359	-0.8901	-0.9391

The Table also shows that at all horizons, the correlation between KZT/USD and *x* movements exceeds (-) 0.8. So it is quite accurate to say that p_t^T and $p^*_t{}^T$ are constant or very slow-moving, while the exchange rate explains much of the variance in *x*.

Engel (2000), supposed that this not necessarily implies that nominal prices are sticky but:

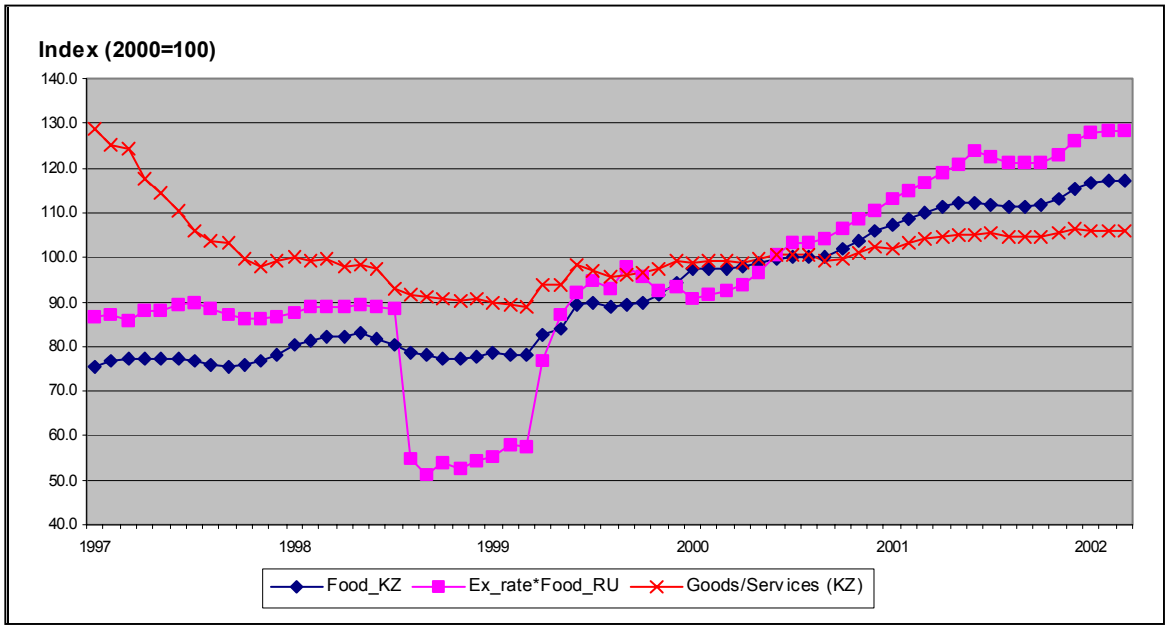
"…Perhaps it is the case that p_t^T and $p^*_t{}^T$ are relatively constant over time because monetary policy does a good job in stabilizing nominal prices."

The simple conclusion is that p_t^T and $p^*_t{}^T$ are stable <u>because</u> the responsiveness of prices to the exchange rate may not be complete.

However, further work is necessary in order to understand the degree of exchange rate pass-through, as Kazakhstan's consumer prices are also highly dependent on relative prices movements with Russia that comprises a significant share of the domestic consumer market (variance decomposition of the tenge-US dollar was assessed with cautious treatment of food prices as non-tradables, at least on the world market).

In both Russia and in Kazakhstan the CPI index is decomposed into food, non-food, and services categories. Figure 2 shows the behavior of the prices of food in Kazakhstan and Russia (adjusted for the bilateral exchange rate), plus the relative prices of goods to services in each country.

Figure 2. The Dynamic of relative prices and prices of food products in Russia and Kazakhstan (1997-2001).



There is some similar pattern in the prices of food goods in Kazakhstan and in Russia (expressed in terms of Kazakh tenge), during the periods before and after the Russian crisis in 1998 and tenge devaluation in 1999. One of the possible explanations is that up to 50% of food imports and significant share of intermediate products, consumed in production, come from Russia so, to some extent, Russian goods could influence the domestic food prices level directly or

through potential competition as they could be regarded as almost perfect substitutes. Another reason my be the similar world price shocks experienced by the country and reflected in the consumer prices as a result of changes in the aggregate demand.

Moreover, it is evident from the Figure that after the Russian crisis occurred, the fall in food goods consumer prices in Russia wasn't fully replicated in Kazakhstan, although during this period food prices did decline as a result of cheaper imports from Russia. So, some pricing-to-market strategy may have existed when the importers preferred to use better price competitiveness for acquiring higher profit at relatively sticky prices, expecting their future growth and tenge devaluation.

This conclusion of price stickiness could also partly explain why prices for food consumer goods and eventually aggregate consumer prices didn't rise equivalently after tenge devaluation: the prices of Russian goods on the Kazakh market were lower than those of domestic producers, but still overstated compared to prices on the Russian market.

