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Is Kazakhstan Vulnerable to the Dutch Disease?

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Is Kazakhstan Vulnerable to the Dutch Disease?[1]

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Abstract

Kazakhstan possesses extensive natural resources reserves that are expected to yield significant export revenues. Since Kazakhstan's attaining independence in 1991, the composition of exports has changed in favor of energy-related sectors. In the context of such evidence and considerable expected future revenues, many researchers have pointed to the Dutch Disease question. This paper examines whether Kazakhstan is vulnerable to this condition. Using an extended version of the Balassa-Samuelson model including a terms-of-trade effect, we find evidence that changes in the terms of trade had a significant effect on the real exchange rate after 1996, providing evidence of the Dutch Disease.

Keywords: Dutch Disease, transition, oil, terms of trade, Kazakhstan.

1. INTRODUCTION

Kazakhstan possesses extensive reserves natural resources and is heavily reliant on revenues from the export of primary commodities, in particular petroleum and natural gas. Between 1995 and 2000, the percentage contribution of fuel and oil products to overall exports rose from 23.8% to 52.8%, while the share of the second most important sector, ferrous metallurgy, declined from above 19% in 1995 to 12.9% in 2000 [*Kazakstan Economic Trends* (*KET*), 2001]. At the same time, the oil and gas sector has attracted a considerable amount of foreign direct investment (FDI) into the economy. Based on 1999 figures, the sector's share in total FDI was about 85%, while ferrous and non-ferrous metals attracted only 3.83% of total FDI in that year [International Monetary Fund (IMF), 2001)]. The oil and gas industry has also been an important source of tax revenues for the national government. Taxes paid by this sector represented 43.7% of total tax payments in the first five months of 2000. By way of comparison, ferrous metallurgy contributed 26.8% of total tax payments. It is expected that the oil industry will continue to play a large role in the economy in the future.

The economy's dependence on revenues from the oil and commodity exporting sectors, which will remain high in the foreseeable future, is likely to make the economy vulnerable to external commodity price fluctuations and, possibly, "Dutch Disease" effects. This question arises not only in the context of future revenues, but also with respect to an analysis of the current situation, namely, structural changes in favor of the resource sector and a real appreciation of the currency. Studying whether such factors are typical indicators of the transition to a market economy or they instead signal a vulnerability to the Dutch Disease is an important issue for Kazakhstan and its future prosperity. In this paper, we shed light on these issues by investigating empirically the validity of the Dutch Disease effects. To anticipate our results, empirical findings suggest evidence for the Dutch Disease during the post-1996 period.

The remainder of this paper is organized as follows. The next section describes the basic model of the Dutch Disease problem as presented in the classic theoretical literature. Section 3 briefly discusses whether the Dutch Disease is a big problem in practice. Motivated by the fact that the government is the main recipient of oil and gas export revenues, Section 4 provides a discussion of the government's spending of mineral resource revenues. Section 5 describes the past and current macroeconomic situation in Kazakhstan and discusses the implications of the country's resource-based development strategy. Section 6 explains our empirical modeling of the real exchange rate and reports our empirical results. We provide concluding remarks in Section 7.

2. THE "CORE MODEL" OF THE DUTCH DISEASE

Many economies were faced with shocks as a result of the sharp increase in energy prices in the 1970s. There is a huge body of literature that analyzes the impact of these shocks and the consequences of the adjustment policies followed by various countries. It includes a significant number of papers devoted to the Dutch Disease problem faced by resource-exporting countries (see, e.g., Corden and Neary, 1982; Corden, 1984; Rosenberg and Saavalianen, 1998). Oil-exporting countries have experienced a significant increase in their national wealth due to higher oil prices, resource discoveries, or technological progress in the energy sector. The booming demand caused by higher wealth leads to shift of an economy's productive resources from the tradeables sector to the non-tradeables sector. Such shrinkage of the tradeables sector is known as the Dutch Disease, referring to the supposedly adverse effects on Dutch manufacturing of that country's natural gas discoveries in the 1960s.

The analysis of the Dutch Disease is relevant not only for oil and gas-exporting countries, but also for those producing any primary export commodity, as well as those experiencing sudden massive capital inflows. As Corden (1984) suggests, Dutch Disease analysis is applicable to gold discoveries in Australia, capital inflows to Switzerland, and the inflow of American gold to Spain in the sixteenth century, among other cases.

Corden and Neary (1982) present the "core model" of Dutch Disease economics. In their simplest static models, a resource boom affects the rest of the economy in two main ways: the resource movement effect and the spending effect.

- *The resource movement effect.* The boom in the energy sector raises the marginal product of labor in that sector, which causes a movement of labor from both the manufacturing and non-tradable sectors to the booming sector. The result is a contraction of the tradable sector due to a reduction in the application of production factors there.
- *The spending effect.* The boom in the natural resource sector, which may be caused by a rise in the world price of the resource, leads to increased income in the country and, consequently, to increased demand for both tradables and non-tradables. Since the prices of tradables are fixed internationally, this effect leads to rising prices of non-tradables relative to tradables, that is, a real appreciation of the exchange rate. This, in turn, leads to mobile factors moving from the tradables to the non-tradables and resource sectors, that is, a contraction of the non-booming tradables sector.

Corden and Neary (1982) consider a small, open economy that comprises three sectors: energy, a manufacturing or tradable sector, and a non-tradables or services sectors. They analyze three static models, which are characterized by different assumptions about the factor mobility between sectors. In the first model, they assume that each sector uses one specific non-mobile factor (capital) and one mobile factor (labor). They show that in this case both the resource movement effect and the spending effect lead to labor leaving the manufacturing sector, resulting in a decline in the output of that sector. The output in the booming sector increases since the boom occurs in that sector. The change in the output of the non-tradables sector is ambiguous: although the spending effect would lead to an expansion of this sector, the resource movement would cause it to contract. The movement of labor from the manufacturing sector to the booming sector is called "direct de-industrialization." The flow of labor out of the non-tradable sector, together with the demand increase for goods from that sector due to the spending effect, causes a further movement of labor from the manufacturing sector to the non-tradable sector; this is called "indirect de-industrialization."

