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Lithuania: History and Future of the Currency Board Arrangement

Patricia Alonso-Gamo, Stefania Fabrizio,
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Lithuania: History and Future of the Currency Board Arrangement

Prepared by Patricia Alonso-Gamo, Stefania Fabrizio, Vitali Kramarenko, and Qing Wang[1]

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Abstract

The paper examines the evolution of the institutional setup of Lithuania's Currency Board Arrangement (CBA) and competitiveness from 1994 through 2001, with a view to determining the resilience of the Lithuanian CBA to external shocks in 2002–03. First, several indicators of competitiveness are analyzed in the context of productivity gains and flexibility of the labor market and prices are considered. Then, the equilibrium exchange rate and misalignments of the actual rate from it are estimated in a cointegration framework. The paper concludes that, under current policies, the CBA would be able to cope with sizable external shocks during 2002–03 provided supporting policies remain in place.

JEL Classification Numbers: E42, E52, E61, and F33

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Authors' E-Mail Addresses: palonsogamo@imf.org, sfabrizio@imf.org, vkramarenko@imf.org, qwang@imf.org

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I. INTRODUCTION

This paper analyzes the economic policy framework under which the currency board arrangement (CBA) has operated in Lithuania since 1994, as well as considerations and steps leading to the repegging of the litas from the U.S. dollar to the euro in February 2002. The authorities' current strategy aims at joining the Exchange Rate Mechanism 2 (ERM2)—while maintaining the CBA if feasible—as soon as possible after EU accession, which is currently envisaged for 2004. Subsequently, their aim is to join the European Monetary Union (EMU) and adopt the euro as soon as possible, which could be no earlier than 2006. In order to assess the future of the CBA and the viability of the authorities' strategy, the paper examines the evolution of competitiveness and of the real effective exchange rate (REER) from 1994 to 2001 with a view to determining the extent of resilience of the CBA to external shocks in 2002–03.

The paper concludes that, under current policies and in the absence of other major shocks, the economy appears to be able to cope with even a 30 percent appreciation of the euro during 2002–03. This resilience could make it feasible for Lithuania to preserve the CBA under its current setup during ERM2 participation. While the REER appreciated at about 9.5 percent per year on average during 1994–2001 (Figure 1), this appreciation was sustainable due to rapid productivity growth, in particular in the export sector, and wage and price flexibility. The projected REER appreciation in 2002–03, in the event of such a 30 percent euro appreciation, would be of the order of almost 5 percent per year—well below the average of the past few years, to which the economy was able to adjust. The financial system also appears well capitalized and resilient to shocks. Thus, in the absence of other large external shocks, the authorities' strategy would appear viable. Nonetheless, the paper emphasizes that the CBA would need to continue to be underpinned by a restrained fiscal stance and market reforms to enhance productivity growth, and labor market and price flexibility.

Figure 1. Non-Energy Exports and Real Effective Exchange Rate (REER), 1994–2002
(January 1996=100)
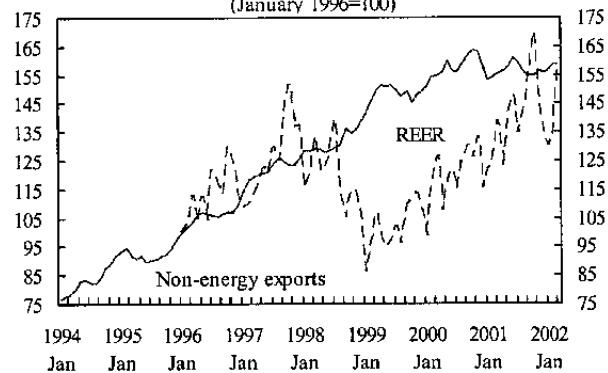
The paper is organized as follows. Section II provides a brief overview of the institutional features of Lithuania's CBA, its history since 1994, the rationale for the repegging in 2002, and initial results after its implementation. Section III assesses the viability of the authorities' strategy for the future, which hinges on the maintenance of competitiveness. To this end, Section IV examines the evolution of competitiveness from 1994 to 2001 from various angles, with a number of competitiveness measures analyzed drawing on developments in productivity, labor markets, and structural reforms. Subsequently, an econometric exercise provides estimates of the equilibrium real effective exchange rate and deviations from it. Section V presents three scenarios of the evolution of the REER for 2002–03 and their implications for the viability of the authorities' strategy for the future, drawing on Lithuania's historical experience described in Section II. Section VI concludes. Annexes I elaborates on specific issues related to institutional developments and structural reforms. Annex II describes the econometric analysis.

II. THE LITHUANIAN CBA

A. Origins and Evolution of the CBA

The CBA was set up on April 1, 1994 with the litas pegged to the dollar at LTL 4 per $1.[2] In some respects, the Lithuanian CBA was somewhat unorthodox, reflecting a difficult compromise between the government's desire to stabilize the exchange rate through limiting central bank functions and the Bank of Lithuania's (BoL) view that this objective could be achieved through conventional central bank operations (Box 1). While the Lithuanian CBA exhibited the standard attributes of a currency board—convertibility of reserve money on demand at a fixed rate and the full backing of reserve money by international reserves—the BoL preserved many functions of a conventional central bank. These include the lender of last resort function up to the excess coverage of reserve money and some money market instruments, which it could use to influence liquidity.

During 1994–97, a recovery in GDP growth contributed to the sustainability of the CBA, despite economic policies which were not fully supportive.[3] The expansionary fiscal stance was not generally supportive of the CBA and external viability in the medium term (Table 1), while the spirit of the CBA was violated on a number of occasions during 1994–95.[4] At the same time, GDP growth accelerated to 7.3 percent in 1997 from 3.3 percent in 1995 and exports grew at about 30 percent on average, owing to structural reforms, including price liberalization and some progress in privatization. The dynamism of the real sector, combined with the low initial stocks of government and private sector debt, lessened the pressure of medium-term considerations. The financial system was weak during the early years of the CBA, but the latter was not undermined by the banking crisis of 1996, since the government took over the financial burden of bank restructuring.[5] The successful resolution of the banking crisis and the reduction in the fiscal deficit in 1997 strengthened the credibility of the CBA and led to rapidly declining interest rates and inflation (Table 1).

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[2] The Litas Stability Law provided the institutional basis for the CBA (Box 1).

[3] In order to preserve the viability of CBAs, countries need to maintain the required strict policy discipline including a conservative fiscal stance, healthy financial system, cautious external debt management, and flexible labor markets (see Camard (1996), Mihalke (1997), Santiprabhob (1997)).

[4] During 1994–95, under political pressure, the BoL authorized a bank to withdraw required reserves to allow it to lend to a utility company a large amount in foreign exchange, and the government undertook foreign borrowing by pledging official reserves.

[5] Thanks to the CBA, the government was able to resist pressures for monetizing the deposits of failed banks. The total recapitalization cost was about 3 percent of GDP. See Enoch and others (2002), Garcia-Herrero (1997).

Box 1. Historical Note on the Currency Board

The need for a CBA and its attributes were subject to a lively public debate. The idea of a CBA emanated from the government, and the BoL was initially skeptical about its benefits. After fierce debates, Seimas passed the Litas Stability Law in March 1994, which was signed into Law by President Brazauskas on March 23, 1994. The initial law provided the legal basis for setting up the CBA and stipulated that the government had responsibility for fixing the exchange rate in consultation with the BoL. According to the law, after the initial choice of the peg, the exchange rate could only be changed if it were detrimental to the economy. The BoL initially favored the rate of peg at LTL 3.9 per $1 and the Fund staff supported this position, but industrialists and banks lobbied for a peg at LTL 4.2 per $1. The government decided to strike the middle ground and opted for LTL 4 per $1. The authorities decided to chose the dollar as a reserve currency, based on a number of considerations. First, 90 percent of trade was denominated in dollars.[1] Second, most foreign currency-denominated assets and liabilities were also in dollars. Third, most cash transactions were conducted in dollars in an environment of high domestic inflation. In July 1994, giving the responsibility of determining the peg to the government was declared unconstitutional, and the Litas Stability Law was amended to assign the responsibility for the exchange rate to the BoL subject to consultations with the government.[2]

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[1] It is not clear whether actual pricing was conducted in dollars.

[2] The consultative role of the government was formalized by the adoption of a government resolution endorsing the adoption of the peg at a LTL 4 per $1 exchange rate on September 19, 1994.

Table 1. Selected Macroeconomic Indicators, 1994–2001

(Annual percentage change, unless otherwise indicated)

	1994	1995	1996	1997	1998	1999	2000	2001
Real GDP growth	-9.8	3.3	4.7	7.3	5.1	-3.9	3.9	5.9
Interest rate 1/	57.4	27.2	21.3	14.4	12.2	13.1	12.1	9.6
Consumer Price Inflation	72.2	35.5	13.1	8.4	2.4	0.3	1.5	2.0
General government balance								
(in percent of GDP)	-4.8	-4.5	-4.5	-1.8	-5.9	-8.5	-2.8	-1.9
Broad money growth	63	29	-3.5	34.1	14.5	7.7	16.5	21.4
Current account balance								
(in percent of GDP)	-2.2	-10.2	-9.2	-10.2	-12.1	-11.2	-6.0	-4.8
Export growth 2/	5.7	35.7	31.9	24.1	-2.9	-16.4	20.6	20.3

Sources: the Lithuanian authorities; and Fund staff estimates.

1/ Average annual interest rates on bank loans in litas on total maturities.

2/ Exports of goods for 2001.

The BoL, in consultation with the government, decided in 1997 to aim at exiting the CBA by 1999,[6] given that its main objective—price stability—had been achieved, but it abandoned this plan in 1999. The intermediate goal was to broaden the array of the asset backing of reserve money and establish a conventional peg to a basket of currencies, including the dollar and euro, to be defended by an independent central bank. The ultimate goal was to peg the litas to the euro permanently as a step toward EMU membership. The BoL began to implement its exit strategy

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[6] The authorities planned to amend the Litas Stability Law in 1999 to formalize the exit from the CBA.

by further developing a range of monetary instruments with technical assistance (TA) from Fund staff. However, insufficient fiscal adjustment during this period of rapid growth and the unclear status of the CBA had made the arrangement vulnerable to shocks. In the wake of the Russian crisis and subsequent pressures, the exit strategy was abandoned in 1999, as the BoL decided to maintain the CBA as a way to provide a nominal anchor for the economy during a period of instability.

