

INTERNATIONAL MONETARY FUND



Staff Country Reports

Republic of Latvia: Selected Issues

This Selected Issues paper for Republic of Latvia was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed on July 15, 2005. The views expressed in this document are those of the staff team and do not necessarily reflect the views of the government of Republic of Latvia or the Executive Board of the IMF.

The policy of publication of staff reports and other documents by the IMF allows for the deletion of market-sensitive information.

To assist the IMF in evaluating the publication policy, reader comments are invited and may be sent by e-mail to publicationpolicy@imf.org.

Copies of this report are available to the public from

International Monetary Fund • Publication Services
700 19th Street, N.W. • Washington, D.C. 20431
Telephone: (202) 623 7430 • Telefax: (202) 623 7201
E-mail: publications@imf.org • Internet: <http://www.imf.org>

Price: \$15.00 a copy

**International Monetary Fund
Washington, D.C.**

INTERNATIONAL MONETARY FUND

REPUBLIC OF LATVIA

Selected Issues

Prepared by Francesco Luna and Emil Stavrev (both EUR)

Approved by European Department

July 15, 2005

Contents	Page
I. Macroeconomic Implications of Domestic Credit in Latvia	3
A. Introduction	3
B. Credit and Macroeconomic Activity: Theoretical Underpinnings.....	6
C. Driving Forces Behind Credit Growth in the New EU Members	6
D. Results from the VAR	8
E. Results from the Theoretical Model.....	11
F. Conclusions	15
Figures	
1. Developments in Domestic Credit, 1997–2004	4
2. Convergence of Interest Rates: Spreads of Retail Banks Household Lending Rates Over Eurozone	7
3. Sectoral Responses to Domestic Credit Shocks	9
4. The Role of Composition of Domestic Credit.....	12
5. Peripheral EU Countries: Response to Domestic Credit Shock.....	13
6. Response to Domestic Credit Shock	14
7. Permanent 15 Percentage Point Decline in the Share of Liquidity Constrained Consumers.....	16
Appendix	
1. Summary of the Model.....	17
References.....	19
II. A Balance Sheet Approach to Macprudential Vulnerabilities in Latvia	20
A. Introduction	20
B. The Balance Sheet Framework.....	20
C. Nonresident Deposits: Contribution to Banking Sector B-S Mismatches	23
D. Stability of NRDs: Will it Continue?	25

E. Potential Effects of a Slowdown or Withdrawal of NRDs.....	26
F. Uruguay's NRD Crisis: What Parallels for Latvia?	28
G. Conclusions	29

Tables

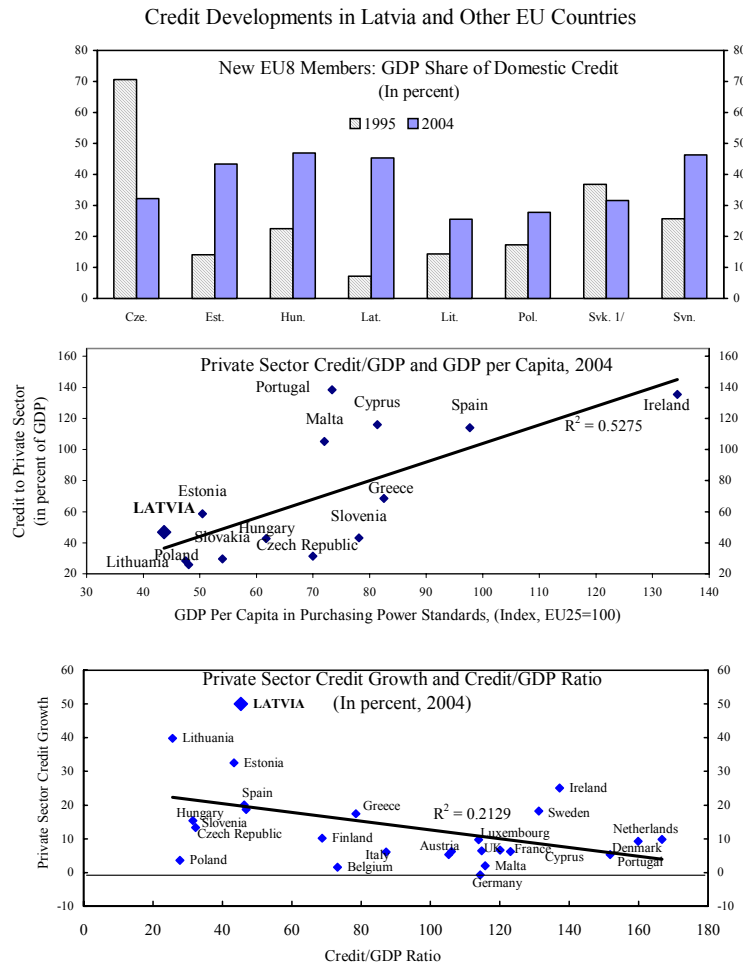
1. Intersectoral Asset and Liability Positions.....	22
2. Selected Banking Indicators by Type of Bank, 2002–04.....	27