The other two models described in the article are suitable for the medium-term analysis of the Dutch Disease problem. In the first, it is assumed that capital is mobile between the manufacturing and services sectors, while the second assumes that capital is mobile among all three sectors. In these cases, the actual outcome of resource reallocation cannot be predicted without a detailed knowledge of the parameter values of the models. If a booming sector does not use domestic factors of production – that is, it is an "enclave" – the resource movement effect will not occur. This may be the case for an oil boom in a Dutch Disease model. Since there is only a spending effect, the oil boom would lead to a shrinking of the non-oil tradables sector and an expansion of the services (non-tradables) sector.[2]

3. IS THE DUTCH DISEASE A MAJOR PROBLEM IN PRACTICE?

A large literature investigates the relationship between a country's natural resource endowment and its economic development and growth. Many researchers report sharp differences in the performance of resource-rich developing economies on the one hand and resource-deficient ones on the other. Auty (1998b) discusses the poor performance of resource-abundant countries in terms of both external and internal factors. There are three hypotheses related to the external impacts. First, exports of primary products increase income inequality. Second, the non-booming tradable sector becomes less competitive because of the Dutch Disease effect. Third, because the prices of primary goods are more volatile than the prices of manufactured goods, a primary export orientation can lead to periodic growth collapses.

An export boom involving primary goods operating via adverse effects on the manufacturing sector, as predicted by the core model of the Dutch Disease, can also affect economic growth in the

[2] Additional reference on Dutch Disease economics can be found in Corden (1984), which provides a lucid survey on this problem.

following way (van Wijnbergen, 1984). If most economic growth is caused by learning by doing, which is mainly confined to the non-oil tradables sector, a temporary decline in that sector may lead to lower productivity and therefore to lower national income in the future.

As for transition economies, some observers have expressed the opinion that resource abundance is more likely to worsen the problems of the transition to a market economy than to alleviate them. According to Auty (1998b), one of reasons for this is that resource rents support a slow response to reforms, and a slow response means a higher risk of policy corruption. In other words, for example, rents from natural resources provide a government with a basis for believing that the gradualist transition is a more appropriate model than "big bang" reform. The second reason why resource abundance may worsen the transition is that resource rents may make a government excessively optimistic about future mineral revenues during contract negotiations and it may then spend those revenues before they are available. In the absence of financial transparency, resource revenues may be squandered. Meanwhile, if expected future production is not realized, the government may face severe budget problems.

A resource-abundant transition economy country facing a Dutch Disease problem may experience worsening problems during the transition period. Rosenberg and Saavalainen (1998) examine the economic risks related to the extensive use of natural resources in a transition economy and propose a policy strategy to deal with these risks in Azerbaijan. The standard Dutch Disease model is modified so as to take into account certain peculiarities of transition economies: undervaluation of the national currency, increases in capital inflows, and the underdevelopment of the financial system. The first two "transition factors" will likely speed up the real appreciation of the currency. Moreover, the non-oil tradables sectors may suffer mainly through transition-specific structural problems rather than through a real appreciation of the currency. Rosenberg and Saavalainen (1998) discuss strategies for government regulation of Azerbaijan's economy in the medium term; their discussion may be seen as a "blueprint" for other transition economies dealing with natural resource booms. In developing these strategies, the authors take into account the experiences of Ecuador, Indonesia, and Nigeria in the 1970s. They argue that Azerbaijan can avoid the Dutch Disease problem if it "promotes savings and open trade and strengthens the supply side through structural policies."[3]

In contrast to the usual pessimistic views on the economic development of resource-rich developing countries, Davis (1995) considers the top 43 mineral-producing developing countries

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[3] In another treatment of these issues, Singh and Laurila (1999, p. 43) conclude that in Azerbaijan, "the expected in-flow of oil revenues will lead to both internal and external surpluses, particularly after 2005. This is expected to lead to a strengthening of the manat and worsening position of the tradable sector. Whilst not a policy concern at present, the real exchange rate is expected to rise from 2003 and so will represent a medium-term policy issue."

according to a modified mineral dependence index. He compares the rankings for 1970 (prior to the oil and gold price boom) and 1991 (after the booms had ended). Davis (1995) concludes that the detrimental effects of the exploitation of natural resources for the long-term development of resource-based developing countries are not widespread.

4. GOVERNMENT SPENDING OF MINERAL RESOURCE REVENUES

The government is typically the main recipient of mineral export revenues, whether through direct sales, royalties, or taxes. Therefore, the question of how governments spend their portion of resource revenues is of great interest.

The main use of export revenues in most of the relevant countries is public expenditures, and in particular public investment. Gelb and Associates (1988) mention two kinds of investment of oil boom revenues that states can make to strengthen the non-oil economy. The first is to invest in the non-oil tradable sectors, such as agriculture and manufacturing. The second is to emphasize the non-tradables sectors, which include economic infrastructure (transport and communications) and social infrastructure (education, housing, and health care). Further, they compare the composition of public investment programs across six developing oil exporters – Algeria, Ecuador, Indonesia, Nigeria, Trinidad and Tobago, and Venezuela – during 1970-1984. They find that the major part (on average 60-70%) of public investment spending by these exporters has been on physical and social infrastructure. For instance, Ecuador allocated a high portion (more than 50%) of its public investment to the construction of economic infrastructure (transport and communications). The only exception was Algeria, which put more than 50% on average of its investment into industry, and only 38% into infrastructure, during 1970-1984.

The largest part of the remainder of government investment has been concentrated on resource-based industries. Investment in infrastructure and resource industries varied in these countries between 56 and 90% of total investment. The lowest figure was 56.2% during 1970-1973 period in Algeria, while the highest was 93.9% in Ecuador during 1979-1981.

At the same time, the number, size, and complexity of projects with capital costs of over $100 million rose in these countries. At least 54% of these projects were in the area of resource-based industries. Gelb and Associates (1988) cite data suggesting that larger projects have a greater tendency to overrun initial estimated costs and time budgets than do smaller ones. In conclusion, Gelb and Associates (1988) underline that the infrastructural bias of government spending did not lead to income-generating activity. As a result, in case of future declines in oil incomes, fiscal revenues will suffer and the economies may face recession.