The combination of a severe recession, an unsustainable fiscal position, and intensified currency substitution brought the CBA to the verge of collapse in late 1999. Following the spillover effects of the Russian crisis and the associated decline in exports, real GDP declined by 3.9 percent in 1999. Political instability further undermined confidence as two successive governments resigned. The large fiscal impulse of 1999 was not supportive of domestic economic activity, as it largely stimulated imports through savings restitution payments (2.8 percent of GDP) and net lending to the distressed Mazeikiu Oil Company (1.9 percent of GDP). Falling exports and a steady outflows of reserves[7], despite a mopping-up of liquidity by the BoL, created a sense that the currency might be overvalued. Together with the fiscal deficit of 8.5 percent of GDP, this led to a virtual closure of the treasury securities' market where the government had difficulties to borrow even at close to 20 percent though inflation was running almost at zero. Moreover, sizable foreign debt payments were due by year-end and the privatization fund was running out of resources. The government also instituted selected trade restrictions and price controls for a short period. At the same time, currency substitution intensified significantly. This was reflected in a steep decline in litas broad money, as economic agents shifted into dollar currency and deposits, but pressures on the CBA did not lead to panic withdrawals of deposits from banks. The short duration of pressures on the CBA and decisive corrective measures of the government in late 1999 prevented a potentially devastating confidence crisis in the banking system. Developments in 1999 demonstrated that the credibility of the CBA needed to be underpinned by an appropriate fiscal stance, and that the return to sustainability hinged on a quick correction of the imbalances.

The conservative government sworn in November 1999 embarked on a massive fiscal adjustment and a comprehensive package of structural reforms in 2000 to correct mounting macroeconomic imbalances and spur growth. The credibility effect of the fiscal adjustment (the budget deficit declined from 8.5 percent of GDP in 1999 to 2.8 percent in 2000), a significant breakthrough in structural reforms, and a resumption of capital inflows more than offset the contractionary effects of the fall in public sector demand. As a result, growth rebounded in 2000, while the external current account deficit declined to 6.0 percent of GDP. Moreover, the adjustment and reforms undertaken in 2000–01 (Table 1 and Annex I) led to major progress in EU accession negotiations, and Lithuania became a firm candidate for accession in the first wave, which is envisaged for 2004. In retrospect, the choice to maintain the CBA appears to have been beneficial. In the midst of an unstable political environment and mounting spending pressures, the desire to maintain the currency board encouraged macroeconomic adjustment and helped restore credibility.

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[7] Net foreign assets (NFA) of the BoL, excluding government deposits, declined substantially from end-December 1998 to end-September 1999, as the NFA of commercial banks did.

B. The Repegging in 2002

By 1999–2000, the peg to the dollar no longer conformed well to Lithuania's trade structure, given the increasing share of trade with the EU in this period (Figure 2). As a result, Lithuanian exporters became increasingly affected by movements in the euro/dollar rate, in particular the steady dollar appreciation vis-à-vis the euro from 1999. Moreover, as EU accession neared, it was clear that Lithuania would only be able to maintain the CBA after accession if the arrangement were euro-based. In late 1999, the BoL made the first announcement of its intent to repeg the litas from the dollar to the euro at parity with a promise to communicate the schedule and modalities of the repegging in mid-2001. In the unsettled financial situation of late 1999, the statement of intent without a precise date did little to arrest speculations about the timing of the repegging or the possibility of a devaluation. A sharp appreciation of the dollar during 2000–01 fueled again speculations about a possible devaluation, but the BoL made a number of public statements trying to reassure the public of its intent to repeg without devaluation. During 2000–

Figure 2. Geographical Composition of Destination of Exports
1996, 2000 and 2001
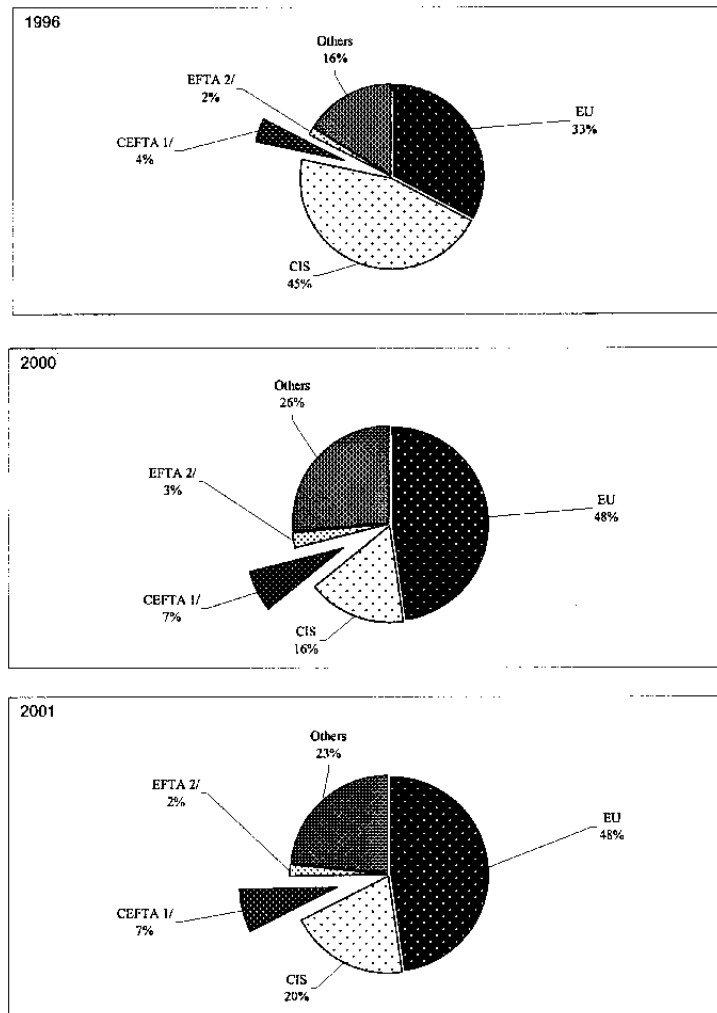
1/ Central European Free Trade Agreement (CEFTA): 1996: Czech Republic, Hungary, Slovakia, Slovenia, Poland
1997-1998: Czech Republic, Hungary, Slovakia, Slovenia, Poland, Romania. Since 1999: Czech Republic, Bulgaria, Hungary, Slovakia, Slovenia, Poland, Romania.
2/ European Free Trade Association (EFTA): Iceland, Liechtenstein, Norway, Switzerland.

01, the BoL initiated technical preparations to the repegging with the assistance of Fund staff (Box 2).

Box 2. Technical Aspects of the Repegging

Preparations for the repegging involved a wide range of measures. In March 2001 the Seimas approved amendments to the Litas Credibility Law to allow the BoL to change the reserve currency in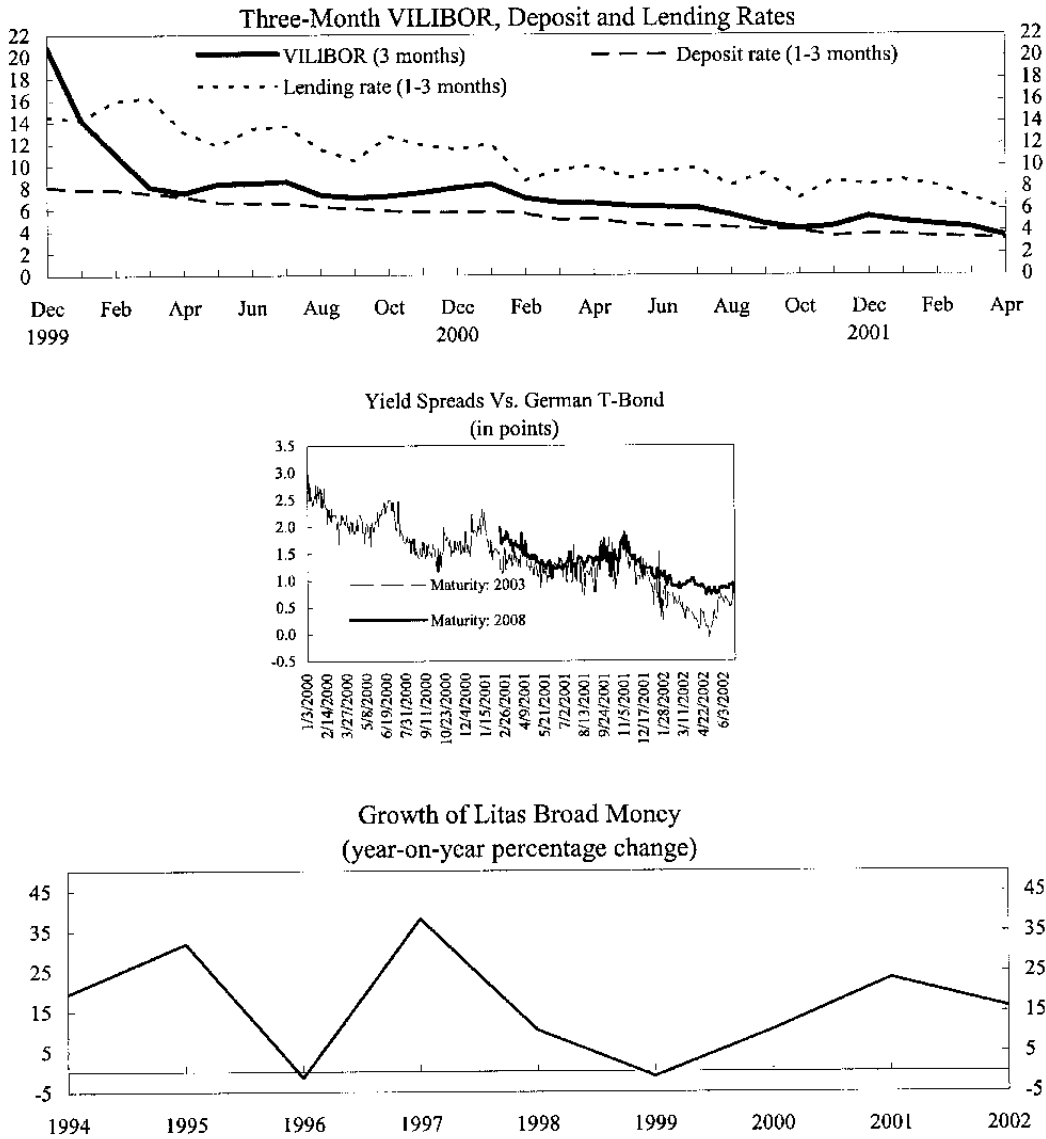 a nonemergency situation. Immediately after announcing the upcoming repegging, the BoL started an active information campaign explaining the modalities of the repegging and changing currency risk patterns, including through public statements, mailing of brochures, and seminars with financial intuitions. The BoL also resolved technical issues that had prevented it from providing liquidity support to banks in the past due to collateral registration problems and reduced its transaction fees for exchange operations with the reserve currency to facilitate better liquidity management by banks. Furthermore, the BoL advised banks to reduce commissions on exchange transactions to facilitate the rebalancing of portfolios of nonfinancial enterprises and households. Finally, a detailed plan for converting gross official reserves was approved by the BoL well in advance. The BoL consulted with Fund staff, the European Central Bank, and the Bank for International Settlements on all aspects of the repegging operation. Commercial banks took a pro-active position in advising their customers on how to re-arrange their portfolios and future financial management consistent with new exchange risk patterns.