References.....	31
-----------------	--------------------

I. MACROECONOMIC IMPLICATIONS OF DOMESTIC CREDIT IN LATVIA¹

A. Introduction

1. **Domestic credit has expanded faster in Latvia than in many other EU countries.** Credit to the private sector has grown by more than 35 percent per year since 1999, driven mainly by credit to households (mostly for mortgages—Figure 1), which expanded at an annual rate of over 70 percent in recent years. As a result, Latvia's credit to GDP ratio has risen from 7 percent in 1995 to over 45 percent at the end of 2004. Consequently, Latvia's credit-GDP ratio is high compared with most other new central and eastern European EU members (NM8) and, after controlling for per capita income, many richer EU-15 countries. Nonetheless, in view of the large untapped potential, credit to households has been the most dynamic segment in each of the NM8.

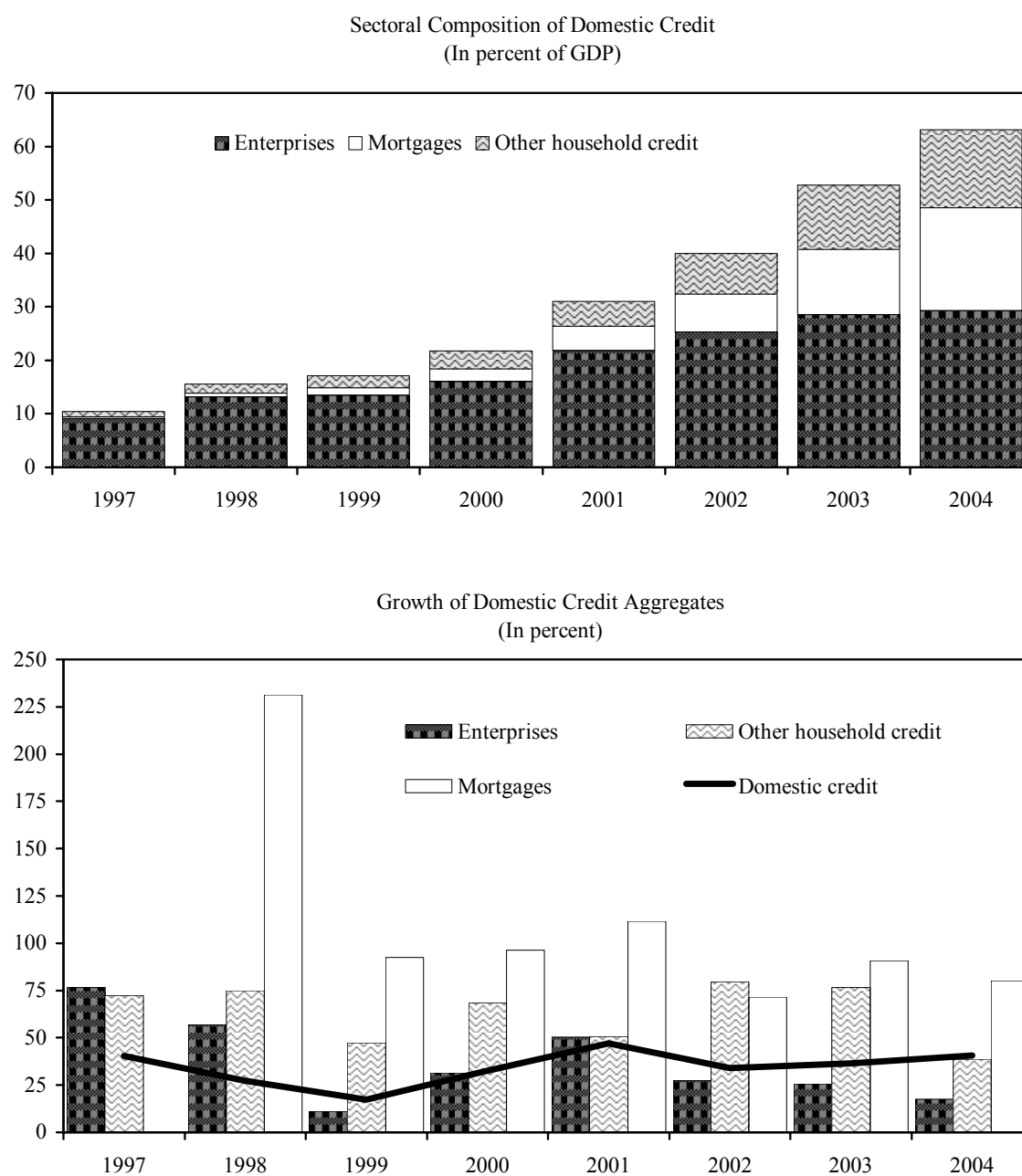


Source: Eurostat and Fund staff estimates.

2. **While rapid credit growth can be seen as an outcome of ongoing real convergence and integration with EU financial markets, the catch-up in private credit could stimulate domestic demand and potentially lead to overheating.** The

¹ Prepared by Emil Stavrev.

Figure 1: Latvia: Developments in Domestic Credit, 1997-2004



Sources: Latvian authorities and Fund staff calculations.

macroeconomic effects of credit expansion may vary over time and from country to country depending, inter alia, on the cyclical position of the economy, how credit growth is financed, and how it is spent. For example, notwithstanding strong credit growth in Latvia for several years, until quite recently there was little evidence of significant effects on inflation or the current account deficit reflecting, perhaps, the spare capacity that previously existed in the economy.

3. **This paper seeks to determine the macroeconomic effects of credit growth in Latvia.** To do so, the paper relies on two approaches. First, a vector autoregressive (VAR) system consisting of domestic credit, real activity, inflation, and the current account is used to determine responses to a positive shock to credit growth. As a frame of reference, we compare Latvia's experience with other NM8 countries and several current euro members. Second, we calibrate the Fund's Global Fiscal Model (GFM) to simulate the macroeconomic effects of Latvia's financial integration with the EU and developing financial system by increasing the number of households with access to bank credit and who can therefore borrow against their future income.

4. **Results from the two approaches suggest that:**

- Private sector credit raises domestic demand, inflation, and the current account deficit in the short- to medium-run;