Not-surprisingly, that estimation of the pass-through coefficient using weak version of PPP for the period of 1997-2001 (monthly basis) is consistent with the above findings on pricing to market. The following equation that reflects the long run relationship between domestic and international prices have been tested:

$$P_t = \alpha + \phi (E_t P_t^*)$$

where P_t is the domestic price level, namely CPI, at the time t ; E_t is the nominal effective exchange rate calculated against 23 countries – main trade partners of Kazakhstan; P_t^* is the index of international prices, approximated by the weighted average of PPI of the main trade partners of Kazakhstan; α - is the murk up constant; ϕ - estimated coefficient of pass-through.

The equation was estimated using Vector Error Correction (VEC) with 4 lags as all of the series are non-stationary and Johansen Test failed to reject a cointegration at the 5% significance level. The emerging long-run relation reveals that coefficient of pass-through is significantly different from 1 and estimated to be 0.6. Second, the function has a relatively low speed of adjustment to its long-run equilibrium – it takes approximately 1 year the 50 percent of the deviation from the long-term stable equilibrium to be eliminated.

VI. Conclusion

The conclusions of the analysis raise the question as to why the Kazakhstan monetary authorities pursue the policy of smoothing high frequency exchange rate fluctuations and *de facto* targeting of the exchange rate to the US dollar.

One of the explanations is that the Central Bank usually opts for more stable exchange rate as an instrument of monetary policy in order to suppress inflation expectations, especially when the country has a previous history of hyperinflation. But this goal doesn't require the stabilization of daily exchange rate fluctuations.

The policy to smooth the high frequency exchange rate fluctuations is necessary when *there are not enough hedging instruments to allow agents to insure fully against abrupt changes in the exchange rate.*

For the case of Kazakhstan the reasons behind the option to lower the exchange rate volatility are as follows:

1. The majority of imported goods and exports of Kazakhstan are invoiced in dollars, while for the latter, the dollar prices of primary commodities are exogenously given on the world market. This means that the degree of exchange rate volatility directly affects traders' exposure to exchange rate risk. Moreover:

"Importers more than exporters find it difficult to cover forward commercial transactions, including ordinary trade credit, which must be continually repaid within a few days or weeks" (McKinnon, 2000).

2. Capital investments into the exportables sector were financed through FDI and consisted to a great extent of purchases of machinery, equipment and other capital goods abroad, as domestic capacities insufficient to fulfill the demand for investment goods. The abruptness of changes in the exchange rate or persistent devaluation increase the cost of investment and directly influence their profitability.

3. There are not enough monetary market instruments to absorb the liquidity. Therefore, persistent devaluation and wide daily exchange rate fluctuations focuses market participants on the foreign exchange market in search of higher speculative profit.

4. The dollarization of the economy is quite high: the share of credits nominated in dollars is 71%, while FX deposits amounted to 61% at the end of 2001. Thus, the more flexible the exchange rate policy, the larger is the volatility of tenge value and incentives to increase the share of foreign assets in the portfolio.

5. As far as the period after devaluation is concerned, since economic agents don't have complete information on prevailing equilibrium nominal exchange rate in the post-devaluation period, their expectations are very sensitive to exchange rate fluctuations that could be regarded as a signal rather than a noise of the new trend locus.

6.The monetary authority itself may not have a clear perception about the equilibrium real exchange rate, so the NBK purchase of the excess supply of dollars could be explained by the "fear of appreciation", as the prevailing real exchange rate could overshoot the equilibrium after the devaluation. Additionally, the Bank could have an incentive to accumulate a stock of foreign exchange sufficient to defend the exchange rate in the case of an unanticipated shift in external factors, such as oil prices or a worsening of Russian economic conditions.

These factors could also explain the "fear of floating", which existed not only in Kazakhstan, but in the majority of the Developing World:

"When circumstances are favorable (i.e. there are capital inflows, positive terms of trade shocks, etc) many emerging markets are reluctant to allow the nominal (and real) exchange rate to appreciate… When circumstances are adverse, the fear of a collapse in the exchange rate comes from pervasive liability dollarization. "(Reinhart, 2000)

7. Especially in the short-run, there may be some local-currency pricing strategy. Furthermore, the importance of relative tradables prices in explaining consumer prices' behavior is higher the larger the share of tradables in the CPI, as is the case in Kazakhstan. Under the flexible exchange rate the automatic stabilizing works through prices if there is any exchange rate pass-through to import prices. The less pass-through to final goods, the stronger the case for a more fixed exchange rate. As Friedman argues, the choice of exchange rate system would be irrelevant if all prices adjusted instantaneously to shocks. Therefore, in the short-run, the exchange rate policy could be less flexible. Stabilization of a high-frequency exchange rate is necessary to hedge the foreign exchange rate risks of economic agents significantly involved in cross-border goods and financial assets transactions.