The complex task of converting 96 percent of official reserves into euro-denominated assets was completed in the week prior to the repegging in a smooth manner. The BoL aimed to: (i) liquidate its dollar investment portfolio and accumulate cash with correspondent banks; (ii) lock-in in euro interest rates through forward contracts for the first day after the repegging to limit interest rate risk; (iii) convert dollar accounts into euros as close as possible to the repegging cross rate; and (iv) settle forward contracts to constitute a euro investment portfolio. These steps, which involved interest rate, exchange rate, and operational risks, were successfully implemented.

In principle, there was a choice between a surprise and pre-announced repegging. Although a swift repegging at a time of a favorable euro/dollar exchange rate might have been helpful for exporters, the authorities finally opted for a repegging announced well in advance, with a commitment not to devalue or revalue, for a number of reasons. First, the authorities wanted to make the process as transparent as possible to avoid associations with Soviet-era surprise confiscatory monetary reforms. The BoL was keen to maintain its institutional credibility, seen as critical to the future introduction of the euro to Lithuania: a mismanaged repegging could have jeopardized EU accession. Second, given a high level of dollarization in the economy, balance-sheet effects of a surprise repegging might have had a large negative impact, offsetting small gains in competitiveness through picking up the "right" exchange rate. It was believed that the financial and nonfinancial sectors would need at least six months to rearrange their financial strategy so as to minimize balance-sheet effects of the repegging. Third, since the repegging issue was an ongoing topic in public debate, it was thought that announcing in advance the modalities and timing of the repegging would be the best way to reassure the public and reduce uncertainty. Thus, the BoL announced on June 28, 2001—seven months in advance—that the repegging would take place on February 2, 2002, based on the euro/dollar reference rate of the European Central Bank of February 1, 2002. The BoL considered that it was important that cash euros be in circulation by the time of the repegging. The announcement was well received by the markets, as reflected in stable eurobond yield spreads and money market rates (Figure 3). More importantly, discussions on the possibility of the devaluation virtually disappeared from public debate after the announcement.

Figure 3. Financial Indicators, 1994–2002

Three-Month VILIBOR, Deposit and Lending Rates

Yield Spreads Vs. German T-Bond
(in points)

Growth of Litas Broad Money
(year-on-year percentage change)

The repegging operation was successfully and smoothly implemented as scheduled. The initial success of the repegging was predicated on strong economic policies and thorough technical preparations. The passage of the 2002 budget with a deficit of 1.5 percent of GDP continued the three-year period of fiscal adjustment. Advancement in structural reforms and the acceleration of growth boosted economic policy credibility further. Moreover, the repegging exchange rate of $0.8632 per euro was only slightly more appreciated than the average of $0.8962 per euro for 2001, and the authorities and entrepreneurs were generally confident that the economy remained competitive. Despite the dissenting voices of a few politicians on the repegging strategy and isolated complaints by some exporters, public confidence in the CBA with the new reserve currency continues to be strong.

Progress was made in rebalancing financial portfolios. The BoL successfully implemented the carefully elaborated plan of conversion of gross official reserves and the government converted a

major part of its foreign exchange deposits into euros during the week prior to the repegging. The banks' open position in foreign exchange was within the prudential limit at end-March 2002. There is little information, however, on the currency composition of stocks of banks' loans and deposits. The flow data indicate that new loans in euro and litas account for a higher percentage of the total (79 percent) than new deposits in litas and euros (63 percent) (Table 2). Large

Table 2. Currency Composition of New Loans and Deposits, February-April 2002
(In percent)

Loans				Deposits			
LTL	Euro	Dollar	Total	LTL	Euro	Dollar	Total
33.5	45.2	21.3	100.0	55.0	8.1	37.0	100.0

Source: Bank of Lithuania.

corporations appear to be managing the consequences of the repegging better than households and small businesses:

- Large and medium-sized companies. According to commercial banks, most large corporations and many medium enterprises converted their dollar liabilities into euros or litas, and use of hedging instruments expanded significantly, although from a low base. Large corporations indicated that they had started to adjust their financial management well before the repegging, and many liabilities had been converted into euros immediately prior to the repegging. At the same time, companies exposed to trade in products priced in dollars prefer to keep a portion of their liabilities in dollars, which in part explains a relatively large share of dollar denominated loans. However, some companies kept their liabilities in dollars, betting that the euro would appreciate. Moreover, some companies had started to negotiate their exports and imports prices in euros, even in their trade with the CIS, providing a hedge to their operations.

- Small businesses. There is anecdotal evidence that small businesses, lacking access to credit or financial services, remain unhedged to exchange rate fluctuations.

- Households. Leading commercial banks also indicated that more than 50 percent of the stock of mortgage loans at end-March were denominated either in litas or in euros, but deposits of households remained largely denominated in dollars. This means that households who kept their deposits in dollars suffered from unrealized losses associated with the recent appreciation of the euro. Households have been reluctant to convert dollar deposits into euros or litas to avoid early withdrawal penalties, but the view is that they would be gradually converted as they mature.

Financial markets received the repegging well, as evidenced by: a further decline in eurobond spreads (Figure 3); the first issue of a 10-year domestic treasury bond yielding 6.15 percent in March; and the successful placement of a 10-year eurobond of €400 million with a 94 basis point spread over comparable German instruments in April (Figure 3). S&P upgraded Lithuania's rating to BBB in April, recognizing progress in stabilization.

III. THE AUTHORITIES' STRATEGY FOR THE FUTURE

The authorities' current strategy regarding the CBA is to join the ERM2 as soon as possible after accession—which is currently envisaged for 2004—followed by full EMU participation after the minimum period allowed. The authorities' aim is to maintain the current CBA through 2004, when they would have to reach agreement with the EU before joining the ERM2 on the timing and nature of the future monetary arrangement and on the exchange rate. At that time, competitiveness would have to be reassessed.[8] The authorities would like to maintain the current CBA even within the ERM2 mechanism, which, in principle, is consistent with the ERM2, according to the European Union[9], but the EU would have to agree. After a minimum of two years of successful participation in the ERM2 Lithuania could be in a position to join the EMU. The latter step would require full compliance with the Maastricht criteria, and the European Growth and Stability Pact.

The authorities' strategy of maintaining the CBA suits Lithuania's economic and institutional conditions and appears feasible at present, given the current external outlook and provided sound financial policies continue. Many authors[10] conclude that CBAs suit best small open economies seeking integration with large trade areas, provided domestic economic policies support it. A further reorientation of trade and capital flows towards the EU makes a fixed peg to the euro a preferred choice, in order to reduce nominal effective exchange rate volatility. Moreover, a euro peg enhances CBA credibility in the context of EU accession. Finally, Lithuania's CBA has proved to be the major disciplining device for maintaining fiscal and external sustainability, due to its popularity with public opinion. Abandoning the disciplining effects of the CBA might lead to political pressures to adopt an expansionary fiscal policy, macroeconomic imbalances, a loss of credibility, and higher borrowing costs for the private and public sectors, whose gross external financing needs are still large. All these negative effects would harm growth in the medium term.

For this strategy to be viable, a number of conditions need to be met. First, the continuation of a restrained fiscal stance, which is crucial for maintaining macroeconomic balance and boosting credibility. The government's objective of achieving a cyclically balanced budget—excluding the cost of the pension reform—over the medium term would provide sufficient flexibility to deal with cyclical pressures, while anchoring the credibility of the CBA. This objective also appears consistent with containing the current account deficit to no more than 5 to 6 percent of GDP in the near future, which is high but still consistent with external viability, given the strong productivity-led growth potential of the economy and the expectation of large FDI inflows. Finally, restrained fiscal policy has already helped Lithuania move toward compliance with the

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[8] EU membership also requires compliance with some parts of the Stability and Growth Pact.

[9] The Nice European Council endorsed the compatibility of a CBA with the ERM2.

[10] See for example, Frankel (1999), Poirson (2002).

Maastricht criteria (Table 3),[11] and it would facilitate compliance in the future, thereby enabling Lithuania to join the EMU. There is a risk, however, of fiscal slippages in the run-up to the presidential and municipal elections at end-2002. Populist measures such as savings and land restitution, unaffordable tax breaks or large-scale borrowing by municipalities would undermine fiscal sustainability. In this respect, the completion of municipal finance reform is key, and any slippages in this area could lead to a deterioration of the overall fiscal stance, with significant negative implications for the CBA.

Table 3. Performance Against Maastricht Criteria, 2001–04

	Maastricht criteria	2001	2004 Proj.
Exchange rate fluctuations vis-a-vis the euro, percent	15	14	...
General government balance, in percent of GDP 1/	-3.0	-1.7	-0.6
General government debt, in percent of GDP	60.0	27.9	24.7
Inflation, percentage change	best 3 countries +1.5	2.0	3.0
Interest rates 2/	T-bond rate of best 3 countries + 2	6.15	...

1/ For Lithuania reported on a cash basis, not consistent with ESA95.
2/ For Lithuania reported the primary market rate for the 10-year T-bond issued in 2002.

Second, the completion of the current plans for structural reform is of paramount importance for maintaining growth and competitiveness in the medium term. The effective application of newly adopted bankruptcy legislation, a further reduction in red tape through the establishment of new company registration procedures in January 2002, a reduction in bureaucratic obstacles to businesses, and the enforcement of newly adopted accounting laws will improve the business environment and corporate governance, facilitating an efficient allocation of resources in the economy. Since flexibility of the labor market is key to CBA sustainability, the revised labor legislation, promoting minimum wage flexibility and simplified hiring and firing procedures, should be also effectively implemented. Furthermore, the authorities should follow up on Financial Sector Assessment Program recommendations pertaining to banking supervision, insurance and capital markets regulations, and anti-money laundering practices. Finally, the privatization of infrastructure and energy companies and the strengthening of regulatory authorities in these areas should be completed during 2002–03 so as to improve cost-effectiveness of the private sector and remove potential liabilities from the government.

Third, the external environment will continue to have substantial effects on Lithuania through the growth performance in trading partner countries and the evolution of the nominal effective exchange rate, which is exogenous under the CBA. It is expected that Lithuania will make further progress in re-orienting trade to the EU, while strengthening its presence in CIS markets. The increasing share of trade with the EU will reduce the volatility of the nominal effective exchange rate thereby reducing the external vulnerability of the economy. The moderate impact so far on export growth of the slowdown in the EU shows that Lithuania appears to have found its *niches* in vast EU market segments—refined oil products, ready-to-wear clothes, high value-added wood products and furniture, electrical appliances, processed food and beverages—where it has strong comparative advantages (Figure 4). Further penetration into the existing *niches* and possibly entry to others would be needed to strengthen over the medium term the resilience of Lithuanian export growth to slowdowns in the EU.

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[11] Accession countries are not bound by the Maastricht criteria before joining the EMU.