5. RELEVANT ASPECTS OF KAZAKHSTAN'S ECONOMY

5.1 Petroleum and Gas Orientation

Kazakhstan is the second largest petroleum producer in the CIS (after Russia), putting it in the top 30 among the world's 90 oil-producing countries. At the end of 1995, the country's proven reserves of oil and natural gas were 3 billion tons, while its projected reserves came to 7 billion tons (*Statisticheskoe obozrenie Kazakhstan*, 1999). More broadly, Kazakhstan is among the world's leading countries with respect to its reserves of strategically important raw materials. "Average per capita reserves of crude oil, coal, iron, chrome, manganese, the main non-ferrous metals and phosphates exceed the world average. The country possesses the world's largest reserves of tungsten, zinc, and barium ores, the second largest reserves of lead, chrome ores, gold, silver and phosphates, and the third largest reserves of copper. It also boasts the world's fourth largest reserves of manganese and molybdenum and the seventh largest reserves of iron ore and tin (Akhmetova, Buranbaeva, and Radivilova, 1996). The importance of natural resources to Kazakhstan's economy is illustrated by the country's export structure, as depicted in Table 1.

Between 1995 and 2000, the percentage contribution of fuel and oil products to overall exports rose from 23.8% to 52.8%, while the share of ferrous metallurgy, the second most important sector in the country, declined from above 19% to 12.9% [*Kazakstan Economic Trends* (*KET*), 2001]. Exports are likely to remain concentrated in a narrow range of commodity groups – fuel and oil products, ferrous and non-ferrous metals, and inorganic chemicals. Production of both ferrous and non-ferrous metals is highly export-oriented: some 70-90% of annual output and up to 90% of copper and zinc are delivered to foreign markets. The export of copper, zinc, and ferrous metals was re-oriented toward non-CIS markets in 1997 (*KET*, 1999). The export values of both ferrous and non-ferrous products are highly dependent on the situation on foreign markets, so these exports will fluctuate over time in accordance with external factors. Further growth of the output of these products is possible only with considerable investment in the relevant sectors. Accordingly, the oil sector, which attracted more than half of total FDI during 1993-1997 – compared with one-quarter for other minerals – is likely to remain dominant for the foreseeable future (Auty, 1998a).

Moreover, the government expects that revenues from the exploitation of the country's hydrocarbon reserves will be able to finance much of the cost of overall economic development. Such a resource-based strategy was established in a program called "Kazakhstan 2030" promulgated by President Nursultan Nazarbaev. The roots of this strategy lie in the structure of the economy inherited from the days of the Soviet Union, which was characterized by a high degree of regional specialization. Like other less developed union republics, Kazakhstan had an industrial structure oriented toward the production and processing of raw materials; it also specialized in heavy machinery and agriculture.

An important characteristic of the government's resource-based development strategy is the significant number of large investment projects that have been announced since the country's independence. These projects aim to expand Kazakhstan's hydrocarbon export transportation capacity, because the insufficiency of such capacity is the most important obstacle to the development of this sector. These pipelines aim to provide new export routes to world markets for Kazakh oil and gas. Nowadays, the export of oil is possible only via Russia and the Caspian Sea. There are (effectively limiting) quotas on transit through Russia, and export via the Caspian is restricted by the capacity of existing terminals

If these planned pipelines become operational, export earnings will jump. In this case, in view of growing export revenues, analysts frequently raise the question of the Dutch Disease problem that Kazakhstan may face. This issue has been analyzed by IMF staff under three scenarios concerning the future prospects for oil exports (IMF, 1998). These three scenarios are termed "optimistic," "central," and "pessimistic," and differ in their assumptions about the evolution of Kazakhstan's oil export capacity and of world oil prices.

According to the optimistic scenario (see Figure 1), oil export revenues as a percentage of projected GDP jump from 6.1% in 1999 to 9.4% in 2000, to 12.4% in 2001, and 14.6% in 2006, after which they converge to 12%, as GDP grows faster than oil export capacity. Under the central scenario, oil export revenues increase from 5.5% of GDP in 1998 to 11% in 2001, thereafter converging to 8%. According to the pessimistic scenario, oil export revenues initially decline until 2002, jumping thereafter by almost 2% to 6.4% in 2002, and in 2003 to 8.4%.

In comparison with other resource-rich developing countries, the oil export revenues of 12% of GDP achieved under the optimistic scenario represent a larger windfall than Venezuela received during 1974-1978 (10.8% of non-mining GDP) or 1979-1981 (8.7% of non-mining GDP) (Gelb and Associates, 1988, p. 62). Even the Mexican oil windfall, estimated at a more modest 3.5% of non-oil GDP during 1979-1981, brought about considerable effects suggestive of the Dutch Disease.

5.2 Recent Macroeconomic Performance

Output has fallen, albeit unevenly, across all industrial sectors since 1991. The most severe decline in output was in 1994. The first signs of industrial stabilization appeared in 1995, when positive output growth was observed in metallurgy due to increased export demand for the output of this sector. Timber and wood processing, construction materials, and light industry all recorded sharp output declines, so that the traditional resource-based sectors recovered faster than the others did (De Broeck and Kostial, 1998).

The transformational recession has been deeper in manufacturing than in resource-based industries. This is illustrated by the fact that, while the share of industry and agriculture in gross domestic product (GDP) shrank by one-third over 1993-1997, within the industrial sector mineral production expanded its share in GDP during this period (IMF, 1998). Sectoral employment has also experienced structural change. The share of total employment accounted for by industry and construction fell from 25.6% to 18.3% between 1994 and 1997, while that of services rose from 52.9% to 57.7% over this period (*Trud i zanyatost naseleniya v Respyblike Kazakhstan*, 1998).

Despite an increase in exports from $3.2 billion in 1994 to $6.9 billion in 1997 (before declining to $5.8 billion in 1998), the current account balance deteriorated from a surplus of $175 million in 1994 to a deficit of $794 million in 1997 or 3.7% of GDP (and $1.2 billion or 5.4% of GDP) in 1998. The current account (and budget) deficits of 1994-1998 were accompanied by a significant accumulation of internal and external debt. Since 1997, the gross foreign debt has increased from $3.26 billion (30.7% of GDP and 88.7% of exports) in 1994 to $7.54 billion (34.9% and 113.1%, respectively), in the first quarter of 1999.