- The financing source matters—foreign financing generates higher inflation and GDP growth and a larger current account deficit than does domestic deposit-financed credit;
- The sectoral allocation also matters, with household credit raising inflation and worsening the current account, while corporate credit has the opposite effect, presumably by expanding productive capacity; and
- How credit is used may also matter. Latvia's results suggest that borrowing to finance housing purchases could initially depress inflation, possibly by crowding out consumption.

5. The remainder of the paper is structured as follows. Section B provides the theoretical underpinnings of the link between credit and macroeconomic activity. Section C discusses the driving forces behind credit growth in the eight new EU members from central and eastern Europe. Section D presents the results from the VAR estimation for Latvia and the other Baltics, Ireland, Portugal, and Spain. Section E provides the results of the GFM simulation. And Section F concludes.

B. Credit and Macroeconomic Activity: Theoretical Underpinnings

6. **Economic theory predicts that low-income countries should experience relatively high current account deficits during their integration with international financial and product markets.** Blanchard and Giavazzi (2002) maintain that to the extent that the NM8 have strong prospects for future growth, they would be expected to borrow against future income to boost current consumption and investment and, hence, run current account deficits. Richer countries, on the other hand, would provide the external resources and, therefore, run current account surpluses. Blanchard and Giavazzi conclude that current account deficits in the NM8 that emerged in response to financial and goods market integration have been due primarily to a reduction in private saving and, to a lesser extent, to higher investment.

7. **A counterpart to the high current account deficits is rapid growth in domestic credit.** Schadler et al. (2005) maintain that as the relatively low-income Central European countries become more integrated with Western Europe, the pickup in growth of incomes, demand, and output is likely to result in credit booms. These credit booms will be stimulated by declining borrowing costs, as access to international financial markets improves and domestic financial systems deepens. With time, as domestic financing sources become insufficient to meet the growing borrowing needs of consumers, credit granted to the private sector is expected to be increasingly financed by borrowing abroad, contributing to high current account deficits and rising external indebtedness.