Figure 4. Commodity Composition of Exports by Broad Economic Categories Classification
1996, 2000, and 2001
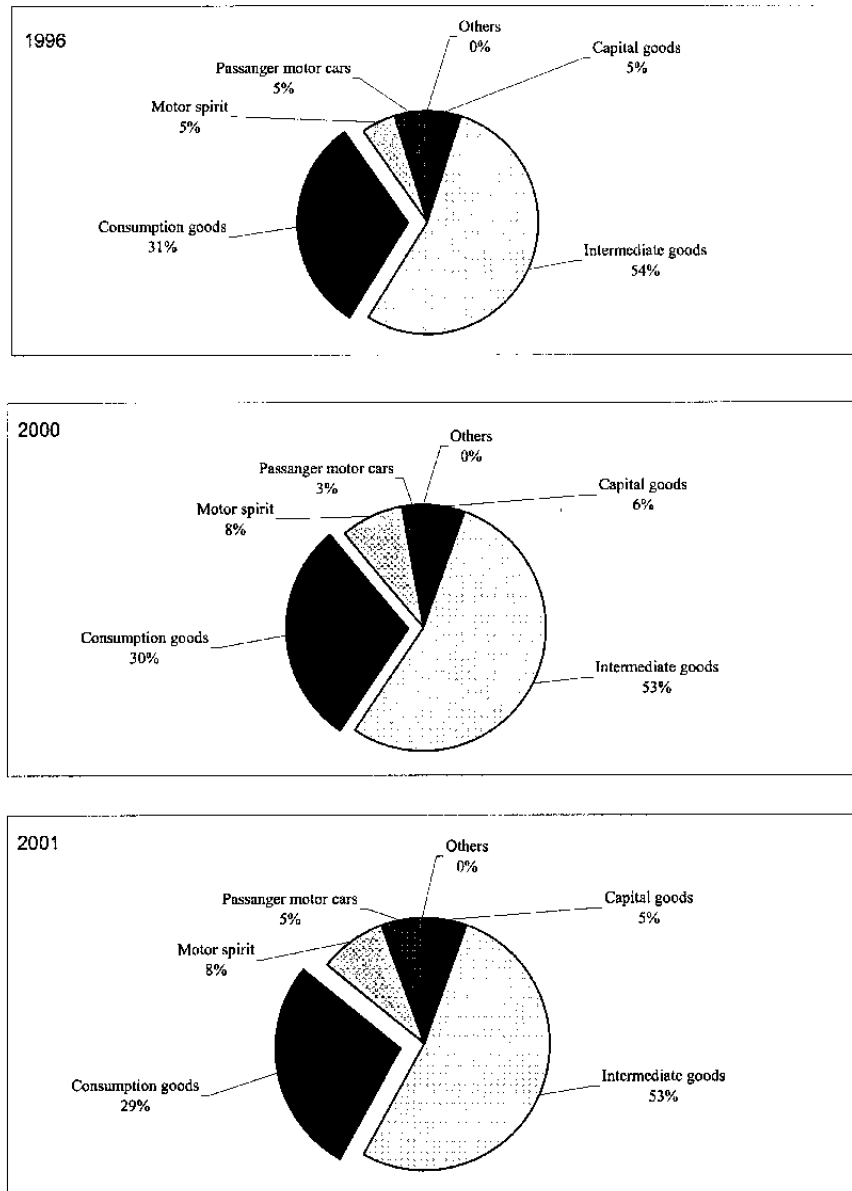
IV. EVOLUTION OF INTERNATIONAL COMPETITIVENESS

In order to gauge whether competitiveness can be maintained in 2002–03, which is key for the viability of the authorities' strategy, it is useful to assess its evolution since 1994. In this section, competitiveness is assessed from different angles. First, several indicators of external competitiveness such as the real effective exchange rate based on the CPI and on export prices are calculated. Second, gains in competitiveness are explained by productivity growth and flexibility of the labor market and prices. Third, the equilibrium exchange rate and misalignments of the observed exchange rate from it are calculated in a cointegration framework.

A. Analysis of Historical Trends

Figure 5. Real Effective Exchange Rate (REER) and Its Permanent Component 1/, 1995M1–2002M2

Real Effective Exchange Rates (REER) and Its Permanent Component

Deviations from the Permanent Component (In logarithms)

1/ The permanent component is calculated using the Hodrick-Prescott filter

Despite a slight depreciation in 2001, the CPI-based REER appreciated by 9.5 percent per year on average from 1994 to 2001 (Figure 1). Lithuania's CPI-based REER was on a steadily appreciating trend until late 1998, when the Russian crisis and the concomitant deep devaluation of the Russian ruble pushed the index sharply up by 13 percent within six months. After a short-lived easing, the index was driven up significantly mainly by the appreciation of the U.S. dollar in particular vis-à-vis the euro, reaching its peak in October 2000. Subsequently, the REER depreciated by about 1.5 percent through December 2001, as the euro recovered somewhat (Figure 1). This only partially reversed the REER appreciation of 2000. During the period under review, the REER moved around its underlying permanent component[12] (Figure 5) with fluctuations contained within a range of less than 5 percent.

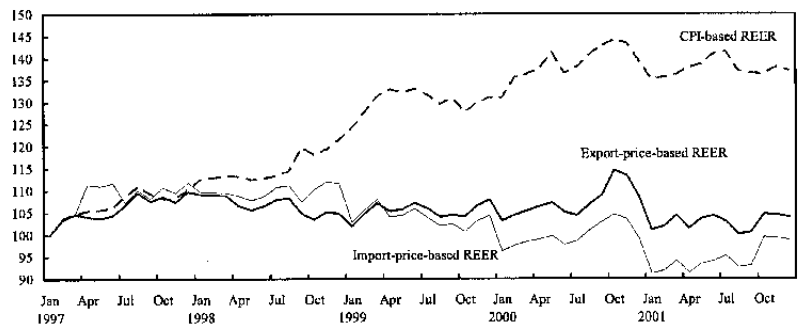While the CPI-based REER showed a protracted appreciation, both the export-price- and import-price- based REER have

demonstrated remarkable stability since 1997. This stability of both indexes means that Lithuania' export and import prices moved broadly in line with those of trading partners (Figure 6). In particular, Lithuania's dollar export prices have declined markedly since 1997 in line with the euro appreciation, which allowed Lithuanian exporters to remain competitive and expand volumes. The decline in dollar import prices similar to those of trading partners benefited Lithuania's producers in

Figure 6. Real Effective Exchange Rate (REER), 1997–2001 (1997 M1=100)

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[12] The permanent component of the REER was estimated by applying the Hodrick-Prescott (HP) filter to monthly REER series for the period January 1995-February 2002 and projections for the period March 2002-December 2002, using an ARIMA (1,1,0) model. Projections are used to avoid end-period distortions induced by the HP filter when only historical data are considered (Kaiser and Maravall (1999)).

terms of input costs. Given the improving profit margins in the manufacturing sector (Figure 7), Lithuania's exporters could reduce export prices in line with trading partners, because productivity increased. High productivity growth in the tradable sector explained the divergence between the CPI-based REER, including a large share of non-tradable goods, and the export-based REER, owing to the Balassa-Samuelson effect. In addition, the improvement in terms of trade[13] reflected in a faster decline of import prices than export prices (Figure 8) added to the CPI-based REER appreciation, because the latter could also be defined as a ratio of non-tradable prices over import prices.

Figure 7. Indicators of External Competitiveness, 1995–2001

Market Shares in EU, 1995–2001 (1995 Q1 = 100)

Market Shares in CIS, 1995–2001 (1995 Q1 = 100)

Export Expectations for the Next 3–4 Months

Gross Profit Margin Manufacturing Sector (In percent)

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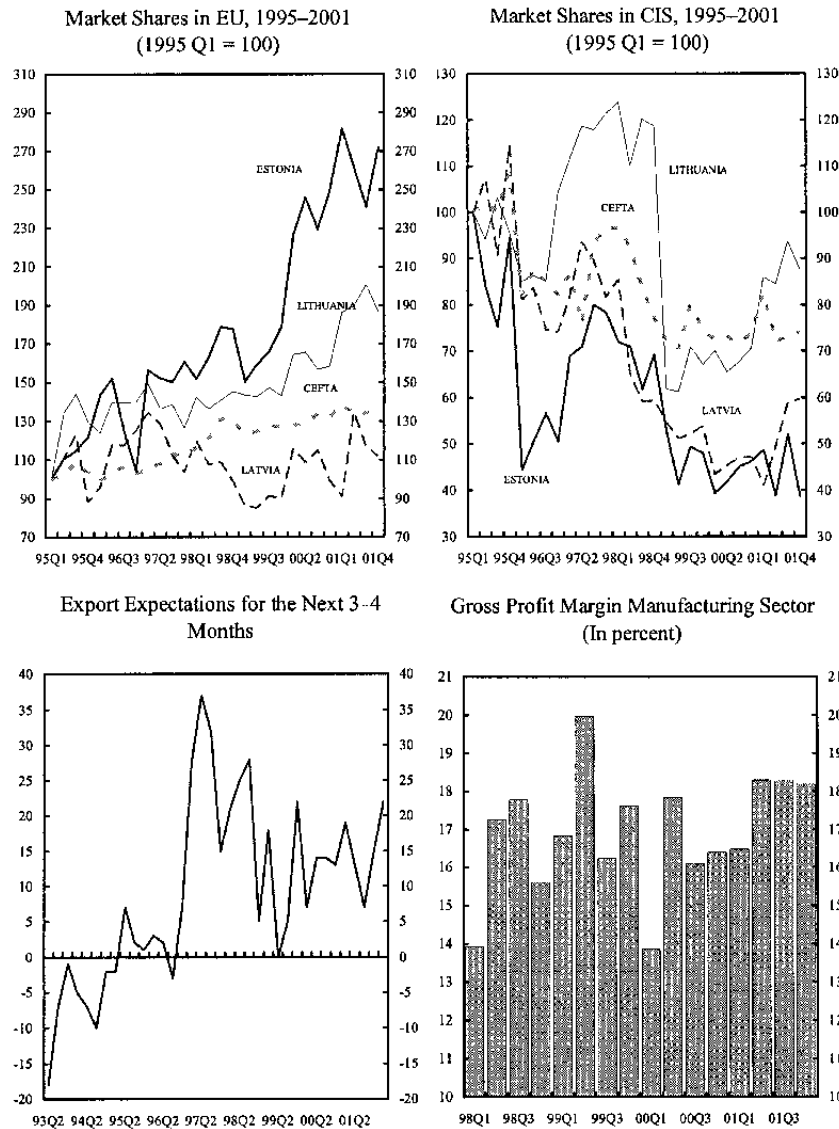
[13] Given the short series of terms of trade, it is impossible to determine whether terms of trade shocks were permanent or transient in nature, thus their medium-term impact on REER and competitiveness could not be definitely determined (Cashin and McDermott (2002)).