The tenge appreciated (see Figure 2) against the U.S. dollar in real terms from mid-1994 through 1998. With respect to the Russian ruble, there has been a similar tendency for the real exchange rate for almost the entire period. Although a real appreciation of the domestic currency is considered one of the indicators of Dutch Disease problem, the transition from a planned to a market economy is generally also associated with the same development. Halpern and Wyplosz (1996), Orlowski (1997), Dibooglu and Kutan (2001), and De Broeck and Sløk (2001) indicate several potential factors that contribute to an appreciation of the currency of a transition economy.[4]

Between the last quarter of 1997 and March 1999, the defensive policy of the National Bank of Kazakhstan (NBK) resulted in a loss of international reserves of about 40% or $600 million (IMF, 2001). By early 1998, output was growing, as it has been since mid-1996, annual inflation had fallen to less than 10% and there were expectations that output growth would continue in 1998. Unfortunately, Kazakhstan was affected by a series of large external shocks during the later part of the year, including a decline in world primary commodity prices, financial turmoil in emerging markets, the Russian financial crisis, and a severe drought. Only after being faced with the significant loss of international reserves and the degradation in the country's external competitiveness did policymakers announce the introduction of a freely floating exchange rate regime (on April 4, 1999). After several weeks of extreme volatility, which saw the tenge falling by 30.3% in April, 12.4% in

May, and 2.5% in June, the nominal exchange rate finally stabilized at TKZ145/USD at the end of 1999, compared to the TKZ88/USD at the end of March 1998.

The external shocks, especially the fall in the world prices for the country's major export commodities (oil, metals, and grain) had a profound impact on economic growth. Real GDP fell by 2.5% in 1998. A fall in industrial output by 2.1% and a drop in agricultural output by 18.9% accompanied the decline in real GDP. The fall in output continued into the first quarter of 1999. Real GDP fell by 4% in the first quarter of 1999, relative to the same quarter of 1998.

Although after the switch to the floating exchange rate in April 1999, the tenge depreciated substantially in real terms, by June 2000 the real exchange rate was about 20% above its level prior to the Russian crisis (see Figure 2 for the operative definition of the real exchange rate). Moreover, in real terms, the U.S. dollar and the Deutsche mark have recently been weaker against the tenge than they were before the Russian crisis (IMF, 2001).

The switch to a freely floating exchange rate in April 1999, along with the increases in world prices of primary commodities, has had positive impacts on the country's economic development. Starting in the third quarter of 1999, economic performance began to improve. Real GDP growth reached 2.7% in 1999 and 3% in 2000. However, the main factor that caused the growth in the economy of the country was the increase in the world prices of the major export commodities of Kazakhstan, such as oil and metals.

Favorable external conditions continued in 2000 and contributed further to the stability of the tenge in 2000. Throughout the year, the tenge depreciated steadily against the U.S. dollar in nominal terms, so by the end of the year its value had decreased by 5.2%. In real terms, the tenge appreciated against the U.S. dollar by 9.8%. The stability of the exchange rate was partly caused by stability of the Russian ruble, whose devaluation rate was approximately equal to the devaluation rate of tenge in nominal terms. At present, the monetary authorities are maintaining the floating exchange rate regime adopted in April 1999. The NBK intervenes in the foreign exchange market exclusively for the purposes of ensuring orderly market conditions and strengthening its international reserve position.

In summary, the composition of trade has undergone a substantial change in Kazakhstan since 1992. Some sectors of the economy like agriculture and manufacturing collapsed, while the extractive sectors, mainly oil and gas, became dominant sectors in the economy (Table 1). The current pattern of economic development of the country so far can be mainly characterized as dominated by the oil and fuel export sector, strong real exchange rate, and hence increased vulnerability to commodity price fluctuations, and hence to the Dutch Disease problem. Such trends

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[4] These studies are reviewed in the following section.

may negatively affect the economic growth in the future as well. It is therefore important to formally test the vulnerability of the Kazakhstan's economy to the Dutch Disease effects. We take up this issues in the next section.

6. METHODOLOGICAL ISSUES

6.1 Estimated Equations

There are various theories that explain the movement of the real exchange rate during the transition. One explanation for the movement of the real exchange rates relies on the Balassa - Samuelson effect (Halpern and Wyplosz, 1997; De Broeck and Sløk, 2001). According to this effect, productivity growth in the tradables sector leads to an increase in real wages. If wages are the same in the various sectors of the economy, then wages and therefore prices should rise in the non-tradables sector, affecting the real exchange rate. Orlowski (1997) finds that real exchange rate movements in transition economies tend to be driven by high inflation rates, rising labor costs, and trends in nominal exchange rates. Dibooglu and Kutan (2001) test Brada's (1998) conjecture that real exchange rates in transition economies should follow a path that reflects either the effects of real shocks or those of monetary shocks. They find that both monetary and real shocks can explain movements in the real exchange rates in transition economies.

De Gregorio and Wolf (1994) have extended the Balassa-Samuelson to include the terms of trade (TOT). The inclusion of the TOT variable is very important in the context of the Dutch Disease phenomenon. An increase in the price of oil, which will improve Kazakhstan's terms of trade, implies an increase in export revenues. This leads to an increase in spending on all goods, which raises domestic prices relative to foreign prices, causing an increase in RER. We therefore propose to employ the extended version of the Balassa-Samuelson model (which includes the TOT effect).

In general terms, this model can be specified as:

$$RER = f(TOT, P, RW) \quad (1)$$

where RER, TOT, P, and RW are the real exchange rate, terms of trade, prices, and real wages, respectively.

Equation 1 is also consistent with empirical evidence on the behavior of real exchange rates in transition economies. The TOT variable is included in the model to test for the Dutch Disease effects. The inclusion of prices in our model is intended to capture the evidence reported in Orlowski (1997). Similarly, labor costs effects are captured by the inclusion of real wages, or past inflation itself (since unit labor costs are directly linked to inflation), which will be included in our estimated model. Since Kazakhstan employed a fixed exchange rate for most of our sample period, we employ a dummy variable to account for the change in the exchange rate regime in 1999. Finally, Equation 1 includes both real and nominal variables to explain real exchange rate movements, a practice consistent with the evidence reported in Dibooglu and Kutan (2001).

To allow for short-run dynamic relationship among the variables, we estimate the following equation:

$$D(RER)_t = a + \sum_{i=1}^{k} b_i\, D[(TOT)_{t-i}] + \sum_{i=1}^{k} g_i\, [D(P)_{t-i}] + \sum_{i=1}^{k} q_i [D(RW)_{t-i}] + \sum_{i=1}^{k} l_i [D(RER)_{t-i}] \quad (2)$$

where D stands for the difference operator and k is the lag length. Equation (2) states that real exchange rate movements are driven by TOT changes, inflation, real wage growth, and past real exchange rates.[5]

6.2 Empirical Results

Data

Monthly data for the period from January 1994 to April 200 is collected from the IMF's *International Financial Statistics*, March 2001 CD ROM version. The real exchange rate is constructed using the U.S. dollar exchange rate and the domestic and foreign (U.S.) price levels. Although Russia is an important trading partner of Kazakhstan's, trade contracts are generally dominated in U.S. dollars, so we rely on a U.S. dollar-based exchange rate to measure the real exchange rate. The exchange rate is expressed as units of domestic currency per U.S. dollar; an increase in the real exchange implies a depreciation of the domestic currency. The domestic price level is represented by the retail price index, while the consumer price index (CPI) is used for the U.S. price level. The data for real wages are constructed using inflation-adjusted nominal wages. TOT is the ratio of export prices to import prices.[6] All variables are expressed in logarithmic form.