C. Driving Forces Behind Credit Growth in the New EU Members

8. **Credit growth has been driven by both foreign and domestic factors.** Prospects for EU membership, sound macroeconomic policies and strong economic development over the past decade have been reflected in improved credit ratings for the NM8. As a result of these positive developments, access to international capital markets by the new EU countries has occurred at increasingly favorable terms.

9. **Favorable external conditions and strong competition in domestic banking sectors have led to declines in interest rates and sharply lower spreads (Figure 2). Simultaneously,**

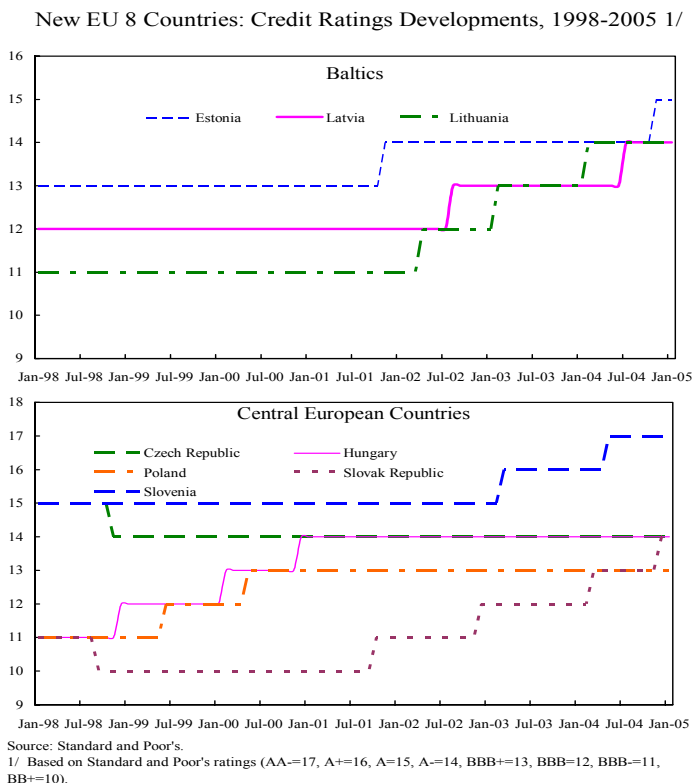
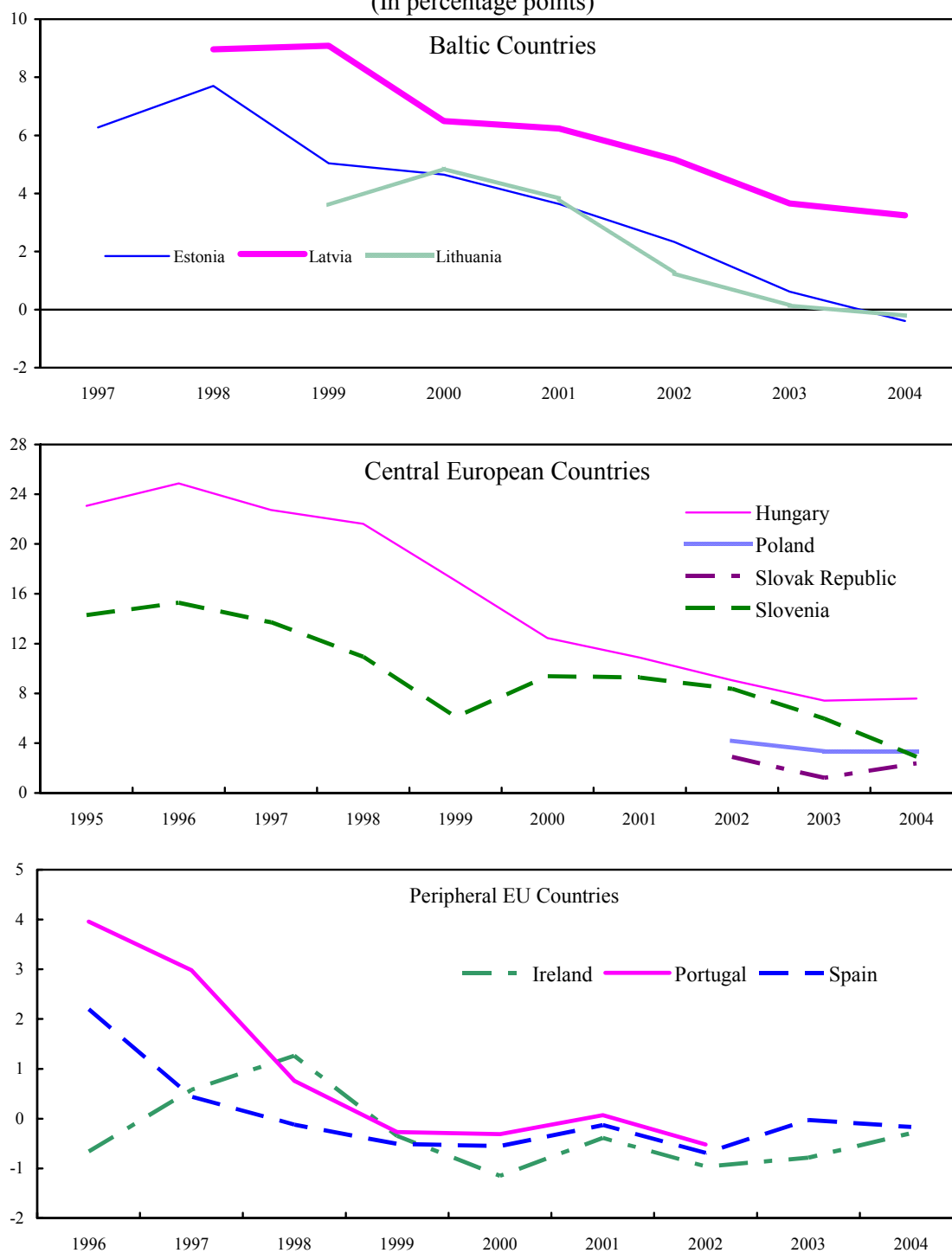