Figure 8. Terms of Trade for Non-energy Goods, 1997–2001
(1996=100)

97 97 97 97 98 98 98 98 99 99 99 99 00 00 00 00 01 01 01 01
Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4
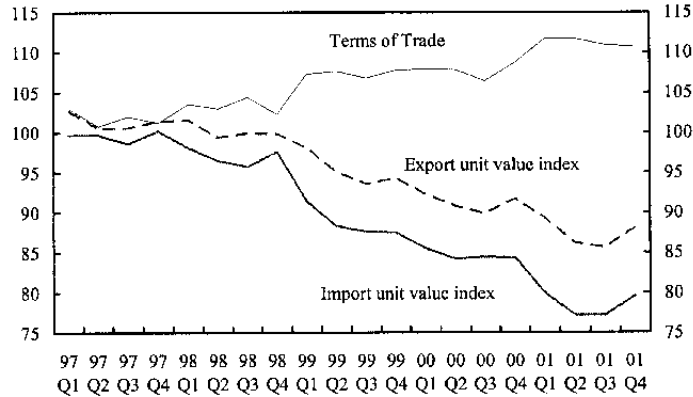
Despite an annual average appreciation of the CPI-based real effective exchange rate of 9.5 during the period under review, Lithuania's good export performance was sustained. Lithuania's non-energy exports in U.S. dollar terms grew at an annual average rate of 14 percent in the years prior to the Russian crisis. Exports suffered a severe setback in 1998 in the aftermath of the crisis and bottomed out in early 1999 (Figure 1), given that a large share of exports (46 percent in 1997) was oriented to the CIS countries. During 2000–01, exports staged a strong recovery, owing to the capacity of exporters to reorient export to EU countries (Figure 1). Business confidence indicators showed a sustained optimism among exporters since early 1999, coinciding with a recovery of the profitability in the manufacturing sector, the main exporting sector in Lithuania, during the same period (Figure 7).

B. Productivity Growth and Structural Reforms

Supply-side and structural factors need to be taken into account to understand how competitiveness was sustained. Data on labor and value added by sectors suggest that labor productivity growth in the economy averaged about 5 percent per year (Figure 9), while in tradable sectors it averaged 11 percent per year during 1995–2001 (Figure 10). This demonstrates that the Balassa-Samuelson effect contributed to the explanation of the competitiveness of Lithuanian producers.

Figure 9. Wages, Productivity, and Unit Labor Costs, 1994–2001
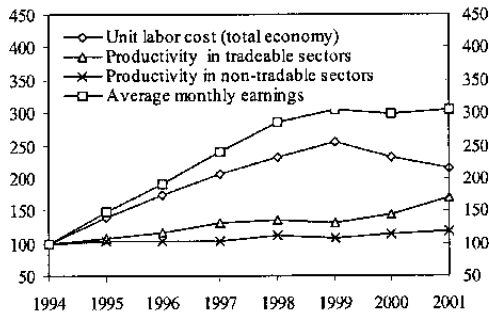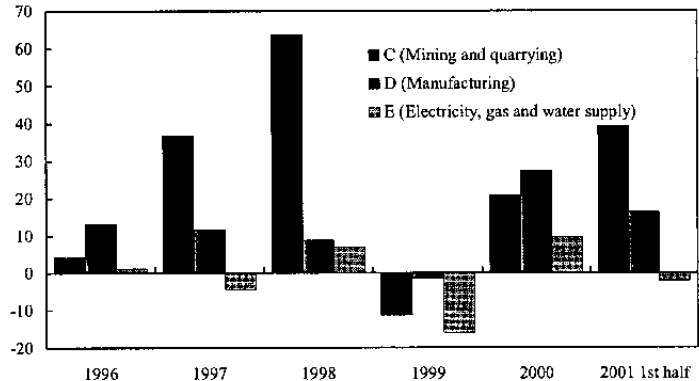(1994=100)

Figure 10. Changes in Gross Value Added per Employee per Working Hour, 1996–2001
(percentage change at constant prices of 1995)

This productivity growth was due to progress in structural reforms. Lithuania had adopted by 1994 a critical mass of first-generation market-oriented reforms (price liberalization, liberalization of current and capital account transactions, the beginning of privatization, and trade policy reforms), which contributed to growth during 1995–98. However, second-generation structural reforms started to lag behind during 1994–99, in particular by the end of this period, slowing down somewhat the productivity growth potential.[14] In 2000–2001, the acceleration of structural reforms and technological and managerial restructuring of private companies, spurred by the appreciation of the REER and the reduced access to CIS markets, led to a significant increase in productivity growth (Figure 9). This also was accompanied by substantial labor shedding.

Prices and wages remained flexible, with moderate wage growth despite productivity gains. The nominal effective appreciation of the litas put pressures on exporters to reduce costs, including the wage bill. The combination of stagnant wages and growing productivity resulted in a substantial decline in unit labor costs during 2000–01, further boosting the competitiveness of Lithuanian exporters (Figure 9). The moderation in wage growth was also possible because of the low bargaining power of the nonunionized labor force. In addition, the policy of wage moderation in the civil service, with nominal wages even declining in 2000, restrained wage growth further.

C. The Equilibrium Exchange Rate

The equilibrium real exchange rate rose sharply during 1994–2001. This appreciation reflected mainly faster productivity growth in the tradable sector with respect to the non-tradable one, and the downward tendency of the net foreign assets position, mainly related to increased demand for Lithuania's assets. Moreover, fluctuations of the observed exchange rate around its equilibrium are estimated to have remained within a range of 13 percent over the entire period.

The estimation of the equilibrium exchange rate is based on a theoretical framework that encompasses the Balassa-Samuelson hypothesis and the balance of payments approach to the determination of the equilibrium exchange rate. Following the illustrative model proposed by Alberola and others (1995) (Annex II), two main determinants of the real effective exchange rate are identified, the stock of net foreign assets and the relative sectoral prices between countries.[15] Using an unobserved component decomposition in a cointegration framework, a time-varying real equilibrium exchange rate is identified, together with misalignments of the litas.

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[14] World Bank (1998).

[15] In the context of modeling the real exchange rate of countries with a currency board, real interest rate differentials (a standard determinant of the equilibrium exchange rate) are likely to be of little relevance, because it is expected that domestic interest rates converge to world interest rates at least in the medium term. However, interest rate spreads are systematically monitored to assess the financial situation and credit standing of the country.

The analysis has been conducted using quarterly data of the CPI-based REER, the net foreign assets position normalized by the gross domestic product in order to adjust for the size of the country,[16] and the index of the relative sectoral prices constructed as the ratio of the consumer price index to the producer price index. The time period under consideration is 1994Q1–2001Q3.[17] The results must be interpreted with caution given the limited length of the time series available and possible measurement problems with the balance of payments data, in particular at the beginning of the period under review. Figure 11 displays the historic series and Figure 12 shows the results.[18] The top panel of Figure 12 displays the actual and the equilibrium effective exchange rates, and the panel at the bottom presents deviations from the equilibrium, which are the differences between the actual and the estimated equilibrium rates. The computed 95 percent standard errors bands are also reported. Positive values suggest an overvaluation of the real effective exchange rate.

Over time, the estimated equilibrium exchange rate appreciated sharply, by almost 100 percent from the first quarter of 1994 to the third quarter of 2001. From the beginning of the period until the last quarter of 1998, the tendency of the equilibrium exchange rate to appreciate was fairly smooth, with a slight reversion in this trend from 1998, changing again starting with the second quarter of 2000. This secular appreciation reflected the fundamentals of the Lithuanian economy. In fact, the determinants of the equilibrium exchange rate (Figure 11) suggest that this behavior reflects mainly the pattern of productivity in the tradable sector relative to the non-tradable one, as indicated by the sectoral price differential. It is important, however, to note that the index is heavily affected by the behavior of administered prices (in particular housing and utilities), which increased substantially during 2000–01, independently from the productivity across sectors, and to a certain extent by oil price movements.

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[16] The evolution of the net foreign assets position was obtained by adding up the current account balances. The initial stock of net foreign assets was provided by EDSS.

[17] It is not possible to use data from the early 1990s based on the model. First, before 1994 the data availability for Lithuania and some of its trading partner countries is very limited. Second, the methodology is based on the assumption of functioning markets, which did not hold in the early 1990s due to insufficient progress in transition.

[18] Before proceeding with the multivariate analysis (Table 4), the stationarity characteristics of the series have been tested performing augmented Dickey-Fuller and Phillips and Perron tests. The results indicate that the hypothesis that the variables are integrated of order one cannot be rejected.

Figure 11. Real Effective Exchange Rate and Its Determinants 1/
1994Q1–2001Q3

Real Effective Exchange Rate
(Q1 94 = log100)

Stock of Net Foreign Assets Normalized by Gross Domestic
Product
(In percent)

Index of Relative Prices of Non-Tradable versus Tradable Goods
(Q1 94 = log100)
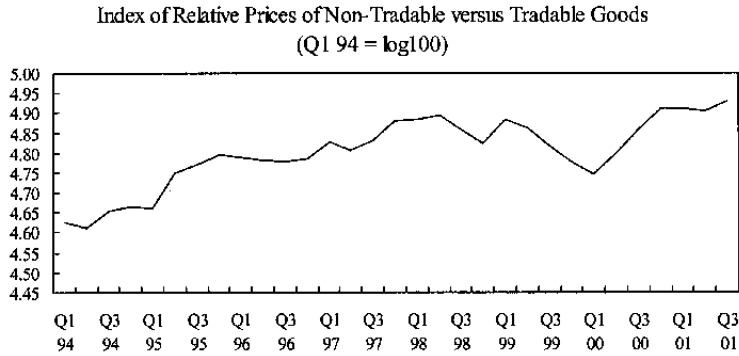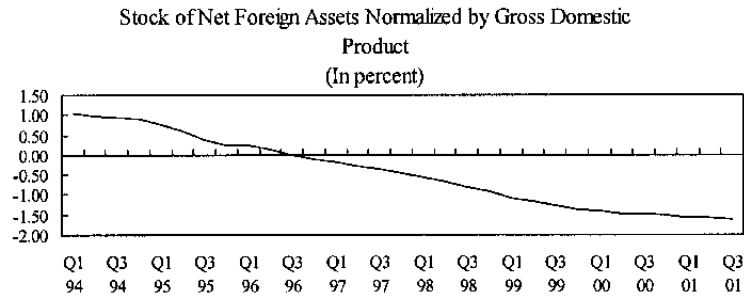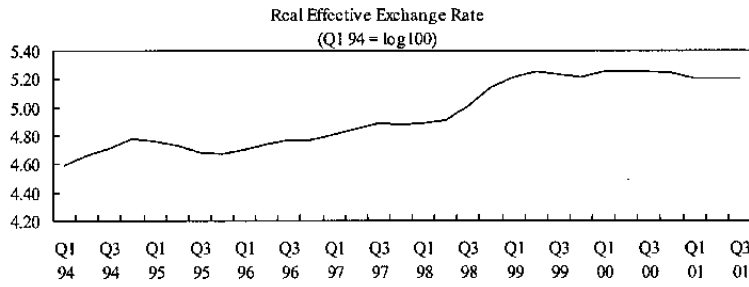
1/ Data are seasonally adjusted.