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[5] Equation 1 represents a long-run relationship among the data, while equation 2 reflects the variables' short-run dynamics. We tested for a long-run relationship among the variables; Johansen co-integration tests indicated that no such relationship exists. Therefore, we did not use an error correction model: equation 2 is a better characterization of the data, which excludes the error correction term.

[6] Due to lack of monthly data for TOT, we had to construct such data. Quarterly data on TOT are regressed against quarterly world oil price data and a constant term. The estimated correlation coefficient between TOT and the world oil price was 0.97. The estimated coefficients from the regression and monthly oil price data are then used to construct monthly TOT data. The constructed monthly data are crosschecked for consistency with the quarterly data, in that the sum of the three-month data and its growth rate over time match exactly with the corresponding quarterly data. The world oil price data were taken from the IMF's *International Financial Statistics*.

Real Exchange Rate Estimates

Table 3 reports the results for the real exchange rate equation. Note that the variables are in percentages, since they are expressed in terms of log differences and multiplied by 100. The data are first-differenced to induce stationarity in order to eliminate spurious regression bias. Unit root test results (not reported) indicated that the log-levels of the variables are non-stationary but that the first-differenced data are stationary.[7]

We report the results for the two sub-samples, namely, the full sample and the post-1996 period. The full period includes the effect of initial implementation of macroeconomic policies, while the 1996-2000 sample corresponds to the post-stabilization period. The full period results may be sensitive to the relatively high inflation that occurred during 1994-1995 and hence unstable. To determine the proper lag length, we employed the Akiake's criterion, with the results supporting a lag length of four.[8]

Two dummy variables are included in the estimated equations to account for the effect of the Russian crisis in August 1998 and the switch to the floating exchange rate regime in April 1999, respectively. These variables take the value of unity for the event date and zero otherwise.

The full-period results reported in Table 3 show that the previous period's changes in TOT have a significant and positive impact on this period's real exchange movements. The sign of the TOT variable is not consistent with theory, however: an improvement in TOT depreciates the domestic currency. This result may be driven by instability in the data during this period.[9]

Past inflation, both during the previous period and four periods ago, has a significant and negative impact on the real exchange rate. The combined effect of the two coefficients is about 0.8, suggesting that a 10% increase in the inflation rate appreciates the real exchange rate by 8%. Real wage movements significantly influence the real exchange rate with a two-month lag. The impact is relatively small, however. A 10% increase in the real wages appreciates the real exchange rate by 1.13%. Own lags have no significant affect on the real exchange rate during this period. Finally, the dummy variables for the Russian crisis and exchange rate regime change are significant and positive, indicating that they caused about 1.9 and 17.9% depreciations of the tenge, respectively.

The diagnostic tests for the full period results indicate no evidence of serial correlation and ARCH effects. The adjusted R^2 shows that the estimated model explains about 77% of the variation

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[7] These results are available upon request from the authors.

[8] Contemporaneous data are not included in the estimations to prevent any simultaneity bias.

[9] Indeed, the CUSUM and CUSUMSO tests indicate instability in the results for the full period while there was no such instability found for the post-1996 period. For comparison purposes, however, we continue to report the results for both sample periods.

in the dependant variable. However, as mentioned earlier, CUSUM and CUSUMSQ tests indicated instability in the model. Therefore, these results should be interpreted cautiously.

Turning to the results for the post-1996 period, which is relatively calmer period and arguably better captures the essence of the post-stabilization period, movements in TOT have now a significant affect on the real exchange rate with the expected sign. Improvements in TOT bring about a real appreciation of the tenge. It takes four months for TOT changes to influence the real exchange rate. A 10% improvement in TOT appreciates the real exchange rate by 2.34%, indicating evidence of Dutch Disease effects.

Last period's inflation has a significant and negative effect on the real exchange rate this period. A 10 percent increase in the inflation rates appreciates the real exchange rates by 4.17 percent. Real wage coefficients are significant for lags 2 through 4. The total effect of the real wage movements sums to about 0.364, suggesting that a 10% increase in the real wage brings about a 3.6% appreciation of the real wage during the post-1996 period. Note that there is significant persistency in real exchange movements during this period. The combined effect of own lags 1 and 3 is about 0.4, indicating that 40% of movements in today's real exchange rate is driven by its own past behavior. In other words, there is significant "memory" in real exchange behavior. Finally, the dummy variables continue to be significant at the 1% level.

The adjusted R^2 shows that the model explains about 88% of the variation in the real exchange rate. The estimated Q and ARCH tests show no significant serial correlation and ARCH effects of up to 12 lags, respectively. The CUSUM and CUSUMSQ tests (not reported) indicate no instability in the estimated model for the post-96 period. Thus, the post-1996 results are more robust and have more explanatory power.

Variance Decompositions

An apparent drawback of the tests in Table 3 is that they are *in-sample* tests. As a complement to our analysis, we also report variance decompositions (see Hamilton, 1994; Lütkepohl and Reimers, 1992) that essentially provide information regarding the *'out-of-sample'* causal structure of the systems. Such tests are powerful in that they provide further evidence about the significance of independent variables in explaining movements in the dependent variable, including its own past shocks. Table 4 reports the variance decomposition results for the two periods. Because the results may be sensitive to the ordering of the variables, we use two alternative orderings, as shown in Table 3.

The results for the full period show that own lags explain about 68% of the variation in the real exchange rate. TOT shocks are able to explain about 15-16%, while real wage changes have a small share of about 4%. Finally, inflation shocks account for about 12% of the variation. Note that the results are quite robust to the ordering of the variables.