In the medium term the National bank of Kazakhstan could allow more flexibility in the exchange rate. When the demand for foreign exchange from importers is high, this could be a good opportunity to adjust the level of the national currency exchange rate downward to ensure against real appreciation. The conclusion on consumer prices rigidity in the short- and even in the medium-term allows us to assume that due to the incomplete exchange rate pass-through to price level this policy could have important real consequences.

References

Calvo, Guillermo, and Carmen Reinhart, (2000), "Fear of Floating", NBER Working Paper, 7993.

Engel, C., (2000), "Optimal Exchange Rate Policy: The Influence of Price Setting and Asset Markets", University of Washington and NBER.

Enrique G. Mendoza, (2000), "On the Instability of Variance Decomposition of the Real Exchange Rate across Exchange-Rate-Regimes: Evidence from Mexico and the United States", NBER Working Paper, 7768.

Francesco Caramazza, Lucca Ricci, and Runil Saldago, (2000), "Trade and Financial Contagion in Currency Crises", IMF Working Paper, WP/00/55.

Jeffrey A. Frankel and Shang-Jin Wei, (1994), "Yen Bloc or Dollar Bloc? Exchange Rate Policies of the East Asian Economies" in Ito, T. and Krueger, A. eds., Macroeconomic Linkage: Savings, Exchange Rates, and Capital Flows, University of Chicago Press.

Jose Antonio Gonzales Anaya, (2000), @Exchange Rate Pass-Through and Partial Dollarization: Is there a Link?", Stanford University.

Paul Cashin, C. John McDermott, and Alasdair Scott, (1999), "Booms and Slumps in World Commodity Prices", IMF Working Paper, WP/99/155.

Paul Cashin, Hong Liang, and C. John McDermott, (2000), "How Persistent Are Shocks to World Commodity Prices?", IMF Staff Paper, Vol. 47, No. 2.

Peter J. Montiel and Leonardo Hernandez, (2001), "Post-Crisis Exchange Rate Policy in Five Asian Countries: Filling in the "Hollow Middle"?", International Monetary Fund.

Ronald McKinnon, (2000), "After the Crisis, the East Asian Dollar Standard Resurrected: An Interpretation of High-Frequency Exchange-Rate Pegging, Stanford University.

APPENDIX

Kazakhstan: Selected Vulnerability Indicators

Table 1.

Financial Sector Vulnerability *(at the end of period)*	Dec.97	Dec.98	Dec.99	Dec.00	Dec.01
Ratio of FX deposits to total deposits	0.23	0.37	0.48	0.51	0.61
Ratio of FX loans to total loans	0.42	0.43	0.54	0.51	0.71
Money Coverage Ratio					
Gross International Reserves/M2	1.05	1.23	1.17	1.04	1.10
Memo: Reserves (incl. Oil Fund)/M2					1.64

Table 2

External Vulnerability Indicators	1997	1998	1999	2000	2001
I. External Shocks Indicators					
1.External TOT (% to prev. per.)	*1.7*	*-18.1*	*15.4*	*27.1*	*-7.0*
1.1 World prices of exports	-5.2	-24.0	12.9	30.1	-9.4
1.2. World prices of imports	-6.8	-7.1	-2.3	2.6	-2.7
2. Real effective exchange rate (dec .as % to dec.)	*8.9*	*16.2*	*-26.4*	*2.8*	*-1.6*
2.1. Relative to CIS countries	3.4	60.7	-28.2	-7.6	-6.3
2.2. Relative to other countries	15.5	-9.9	-25.1	16.8	2.5
2.3. Relative to Russia	1	68.6	-30	-8.5	-6.7
II. Balance of Payments and External Debt					
Current Account (% to GDP)	-3.6	-5.6	-1.4	2.3	-7.8
FDI – Current account (% to GDP)	2	0	7	9	5
Trade Balance (% to GDP)	-1.2	-3.6	2.0	13.4	4.0
Exports (% to GDP)	*31*	*27*	*36*	*51*	*41*
Imports (% to GDP)	*-32.4*	*-30.2*	*-33.6*	*-37.5*	*-36.8*
Gross External Debt, at the end of period (% to GDP)	28.6	44.9	71.4	68.9	66.7
Short-term external debt in total external debt (%)	30.0	23.0	15.0	7.8	8.6
Government and government-guaranteed debt in total external debt (%)	42.0	40.3	33.6	31.3	25.5
III. Memorandum					
GDP (real, %)	1.7	-1.9	2.7	9.8	13.2
Inflation (%, dec. to dec.)	11.2	1.9	17.8	9.8	6.4
Exchange rate (%, at the year end)	2.8	10.7	64.6	5.2	3.8
Money ratio (%, M3/GDP)	10.3	8.6	13.6	15.3	17.3