Table 4. Cointegration Analysis Results

Ho: r <=		Eigenvalues	Trace	8-max	Critical Value	10%
	2	0.13	4.03	4.03	6.5	6.5
	1	0.28	13.44	9.41	15.66	12.91
	0	0.45	30.65	17.21	28.71	18.9

	Cointegrating Vector	Loading matrix	
[q nfa n]$_t$'			
	1.00	-0.14	(0.05)
	0.17	-0.003	(0.07)
	-1.02	0.08	(0.05)

Tests on residuals
Stationarity tests (c.v. 5.99):	25.5	27.9	24.8
Exclusion tests (c.v. 3.84):	13.9	16.3	14.9
Homogeneity (c.v. 3.84):	16.64		

Note: standard errors in brackets.

The downward tendency of the net foreign assets position would also contribute to the equilibrium exchange rate appreciation. By contrast with the empirical evidence for many other countries, the net foreign assets position enters in the long-run relation with a negative sign (Annex II). This behavior could be attributed to the fact that, for the period under consideration, the current account deficit was financed by increased demand for Lithuania's assets, since the country started with a very small liability position at the beginning of the period and offered good potential opportunities for foreign investors ready to enter an attractive small open economy with high productivity growth, relatively cheap labor costs, and a stable macroeconomic environment.

The REER has fluctuated around its equilibrium level, in line with the Hodrick-Prescott results (Figure 5); fluctuations, remained within a range of 13 percent (Figure 12, bottom panel, and Table 5). After an initial period of overvaluation, the REER started to depreciate in mid-1995, and for a period of approximately two and a half years, starting with the last quarter of

Figure 12. Real Effective Exchange Rate and Its Equilibrium,
1994Q1–2001Q3

Real Effective Exchange Rate (REER) (Q1 94 = log100) and its Equilibrium (ERER) (Q1 94 = log100)

1994Q1 1994Q4 1995Q3 1996Q2 1997Q1 1997Q4 1998Q3 1999Q2 2000Q1 2000Q4 2001Q3

Deviations from Equilibrium (difference in logarithms)

1994Q1 1994Q4 1995Q3 1996Q2 1997Q1 1997Q4 1998Q3 1999Q2 2000Q1 2000Q4 2001Q3
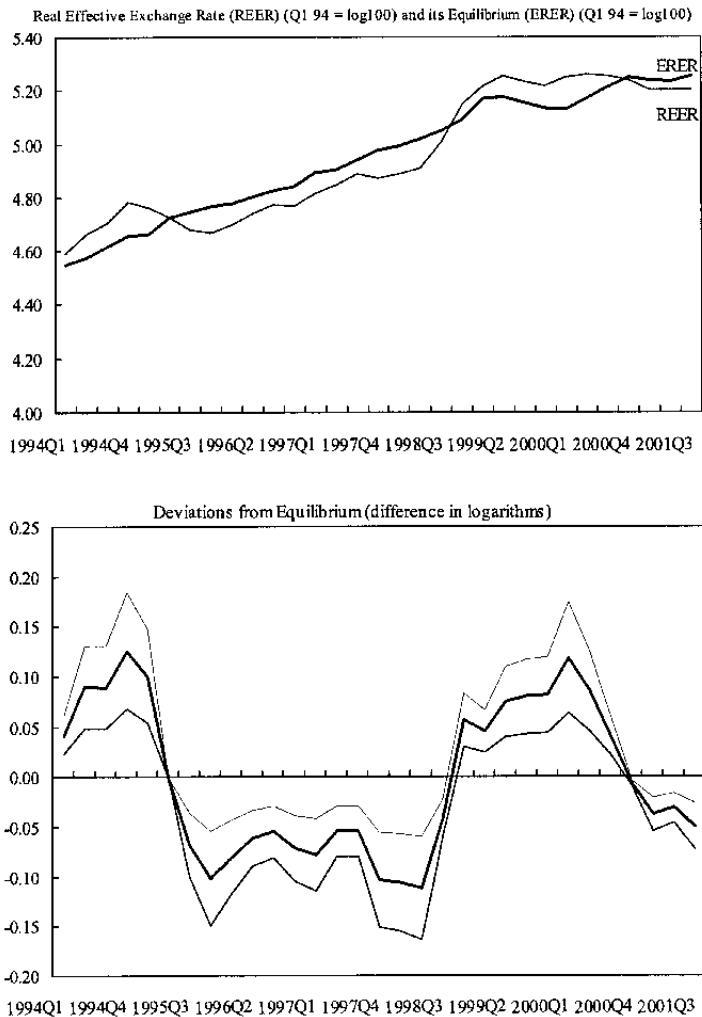
1995, it maintained an undervalued position, as inflation declined sharply. The most protracted period of overvaluation started in the last quarter of 1998, following the Russian crisis, and lasted for about six quarters. It must be noted that, during this period, the dollar, and consequently the litas, appreciated substantially vis-à-vis the euro, after the introduction of the latter in January 1999. This behavior started to revert approximately after the second half of 2000, and by the end of year the REER reached its equilibrium level. In the subsequent months, the REER continued to depreciate moderately, so that by the third quarter of 2001 it appeared to be undervalued by about 5 percent with respect to its equilibrium.

Table 5. Misalignments of Real Effective Exchange Rate
(REER) from the Equilibrium Level, Q4 1994–Q3 2001
(In percent)

	Point estimate	Standard deviation
Q4 1994	13	(2.9)
Q3 1995	-7	(1.5)
Q3 1995	-10	(2.3)
Q2 1998	-11	(2.5)
Q4 1998	6	(1.3)
Q1 2000	12	(2.7)
Q4 2000	-1	(0.2)
Q3 2001	-5	(1.1)

Source: Fund staff estimates.

Thus, it appears that the Lithuanian economy managed to preserve its competitiveness under the CBA, and was able to cope with periods of crisis, such as 1998–99, when the real appreciation of the exchange rate was particularly sharp and misalignments from its equilibrium were among the highest experienced during the entire period. The main elements underpinning competitiveness were strong productivity growth due to structural reforms and labor shedding, and the great capacity of the economy to reorient exports as needed. At end-September 2001, the econometric analysis suggests that REER was slightly undervalued relative to its estimated equilibrium level, and we can assume that this assessment remained valid at the time of the repegging four months later, given similar conditions, in particular exchange rates and inflation. It should be noted that the estimated deviations from the long-run trend of the REER were short-lived and they were not large, suggesting that the self-correcting mechanisms of the CBA operated unfettered, as wages and prices adjusted to their underlying value. The strong export and GDP growth during 2000–01 suggest that the self-correction mechanism did not impose a high output cost for correcting the REER misalignments.

V. IMPACT OF EXTERNAL SHOCKS ON THE LITHUANIAN ECONOMY

For the authorities' strategy to be viable for the next few years, not only would the authorities have to continue pursuing sound economic policies but they would also have to be able to cope with external shocks. We examine first the impact of different degrees of appreciation of the euro vis-à-vis the dollar, the most likely external shock, and then assess the resilience of the Lithuanian economy to these and other shocks.

A. Alternative Scenarios Following a Euro Appreciation

An appreciation of the euro relative to the dollar represents the major potential external shock. Three scenarios are presented to quantify the impact of different assumptions on the appreciation of the euro on the REER index of Lithuania for 2002–03. Under the baseline scenario, the euro/dollar rate is assumed to appreciate by 10 percent during 2002–03. Under the worst-case scenario, the euro is assumed to appreciate vis-à-vis the U.S. dollar by about 30 percent to return to its highest historical level by end-2003. In addition, under a middle-case scenario, it

Table 6. Key Assumptions for Simulation of Lithuania's Effective Exchange Rates

		2001	2002			2003		
			Baseline	Middle-case	Worst-case	Baseline	Middle-case	Worst-case
Nominal exchange rate (national currency/ U.S. dollar, except for euro)								
Lithuania	Trade weight 1/	4.00	4.20	4.01	3.83	4.41	4.02	3.73
Euro area 2/	45	0.89	0.94	0.98	1.02	0.98	1.08	1.16
CIS 3/	25	30.14	32.39	32.39	32.39	34.80	34.80	34.80
Other 4/	30	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CPI (eop, %)								
Lithuania		1.34	2.00	1.50	1.00	2.00	1.50	1.00
Euro area		2.73	1.40	1.40	1.40	1.60	1.60	1.60
CIS		20.59	13.47	13.47	13.47	10.44	10.44	10.44
Other		9.31	7.27	7.27	7.27	5.97	5.97	5.97

1/ Trade weights are calculated based on the average trade shares during 2000–01.
2/ For the Euro area, the exchange rate is presented as U.S . dollars per euro.
3/ Russian ruble is used and projection for 2002 is based on Consensus Forecast
4/ Exchange rate movement is assumed to be in line with U.S. dollar.

is assumed that the euro/dollar rate would appreciate by 20 percent by end-2003. The differences between the scenarios are confined to the two variables—the litas/dollar rate and CPI inflation rate in Lithuania—with other assumptions and policies unchanged (Table 6). While these assumptions are rather strong, they highlight very transparently the direct impact of different euro/dollar rates.

The three scenarios generate an annual rate of real appreciation below the average experienced in 1994–2001, as well as below the projected values of the HP filter (Figure 13). Under the baseline scenario, the REER would depreciate by 0.6 percent in 2002 and then a further 1.5 percent in 2003 (Figure 13). Under the worst-case scenario, it would appreciate by almost 5 percent in both years (Figure 13). Under the middle-case scenario, there would be some real appreciation in both years, but at a slower pace than that under the worst-case scenario (Figure 13). In all scenarios, the rather sizable inflation rate differentials between Lithuania's trading partners outside the euro area and Lithuania would partly offset the euro-induced nominal appreciation in all three scenarios.

In the worst case scenario, the required productivity growth in the tradable sector should be about 13 percent per year, which would lead to 7 percent economy-wide productivity growth, to sustain competitiveness, based on the analytical framework presented by De Broek and Slok (2001). While these growth rates are consistent with Lithuania's recent experience, supporting macroeconomic and structural policies should be firmly in place to avoid a loss of competitiveness. To the extent productivity growth did not materialize there would be an output cost arising from a 30 percent appreciation of the euro.