Looking at the results for the post-1996 period, the most significant change in the results is the role played by real wages and inflation. The role of inflation in explaining movements in the real exchange rate becomes minimal compared to the full period, while real wage shocks can now explain about a quarter of the variation in the real exchange rate. Own lags and TOT shocks continue to be significant, explaining about 55-61% and 12-17% of the variation in the real exchange rate, respectively. These findings support the evidence reported in Table 3.

These results for the post-1996 period are consistent with prior expectations. During this period, the inflation rate and its effect on the real exchange rate have declined over time as economic and financial reforms have induced a significant restructuring and change in productivity; this has allowed real wage rate developments to have a more significant effect on real exchange rate movements. This finding is also consistent with the Balassa-Samuelson effect, provided that real wage movements reflect for productivity developments.[10]

In sum, the post-1996 period results suggest that there is statistically significant evidence of Dutch Disease effects in Kazakhstan. We find that improvements in TOT tend to appreciate the real exchange rate. Although, the variance decompositions results indicate that the impact of TOT shocks range about between 12 and 17%, depending upon the ordering used, the discussion above suggests that this effect will likely become larger in the future.

7. POLICY IMPLICATIONS AND CONCLUSIONS

In this paper, we have examined Kazakhstan's vulnerability to the Dutch Disease by estimating a real exchange rate equation that includes the TOT effect. The evidence indicates that movements in the terms of trade have a significant effect on the real exchange rate with the expected sign only in the post-1996 period. This finding might be explained by the features of Kazakhstan's inherited trade patterns, which remained dominated by Russia and other partners in the Commonwealth of Independent States during the initial years of the transition. It is more likely that the effects of the wide swings in the internal value of the ruble, and the timing and pattern of price and trade liberalization in Russia and other neighboring countries significantly affected the terms of trade and dominated fluctuations in world oil prices.

[10] The link from productivity to wages is critical for the Balassa Samuelson effect. Evidence indicates that this link exists and strong for transition economies (Economic Survey of Europe, 2001). Using nine transition countries for the period from 1991 to 1999, this study finds that the implied long run impact of productivity on real wage is 0.79 at the industry level. In other words, a 10 percent increase in productivity raises real wages by 7.9 percent.

The fact that we have find evidence that TOT shocks affect the real exchange rate only in the post-1996 period may be due in part to a corrective movement away from an initial overvaluation of the exchange rate. Accordingly, transitory factors may have an impact on the real exchange rate. At the same time, our results suggest that the Balassa-Samuelson effect may be present in Kazakhstan through productivity changes and evidence that this is possibly reflected in real wages (Economic Survey of Europe, 2001). Therefore, a real exchange rate appreciation may be a sign of both productivity gains and a loss of competitiveness, which is inevitable in the change of the economic structure. However, it would be unwarranted to interpret our results as suggesting that the real appreciation in the country was due only to the transitional factors, and that Kazakhstan over the medium and long term faces no vulnerability to the Dutch Disease. Given that oil will play an even greater role in the country's economy and exports in the future (IMF, 2000), the impact of terms of trade shocks on the real exchange rate of similar magnitude or larger in the future should be expected. Thus, Dutch Disease-type structural relationships are likely to apply in the future. Therefore, it is critical that policymakers design appropriate macroeconomic polices to successfully deal with such issues.

REFERENCES

Akhmetova, S.O., Buranbaeva, A.M., and Radivilova, O.V. "Foreign Direct Investment," *Kazakhstan Economic Trends*, second quarter, pp. 35-42, 1996.

Auty, Richard M., "Mineral Wealth and the Economic Transition: Kazakhstan," *Resources Policy* **24,** 4:241-249, 1998a.

Auty, Richard M., "Resource Abundance and Economic Development: Improving the Performance of Resource-Rich Countries," World Institute for Development Economics Research, Research for Action paper no. 44, 1998b.

Brada, Josef C., "Introduction: Exchange Rates, Capital Flows and Commercial Policies In Transition Economies." *J. Comp. Econ.* **26**, 4:613-620, Dec. 1998.

Corden, W. Max, "Booming Sector and Dutch Disease Economics: Survey and Consolidation," *Oxford Econ. Papers* **36,** 3:359-380, 1984.

Corden, W. Max and Neary, J. Peter, "Booming Sector and De-industrialization in a Small Open Economy," *Econ. J.* **92,** 825-848, 1982.

Davis, Graham A., "Learning to Love the Dutch Disease: Evidence from the Mineral Economies," *World Development* **23,** 10:1765-1779, 1995.

De Broeck, Mark and Kostial, Kristina, "Output Decline in Transition: The Case of Kazakhstan," IMF Working Paper, WP/98/45, April 1998.

De Broeck, Mark, and Sløk, Torsten, "Interpreting Real Exchange Rate Movements in Transition Countries," IMF Working Paper, WP/01/56, May 2001.

Dibooglu, Selahattin, and Kutan, Ali M., "Sources of Real and Nominal Exchange Rate Fluctuations in Transition Economies: The Case of Poland and Hungary," *J. Comp. Econ.* **29,** 2:257-275, June 2001.

De Gregorio, Jose, and Wolf, Holger C., "Terms of Trade, Productivity and Real Exchange Rate," NBER Working paper no. 4807, 1994.

Economic Survey of Europe, "Chapter 6: Economic Transformation and Real Exchange Rates in the 2000s: The Balassa-Samuelson Connection," 227-239, 2001.

Gelb, Alan H. and Associates. *Oil Windfalls: Blessing or Curse?* New York: Oxford University Press, 1988.

Hamilton, James D., *Time Series Analysis*, Princeton University Press, Princeton, 1994.

Halpern, László, and Wyplosz, Charles, "Equilibrium Exchange Rates in Transition Economies," IMF Working Paper, WP/96/125, November 1996.

IMF, "Republic of Kazakhstan: Recent Economic Developments," Staff Country Report, no. 98/84, August 1998.

IMF, “Republic of Kazakhstan: Selected Issues and Statistical Appendix,”, Staff Country Report, no. 00/29, March 2000.

IMF, “Republic of Kazakhstan: Selected Issues and Statistical Appendix,” Staff Country Report, no. 01/20, January 2001.

Kazakstan Economic Trends (*KET*), all issues from February 1996 through January 2001. Almaty, Tacis.

Lütkepohl, Helmut, and Reimers, Hans-Eggert., “Granger-Causality in Cointegrated VAR Processes: the Case of the Term Structure,” *Econ. Letters* **40,** 263-268, 1992.