Figure 2. Convergence of Interest Rates:
Spreads of Retail Banks Household Lending Rates over Eurozone 1/
(In percentage points)



Sources: Eurostat; and Fund staff calculations.

1/ For housing loans.

banks began to offer various new financial instruments, including mortgages, while continuing to ease borrowing conditions. For example, in recent years, Latvian banks have lowered down-payments, lengthened loan maturities, reduced or eliminated loan application fees, and lowered fees for credit cards. These factors resulted in fast growth of domestic credit, and in particular mortgages.

10. **Growth in bank lending reflects newly acquired access to credit by those previously precluded in addition to the demand response to lower interest rates by those who already have access to credit.** Only about 25 percent of households in Latvia are thought to have some form of credit, with 10 percentage points having a mortgage. Since bank lending rates have already largely converged to EU-15 levels, future credit growth will, therefore, be driven primarily by a further decline in the number of liquidity constrained households.

D. Results from the VAR

11. **To analyze the impact of domestic credit on economic activity we use a vector autoregressive (VAR) system.** For Latvia, we estimate a four-equation VAR system consisting of the percent change of real credit, a measure of real economic activity (either GDP, investment, or private consumption), the inflation rate, and the current account balance (in percent of GDP). This system is estimated for the total economy and separately for the household and enterprise sectors using quarterly data for the period 1995Q1–2004Q3. The total economy system is also estimated for the other Baltics, Ireland, Portugal, and Spain. The VAR system is of the form:

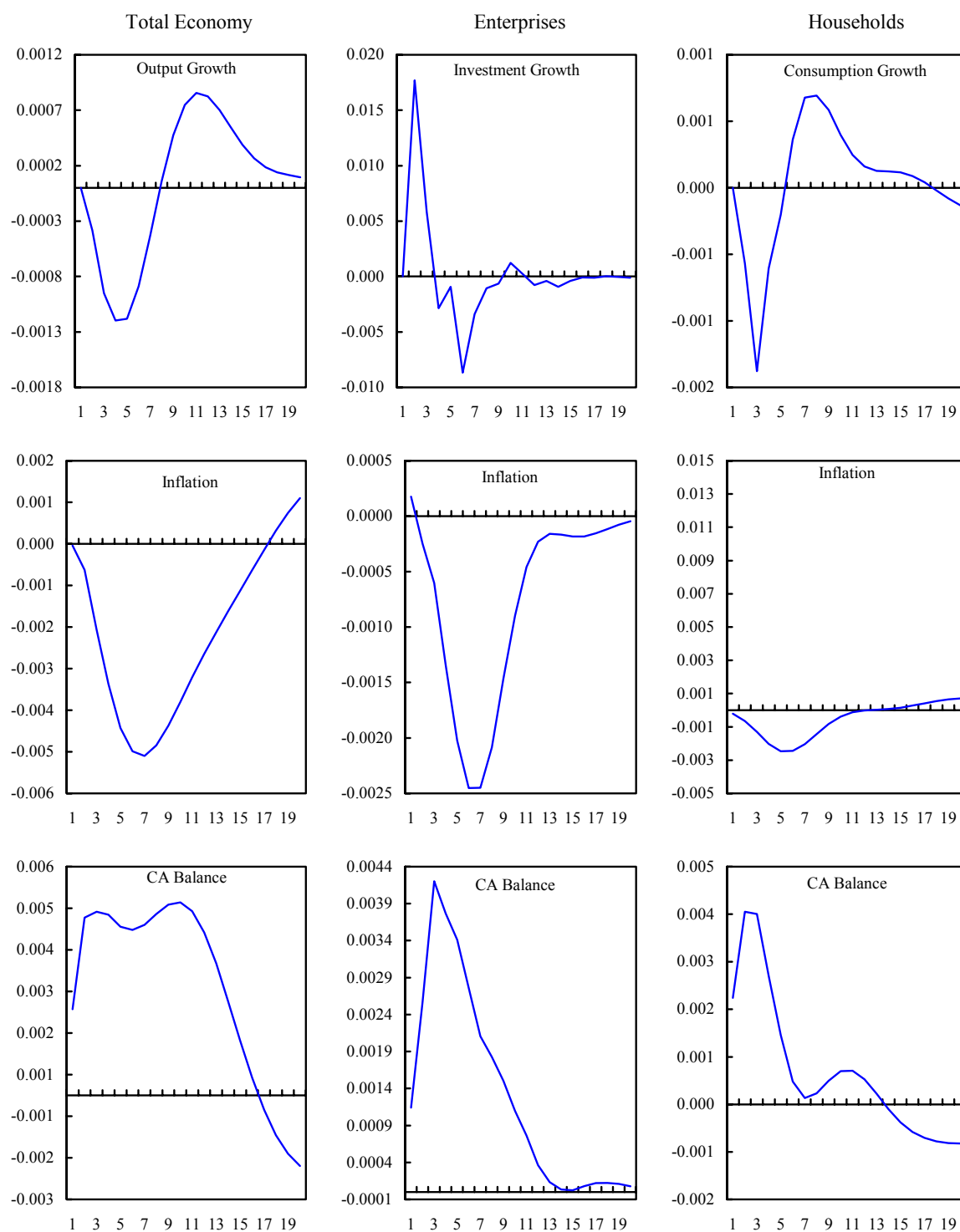
$$\begin{bmatrix} d \log(DC)_t \\ d \log(Activity)_t \\ \pi_t \\ ca_t \end{bmatrix} = C + \sum_{i=1}^n A_i \begin{bmatrix} d \log(DC)_{t-i} \\ d \log(Activity)_{t-i} \\ \pi_{t-i} \\ ca_{t-i} \end{bmatrix} + \begin{bmatrix} \varepsilon_t^{dc} \\ \varepsilon_t^{activity} \\ \varepsilon_t^{\pi} \\ \varepsilon_t^{ca} \end{bmatrix}$$

where, $d \log(DC)$ is growth of real domestic bank credit, $d \log(Activity)$ is growth of real GDP/investment/private consumption, π is consumer price inflation, ca is current account balance as a percent of GDP, C is a vector of constants, and ε s are the corresponding reduced form error terms.

12. **The macroeconomic impact of shocks to different credit aggregates in Latvia is depicted by the impulse response functions from the estimated VAR systems (Figure 3).**²

² To obtain the impulse response functions, the variables in the VAR were ordered as follows: economic activity, credit, current account, and inflation. Changing the ordering of the shocks did not change significantly the pattern of impulse responses.

Figure 3. Latvia: Sectoral Responses to Domestic Credit Shocks (Cholesky 1 S.D. Innovations) 1/



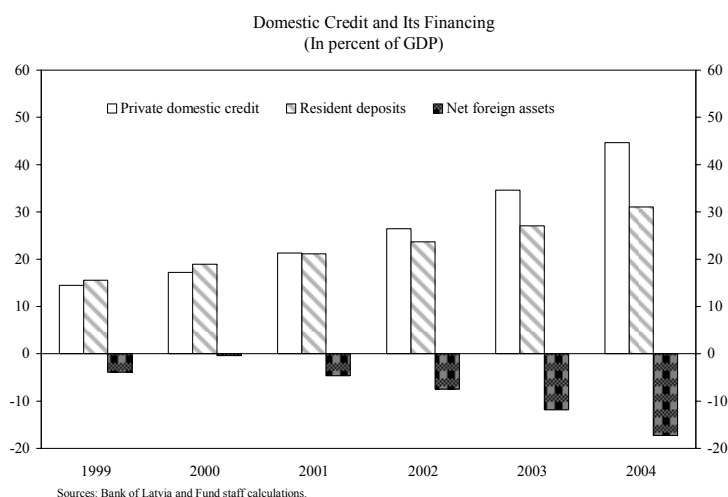
Source: Fund staff calculations.