B. Resilience of the Economy to External Shocks

The Lithuanian economy should be able to cope with a cumulative real effective appreciation of the litas of about 10 percent over 2002–03 for a number of reasons. First, the medium-term
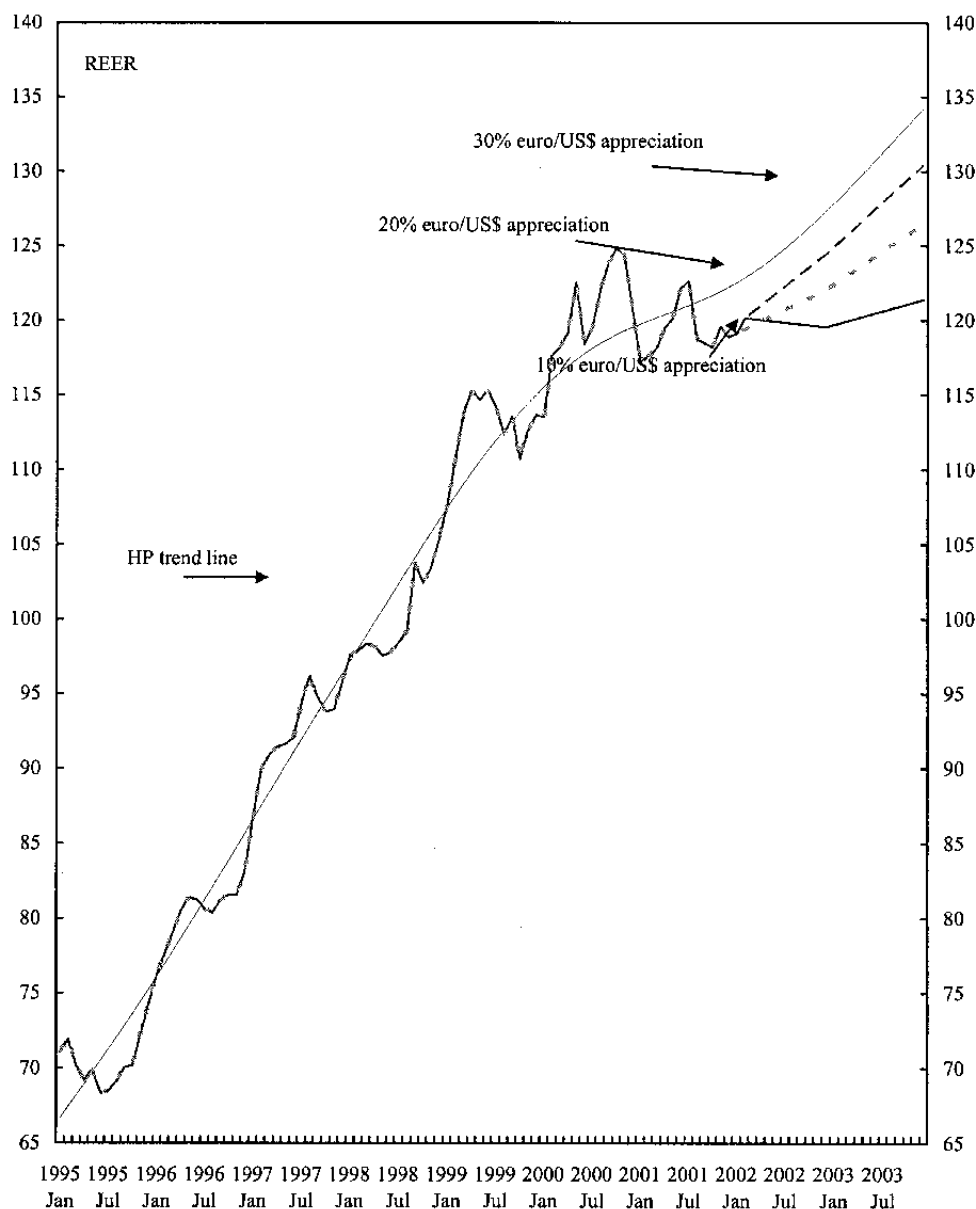
- 24 -

Figure 13. Simulation of Real Effective Exchange Rate (REER) under Different Scenarios for 2002–03
(1998 = 100)

productivity growth trend, which would be reinforced by further progress in structural reforms,[19]
a significant pick-up in investment and additional effects of cyclical improvements in
productivity during 2002–03 would be sufficient to keep the economy competitive under the
worst case 10 percent real appreciation. Second, prices, wages and employment should be
flexible enough, as shown by past experience, to offset to a significant degree spikes in the
nominal effective exchange rate appreciation.[20] All these arguments back the presumption that

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[19] An impressive reform agenda is planned in connection with EU accession.

[20] The share of structural unemployment is likely to remain high in the medium-term and
exchange rate fluctuations would have a marginal impact on the size of structural unemployment.

the Lithuanian economy would be able to achieve sustainable growth over the next 18 months under the present exchange regime even in the face of such adverse developments.

A capital account or financial crisis could undermine the CBA, but their likelihood in 2002–03 would be low provided the authorities pursue appropriate financial policies and continue to improve financial system supervision. The external liquidity situation appears strong with short-term net foreign assets of the economy being positive. Moreover, large scale capital outflows are unlikely as most foreign investments are in the form of FDI or government securities placed abroad. Nevertheless, the large gross external financing needs of the government and the private sector would require the continuation of market access at low spreads to ensure debt sustainability. In this context, the credibility enhancing effects of restrained fiscal policy and a highly liquid position of the government are the major conditions for external viability. Finally, the recent Financial Sector Assessment Program concluded that the Lithuanian financial system would be resilient to shocks commensurate with its historic experience, and only a significant deterioration in the situation of foreign parent banks can potentially cause stress in the Lithuanian banking system. This conclusion should not lead to complacency, as the financial system evolves rapidly. A significant increase in mortgage finance and its impact on real property values should be carefully watched. Moreover, a rapid pick-up in credit growth is increasing the riskiness of bank assets and supervisory authorities should carefully assess banks' risk management strategy. Finally, a wider use of OTC derivatives warrants the development of supervisory capacity in this area.

VI. CONCLUSION

The CBA has served Lithuania well since its inception. It encouraged adjustment in an unstable political environment with populist pressures, which, in turn, strengthened credibility and provided renewed impetus to EU accession negotiations, whereas an exit and probable subsequent devaluation under pressure in 1998–99 might have led to fiscal slippages and have set the whole EU process back. The Lithuanian authorities have also proved successful in adapting to increasing economic integration with the euro area and in implementing their repegging strategy. They have recently announced a strategy for the future that appears viable under current polices/external prospects.

Looking ahead, the ability to cope with competitiveness pressures and a low likelihood of financial and capital account crises provide reassurance regarding the sustainability of the CBA during 2002–03. The CBA appears well placed to withstand possible competitiveness pressures or disturbances emanating from the financial system. Even shocks moderately outside the range of the presented scenarios would not warrant changes in the CBA setup before joining ERM2, especially given the relatively short period of time that is envisaged. If the assumptions and policies underlying the projections were to materialize, the Lithuanian authorities would have strong arguments in favor of maintaining the current CBA in ERM2 from 2004 to 2006. In any event, the authorities would have an opportunity to reconsider the monetary arrangement at the time of joining ERM2.

Structural Reforms in 2000–01

Fiscal structural reforms:
- New organic budget law*
- Completion of staged Treasury modernization, involving single Treasury account
- Reorganization of the customs department on the basis of EU best practices
- Approval of internal audit manual by Ministry of Finance (MOF)
- Creation of two departments at MOF to coordinate and monitor EU-related financial issues
- Seimas instituted a Reserve Stabilization Fund*
- Monthly reporting and monitoring of arrears by a cabinet level commission*
- Approval of legislation to more clearly define municipal expenditure obligations related to state-delegated functions*
- Audit of 30 municipalities by State Controller*
- Pricing, reimbursement, and procurement of pharmaceuticals were changed and a government resolution on arrears of the Health Insurance Fund adopted
- Amendments to the law on excise duties to harmonize treatment with EU
- New VAT law in line with EU requirements was submitted to Seimas in December (and passed in February 2002)*
- New CIT law broadening the tax base and reducing the rate was passed in December*
- Pension reform concept was submitted to Seimas in December*
- Entry into force of amendments to the law on tax administration relating to audit, sanctions, enforcement and postponement of debts

Corporate governance:
- Approval of new laws on accounting, financial reporting and consolidated financial statements*
- Abolition of price controls instituted in the wake of the Russian crisis*
- Approval of new bankruptcy and enterprise restructuring laws, with more flexible and rapid procedures
- Entry into force of new law on companies, with greater protection of shareholders and creditors
- Approval of law on corporate registry, providing for publication of annual financial statements

Labor and social protection:
- Approval of amendments to labor legislation, providing for more flexibility in employment contracts and severance
- Approval of amendments to the law on civil service to ease dismissal/recruitment procedures
- Ratification of European Social Charter
- Establishment of a guarantee fund for employees of bankrupt companies, in line with EU directives and ILO conventions

Energy sector:
- Energy price adjustments and restoration of profitability of major utility companies
- Entry into force of new electricity and gas laws, providing for liberalization of markets and strengthening of regulatory independence
- Approval of Ignalina decommissioning program

- Framework agreement signed with the European Bank for Reconstruction and Development on Ignalina decommissioning support fund

Foreign Trade:
- Abolition of export taxes*
- Accession to the WTO and reduction of conventional duties for 20 groups of imports
- Signing of free trade agreements with Bulgaria and Romania (remaining CEFTA countries)

Privatization:
- Sale of a 25-percent stake in Lietuvos Telekomas.
- Sale of the Savings Bank*
- Sale of the Development Bank*
- Sale of Lithuanian Shipping Company
- Conclusion of tender for sale of Lithuanian Agriculture Bank*
- Announcement of tender for sale of stake in Lithuanian Gas to strategic investor
- Approval of restructuring plan for Lithuanian Electric, a precondition for privatization
- Selection of advisors for restructuring and privatization of Lithuanian Airlines
- Approval of reorganization of Lithuanian Railways, with a view to restructuring and privatization
- Sale of 676 objects (through November 1, 2001) with receipts of LTL 440 million

Financial sector:
- Approval of amendments to the law on the BOL, strengthening central bank independence in line with EU requirements
- Amendment of the law on deposit insurance, in line with EU directives
- Amendment of the law on insurance to liberalize provisions for investment abroad and for access to transport insurance (WTO)

Other legislation/legal developments:
- Entry into force of the new civil code
- Adoption of amendments to the law on restitution to speed up completion of land restitution
- Commencement of operations of two-tier administrative court system
- Approval by Seimas of a national anti-corruption program (strategy, law and action plan) Entry into force of new legislation on trademark protection and intellectual property rights; ratification of World Intellectual Property Organization (WIPO) copyright treaty
- Entry into force of the law on consumer protection

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* Covered by Fund conditionality.

The Theoretical Framework and the Empirical Model

The concept of long-run or equilibrium real exchange rate has been addressed in a vast literature. One standard and traditionally used method of assessing currency valuation is the purchasing power parity (PPP) hypothesis. This approach implies a constant equilibrium exchange rate, as it posits that there is an underlying tendency for movements in the nominal exchange rate to offset inflation differentials with country's trading partners, such that deviations from the equilibrium real exchange rate will be transitory. However, long-run exchange rate deviations from its PPP equilibrium can be induced by several factors. Among others, these include technical progress, or more specifically, productivity differentials, which change the relative prices of tradable to non-tradable goods in the economy, and the lack of perfect substitution between tradable goods produced in different countries. As a result, two main lines of research on determination of the real exchange rates were developed. The first emphasized the sectoral (tradable/non-tradable) balance of the economy and the second dealt with the underlying net foreign asset position of the country.