Orlowski, Lucjan, “The Link between Real Exchange Rates and Capital Accounts in Transforming Economies,” *Journal of Emerging Markets*, **2,** 3:5-9, 1997.

Rosenberg, Christopher B., and Saavalainen, Tapio O., “How to Deal with Azerbaijan’s Oil Boom? Policy Strategy in a Resource-Rich Transition Economy,” IMF Working Paper, WP/98/6, January 1998.

Singh, Rupinder, and Laurila, Juhani, “Azerbaijan: Recent Economic Developments and Policy Issues in Sustainability of Growth.” Bank of Finland, Institute for Economies in Transition, Discussion Paper, no. 5, 1999.

van Wijnbergen, Sweder, “The Dutch Disease: A Disease After All?” *Econ. J.* **94,** 41-55, 1984.

Statisticheskoe obozrenie Kazakhstan, N-1-1999. Almaty: Agency for Statistics of the Republic of Kazakhstan, 1999.

Trud i Zanyatost naseleniya v Respyblike Kazakstan, 1998. Almaty: Agency for Statistics of the Republic of Kazakhstan, 1998.

TABLE 1

Structure of Exports by Aggregate Commodity Groups (% of total export)

Commodity Group	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
Fuel, oil products	23.8	33.0	34.1	38.1	40.9	52.8
Ferrous metals	19.3	15.8	14.6	14.2	15.8	12.9
Copper and copper products	12.3	9.9	10.8	10.7	10.3	8.1
Inorganic chemicals	7.3	6.8	5.4	5.7	5.8	4.2
Grain	6.7	7.2	7.9	5.4	5.6	5.5
Precious metals	3.0	0.1	2.0	4.6	5.1	4.2
Zinc and zinc products	2.9	2.3	3.4	3.3	2.9	2.2
Ores, slag, and cinders	2.4	2.5	3.8	4.3	2.1	1.9
Reactors, machinery	1.9	2.5	1.7	1.1	1.3	1.0
Others	20.4	19.9	16.3	12.6	10.2	7.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Agency for Statistics of the Republic of Kazakhstan; calculations of *Kazakstan Economic Trends* staff.

TABLE 2

Real Output Growth (Percentage Change from Previous Year)

	1993	1994	1995	1996	1997
Electric power engineering	-4.4	-15.2	-2.8	-10.3	-14.2
Fuel industry	-14.8	-14.0	-46.2	3.8	2.3
Ferrous metallurgy	-24.4	-29.5	13.5	-17.5	25.3
Non-ferrous metallurgy	-7.8	-22.8	6.3	3.6	13.8
Chemicals and petro-chemicals	-44.6	-41.1	1.6	-27.0	-29.9
Machine-building	-14.7	-38.6	-27.3	-9.2	-29.9
Timber and wood processing	-8.7	-44.9	-40.0	-21.8	-30.5
Construction materials	-26.8	-57.1	-29.0	-37.0	-23.7
Light industry	-11.7	-44.3	-59.3	-11.3	-24.2
Food industry	-13.7	-26.1	-37.5	-24.6	-3.3
Total industry	-14.0	-27.5	-8.6	0.3	4.1

Source: IMF (2000).

Note: Starting in 1998 a new classification was introduced; comparable categories are not available for data prior to 1998.

TABLE 3

Real Exchange Rate Equation Estimates - Dependent Variable: D (log $RER)_t$

Variables	1994:01 – 2000:04	1996:01 – 2000:04
Constant	0.745 (0.045) **	0.367 (0.314)
D (log TOT_{t-1})	0.483 (0.019) **	0.132 (0.159)
D (log TOT_{t-2})	0.183 (0.209)	0.162 (0.117)
D (log TOT_{t-3})	0.001 (0.999)	0.031 (0.729)
D (log TOT_{t-4})	-0.518 (0.374)	-0.234 (0.053) **
D (log P_{t-1})	-0.526 (0.019) **	-0.417 (0.044) **
D (log P_{t-2})	0.098 (0.684)	0.018 (0.929)
D (log P_{t-3})	0.166 (0.273)	0.102 (0.561)
D (log P_{t-4})	-0.284 (0.016)**	-0.056 (0.78)
D (log RW_{t-1})	-0.045 (0.781)	0.019 (0.733)
D (log RW_{t-2})	-0.113 (0.065) **	-0.082 (0.058) ***
D (log RW_{t-3})	-0.020 (0.723)	-0.118 (0.056) ***
D (log RW_{t-4})	-0.039 (0.479)	-0.164 (0.006) *
D (log RER_{t-1})	-0.009 (0.347)	0.309 (0.000) *
D (log RER_{t-2})	0.036 (0.741)	0.055 (0.429)
D (log RER_{t-3})	0.007 (0.922)	0.095 (0.102) ***
D (log RER_{t-4})	-0.115 (0.249)	0.058 (0.417)
Russian Crisis	1.902 (0.007) *	1.463 (0.009) *
Flexible Regime	17.878 (0.000) *	18.719 (0.000) *
Adj. R^2	0.766	0.878
Q (12)	7.374 (0.832)	13.344 (0.345)
ARCH (12)	7.761 (0.803)	15.024 (0.209)

Notes: White heteroskedascity-consistent standard errors are used in all estimations. Q (12) is the test for serial correlation and ARCH (12) is the autoregressive conditional heteroskedasticity test up to 12 lags.

TABLE 4

Variance Decompositions

	1994:01 – 2000:04				1996:01 – 2000:04			
Ordering/Variables	RER	TOT	RW	P	RER	TOT	RW	P
RER, TOT, RW, P	68.5	15.1	4.1	12.2	60.6	11.6	24.0	3.7
TOT, RER, RW, P	67.6	16.1	4.1	12.2	54.8	17.4	24.0	3.7

Notes: Variables refer to the growth rates. RER = Real Exchange Rate, TOT = Terms of Trade, RW = Real Wages, and P = Price level. The decompositions are computed using a 12-month horizon and the reported results refer to the end of 12-month horizon.