1/ The shock is to total domestic credit, credit to enterprises, and credit to households for each column correspondingly. Quarters on horizontal axes.

A positive shock to enterprise credit is found to result in higher initial investment, a decline in inflation, and an improvement in the current account relative to baseline. These responses are consistent with firms using the credit for investment which, in turn, expands the economy's supply potential, placing downward pressure on consumer prices and improving export capacity. On the other hand, a positive shock to household credit leads initially to lower consumption and inflation, and an improvement in the current account. Beyond the two-year horizon, however, these results are reversed, with rising consumption, higher inflation, and a worsening of the current account. We discuss below how a different specification of the credit variable eliminates the somewhat paradoxical initial responses to a household credit shock.³ For the economy as a whole, the results reflect the mix of the two sectors, with output growth and inflation initially declining and the current account improving, but with the results reversing to the expected pattern after two or more years. As we discuss in Section E, these cyclical patterns—which occur due to the presence of imaginary roots in the system—are consistent with optimizing behavior on the part of consumers and firms.

13. The way in which credit expansion is financed affects its macroeconomic impact.

Until recently, Latvian banks financed credit growth through a combination of building-up private domestic deposits (both households and enterprises) and foreign liabilities. In fact, in 2004, the stock of household deposits was about equal to bank credit to households. The relatively large stock of household deposits is consistent with the limited range of alternative savings instruments and the persistence of full or partial liquidity constraints in many households that, therefore, must save to purchase big-ticket items or to fund the down payment for a home. Since 2003, however, accumulation of foreign liabilities has played a much greater role in financing domestic credit. To the extent that savers (deposit accumulators) are matched by dissavers (borrowers) within the domestic economy, one would expect the macroeconomic effects of credit growth to be quite limited. Only when credit creation is financed primarily from abroad (the economy as a whole is a net



³ The result that higher household credit initially lowers inflation and consumption is also consistent with a household that initially does not have access to credit (and, hence, faces an infinite interest rate) but subsequently obtains a housing loan. This household would, therefore, reallocate part of its disposable income from general consumption to debt servicing, exerting downward pressure on nonhousing prices.

borrower) would one expect significant macroeconomic effects from credit growth. This prediction is borne out by the Latvian data. Re-estimating the VAR system for the whole economy but replacing credit with net credit (defined as the difference between domestic credit and domestic deposits) yields intuitively appealing results; namely, a positive shock to net credit initially raises inflation and worsens the current account, and—except for the first year—increases real activity relative to baseline (Figure 4). These results reverse in later periods.

14. **Euro-area countries that have experienced rapid credit growth show a common macroeconomic response to a positive credit shock.** Based on VAR estimations for Ireland, Portugal, and Spain covering 1991Q1–2004Q2 (1997Q1–2004Q2 for Ireland), an increase in credit is found to raise growth for about two years and, after a relatively short delay, to increase inflation (Figure 5). In each country the current account initially deteriorates. However, in Ireland, the current account quickly recovers, which may reflect the fact that the estimation covers a period of strong fiscal consolidation that more than offset the effect of lower net private saving. It should be noted that—owing to data limitations—no adjustment was made for the source of bank funding, although in each country, banks’ net foreign liabilities increased sharply during this period, suggesting that such an adjustment would strengthen the macroeconomic response to credit. Comparing these results with those for Estonia and Lithuania reveals little cross-country similarity in responses to credit shocks (Figure 6). This may reflect differences in funding sources, degree of development of financial systems, size of real estate markets, or size of output gaps.