In a given economy, productivity growth in the open or tradable goods sector is usually higher relative to that of the closed or non-tradable goods sector. Under perfect labor mobility, wages tend to be roughly the some across sectors, and hence faster productivity growth in the tradable goods sector pushes up wages in all sectors. This in turn increases the prices of non-tradable goods. As a result, in a two-economy world, inflation would be higher in the economy with higher productivity growth, which would experience a secular appreciating CPI-based REER. This is the Balassa-Samuelson hypothesis stripped to its bare essentials.

Whereas the Balassa-Samuelson hypothesis assumes that tradable goods produced in any two countries are perfect substitutes, and hence that the nominal exchange rate adjusts to changes in tradable prices in order to equalize prices when measured in a common currency, the lack of perfect substitution between traded goods may also lead to deviations from the PPP. Theories in this area have focused on the trade balance as the main determinant of the exchange rate, with capital flows being treated as exogenous factors. With financial liberalization and the increasing volume of international trade in financial assets, modern exchange rate models emphasize financial-asset markets and the role of the exchange rate as one of many prices in the worldwide financial markets. Following these theories, the trade flows have still a useful role in asset-approach models, since trade flows have implications for financial-asset flows. In fact, the exchange rate must be consistent with a balance of payment position where a current account is financed by a sustainable flow of international capital. A country running a current account deficit or surplus will accumulate or de-cumulate net assets, and such imbalances would be due to the relevant propensities to save and invest in the respective countries, and it is assumed that such factors are not influenced by exchange market developments. In the long run, however, when agents' assets are at their desired level, the current account should be balanced (Mussa (1984), Frenkel and Mussa (1985)).

The model used in our analysis (Alberola and others (1999)) encompasses both perspectives on exchange rate determination. The starting point is the decomposition of the exchange rate into two different relative prices, the price of domestic relative to foreign tradable goods, and the relative prices of non-tradable goods relative to tradable goods within each country. Each component is related to one of the models reported above. The first component incorporates the

concept of productivity differential as in the Balassa-Samuelson hypothesis, and since these prices determine the allocation of resources within the economy, it is associated with the internal equilibrium of the economy. The second component captures the competitiveness of the economy and determines the evolution of the net foreign assets position, and it is therefore associated with the external equilibrium of the economy. The long-run solution of the model represents an equilibrium value for the real exchange rate consistent with the internal and the external equilibria of the economy.

Assuming that there are two countries in the world, each producing a tradable good (T) and a non-tradable good (N), the REER (q) in logarithm terms can be defined as

$$q = s + p - p^* \tag{1}$$

where p and p^* are the domestic and the foreign consumer price indices (CPI), respectively, and s is the nominal exchange rate. For each country, the CPI, which is formed by prices of domestic and foreign tradable goods and non-tradable goods, can be expressed as follows

$$p = (1 - \alpha_T - \alpha_N)p_T + \alpha_N p_N + \alpha_T(p_T^* - s)$$

$$p^* = (1 - \alpha_T^* - \alpha_N^*)p_T^* + \alpha_N^* p_N^* + \alpha_T^*(p_T - s),$$

where the αs determine the share of each good in the consumer price index. Substituting these expression in (1), we obtain

$$q = (1 - \alpha_T - \alpha_T^*)(p_T + s - p_T^*) + \alpha_N[(p_N - p_T) - (p_N^* - p_T^*)]$$

where the weights of non-tradable goods for the two countries are assumed to be the same, and the lack of perfect substitution between tradable goods between different countries is also considered. The latter expression indicates that the exchange rate is determined by two different components: the evolution of relative prices of domestic to foreign tradable goods, $q_x = (p_T + s - p_T^*)$, which reflects the external dimension of the economy; and the behavior of non-tradable goods relative to tradable goods across countries, $q_I = [(p_N - p_T) - (p_N^* - p_T^*)]$,

which relates the internal dimension of the economy. Thus, the equilibrium exchange rate ($\bar{q}$) implies both external and internal equilibrium.

The external equilibrium. The external balance clears the tradable goods market, and is characterized by the achievement of a desired stock of net foreign assets. The evolution of the current account balance, which determines adjustments to the equilibrium, leads to an accumulation of net foreign assets. The current account balance (*ca*) is defined as the trade balance (*x*) *plus* the net income received or paid by residents (r^*) on foreign asset holdings (*nfa*): $ca = x + r^* nfa$ expressed in real terms. The trade balance depends on the evolution of the external real exchange rate,[21] namely $x = -\gamma q_x$, and the current account adjusts to the difference

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[21] An appreciation of the external exchange rate ($q_x > 0$) will worsens the competitiveness of the domestic products and consequently the trade balance, when the Marshall-Lerner condition holds.

between the current and the desired level of net foreign assets (Mussa (1984)), so that a current account surplus would reflect a net foreign asset position below the desired level

$$ca = \eta(\overline{nfa} - nfa)$$

In the long run, $\overline{nfa} = nfa$, and the equilibrium external exchange rate can be defined as follows

$\overline{q}_x = (r^* / \gamma)\overline{nfa}$ where the bars over the variables indicate long-run equilibrium values.

The internal equilibrium. The evolution of the internal real exchange rate is determined by the different behavior of sectoral relative prices between countries, which in turn are related to the evolution of sector productivity. Starting from the productivity hypothesis, it can be shown that

$$\overline{p}_N - \overline{p}_T = \mu + (y_T - y_N)$$

where the y's are the average sectoral productivities (see Obstfeld and Rogoff (1996) among others, for an illustration of the Balassa-Samuelson effect). Neglecting constant terms, it follows that the equilibrium internal exchange rate can be expressed as follows

$$\overline{q}_I = \alpha_N[(\overline{p}_N - \overline{p}_T) - (\overline{p}_N^* - \overline{p}_T^*)] = \alpha_N[(y_T - y_N) - (y_T^* - y_N^*)] = \alpha_N \overline{n}$$

Putting together the external and internal equilibria concepts produces the equation for the equilibrium REER:

$$\overline{q} = (1 - \alpha_T - \alpha_T^*) r^* nfa / v + \alpha_N[\alpha_N r^* nfa + ((k - k^*) + (z - z^*))/2]$$

where

v = speed of adjustment of net foreign assets to changes in relative prices,
$(k-k^*)$ = difference between measures of relative sector productivity at home and abroad (where $k = y_T - y_N$ and $k^* = y_T^* - y_N^*$), and
$(z-z^*)$ = demand shocks

The empirical model. The theoretical model has identified two main determinants of the real exchange rate (q) in the long-run: the stock of net foreign assets (nfa) and the relative sectoral prices between countries (n) and could be rewritten in the following form by factoring nfa:

$$\overline{q} = r^*[(1 - \alpha_T - \alpha_T^*)/v + \alpha_N^2)]nfa + \alpha_N((k - k^*) + (z - z^*))/2$$

In this form the equilibrium real effective exchange rate is a function of **three variables,** nfa, the difference between measures of relative sector productivity at home and abroad, and demand shocks. Abstracting from demand shocks and using price differentials in lieu of the relative sector productivity differential at home and abroad, we obtain our empirical model:

$$q_t = \beta_0 + \beta_1 nfa_t + \beta_2 n_t + u_t,$$

where, if $(1 - \alpha_T - \alpha_T^*)/v + \alpha_N^2 < 0$ in the theoretical model, one would expect $\beta_1 < 0$

Since our main objective is to compute the equilibrium exchange rate as a function of its fundamentals, we have first to establish the existence of a long-run relationship among the variables, and second we have to compute the equilibrium levels of the determinants nfa and n. In order to determine the existence of a long-run relationship among variables (i.e. to test for cointegration), we use the Johansen procedure for cointegration. To establish the equilibrium level of the REER, we assume that q_t fluctuates around its long-term value, but it is not permanently at that value. Moreover, in order to derive the equilibrium exchange rate, we also allow for the possibility of nfa_t and n_t deviating from their long-run values. From an empirical point of view, the three variables in the system are decomposed into transitory $[\hat{q}_t, \hat{nfa}_t, \hat{n}_t]$ and permanent components $[\bar{q}_t, \overline{nfa}_t, \bar{n}_t]$, with the latter capturing the equilibrium of the system:

$$\bar{q}_t = \beta_0 + \beta_1 \overline{nfa}_t + \beta_2 \bar{n}_t$$

Bearing in mind that a unique decomposition between permanent and transitory components does not exist (see among other Maravall (1993) and Quah (1992)), we consider the decomposition suggested by Gonzalo and Granger (1995), based on the assumption that shocks to the transitory component (i.e., our estimate of the misalignment) do not affect the permanent component (i.e., our estimate of the equilibrium).

Gonzalo and Granger (1995) derive a decomposition where the transitory component does not Granger-cause the permanent component in the long run. And where the permanent component is a linear combination of contemporaneous observed variables. In other words, the first restriction implies that a change in the transitory component today will not affect the long-run values of the variables. The second restriction makes the permanent component observable and assumes that the contemporaneous observations contain all the necessary information to extract the permanent component.

Analytically, consider a 3×1 vector $x_t = [q_t, nfa_t, n_t]'$, which under the null hypothesis of one cointegration vector admits the following representation:

$$\Delta x_t = A_1 \Delta x_{t-1} + \ldots + A_{p-1} \Delta x_{t-p} + \Pi x_{t-p} + e_t,$$

where e_t is a vector white noise process with zero mean and variance Σ and Π is a 3×3 matrix of rank one. Given that Π is not full rank, it can be written as the product of two rectangular matrices 3×1, $\Pi = \alpha\beta'$, where β is the cointegrating vector and α is the factor-loading vector. Next, one can always define the orthogonal complements $\alpha_\perp$ and $\beta_\perp$ as the eigenvectors associated with the unit eigenvalues of the matrices $(I - \alpha(\alpha'\alpha)^{-1}\alpha')$ and $(I - \beta(\beta'\beta)^{-1}\beta')$, respectively. Notice that $\alpha'_\perp \alpha = 0$ and $\beta'_\perp \beta = 0$. With this notation is possible to write

$$x_t = \beta_\perp (\alpha'_\perp \beta_\perp)^{-1} \alpha_\perp x_t + \alpha(\beta'\alpha)^{-1}\beta' x_t,$$

where the permanent and the transitory components are captured by the terms $\beta_\perp \left(\alpha'_\perp \, \beta_\perp \right)^{-1} \alpha_\perp x_t$

and $\alpha \left(\beta' \alpha\right)^{-1} \beta' x_t$, respectively. Gonzalo and Granger (1995) show that the transitory components defined in this way will not have any effect on the long-run values of the variables captured by the permanent components. The identification of the permanent component with the equilibrium implies that

$$\bar{x}_t = \beta_\perp \left(\alpha'_\perp \, \beta_\perp \right)^{-1} \alpha_\perp x_t$$

and

$$\hat{x}_t = \alpha \left(\beta' \alpha\right)^{-1} \beta' x_t$$

from where the estimation of the equilibrium exchange rate and its deviation directly follow.

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