Figure 1 - Kazakhstan: Scenarios for Export of Oil and Gas Condensate, 1998-2014

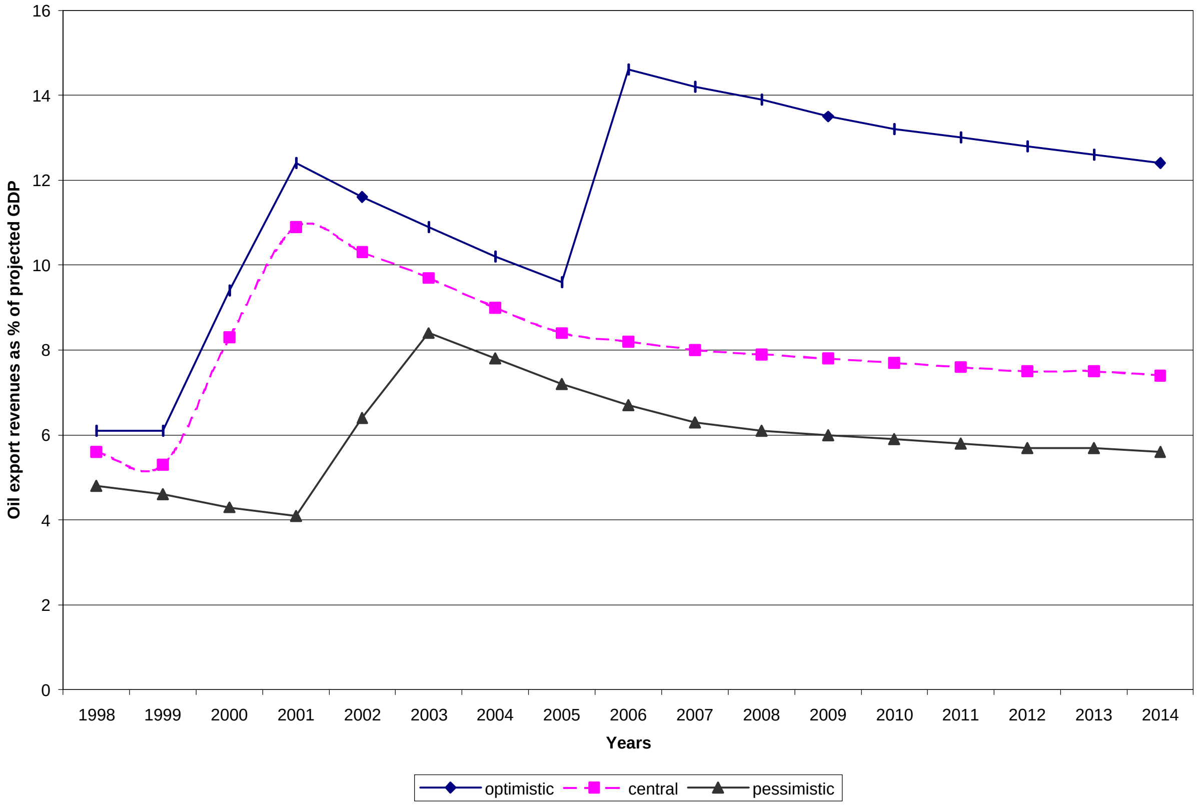
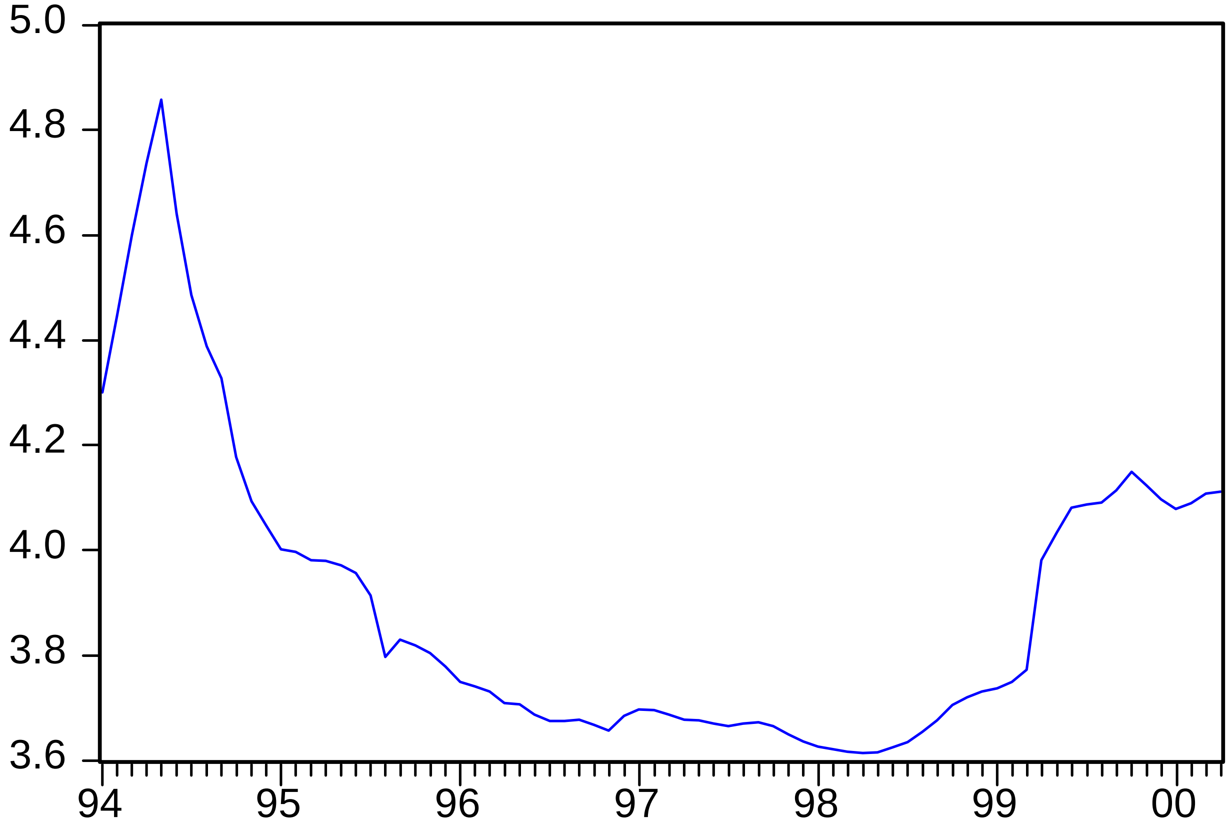


Figure 2 - Real exchange rate (in log)



Note: The logarithmic of the real exchange rate is defined as follows: log(RER) = log[(E*US price index)/domestic price index], where the nominal exchange rate, E, is defined in terms of the units of domestic currency per U.S. dollar. Hence, a decline in the real exchange indicates the appreciation of the domestic currency.

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