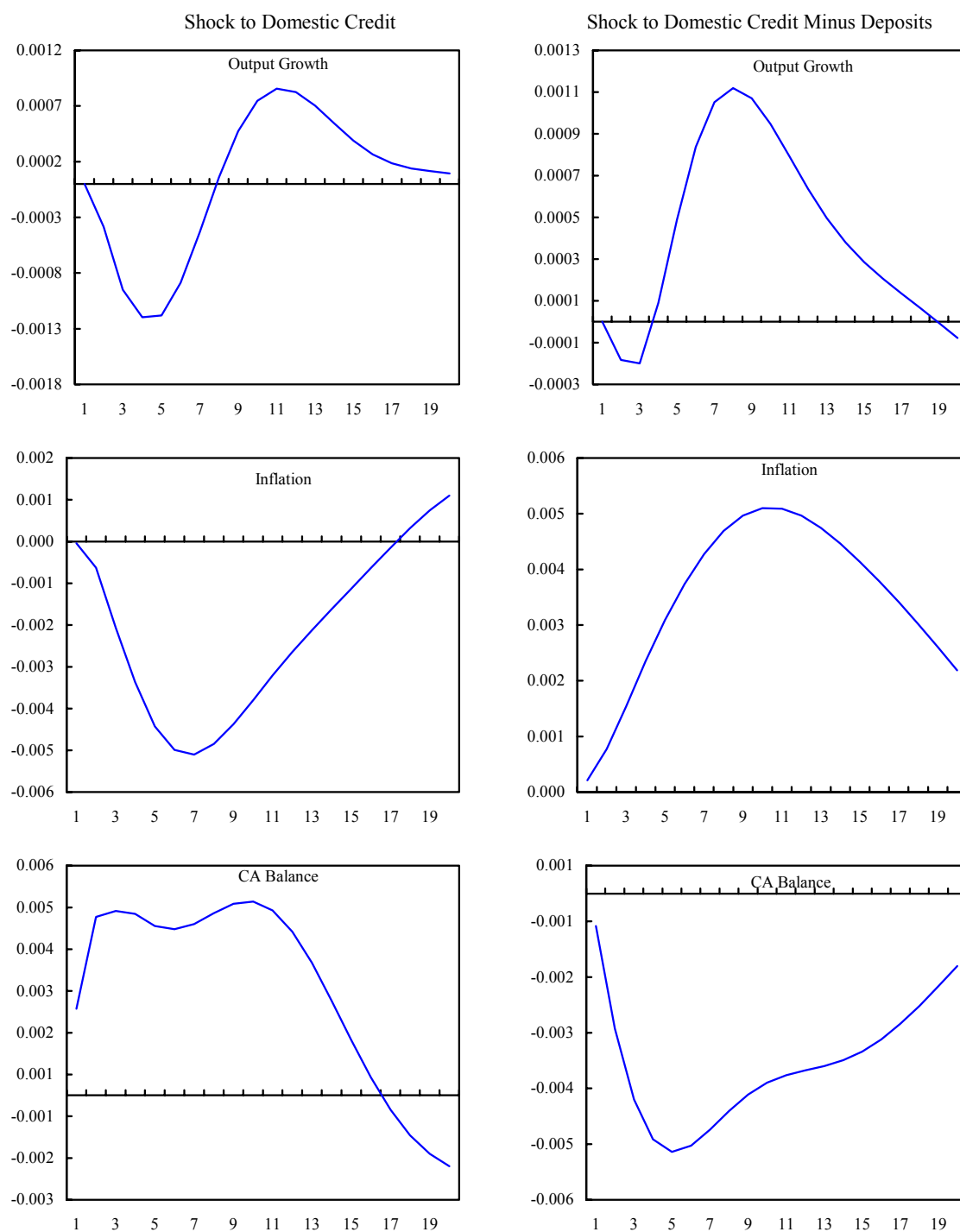
E. Results from the Theoretical Model

15. **To complement the results of the VAR analysis, we use an optimizing framework with micro-foundations to simulate the impact of domestic credit on economic activity.** While a VAR analysis allows the data to determine the propagation channels in the system, the resulting VAR model has no theoretical underpinnings. In this section we rely on a new open-economy macro model, calibrated to Latvia and the EU, Latvia’s main trading partner, to analyze the effects of credit growth. Following Laxton et al. (1998) and Botman et al. (2005), the model has two types of consumers: those who are liquidity constrained and can consume only out of disposable income or accumulated savings, and unconstrained consumers who are able to borrow against future income to finance current spending. This feature of the model makes it particularly well-suited to studying the effects on macroeconomic variables of relaxing liquidity constraints (see the Appendix for further details on the model).

16. **The model-based simulations suggest that relaxing liquidity constraints on households generates consumption-led growth.**⁴ An increase in the number of consumers

⁴ The results in this section are similar to those in Schadler et al. (2005).

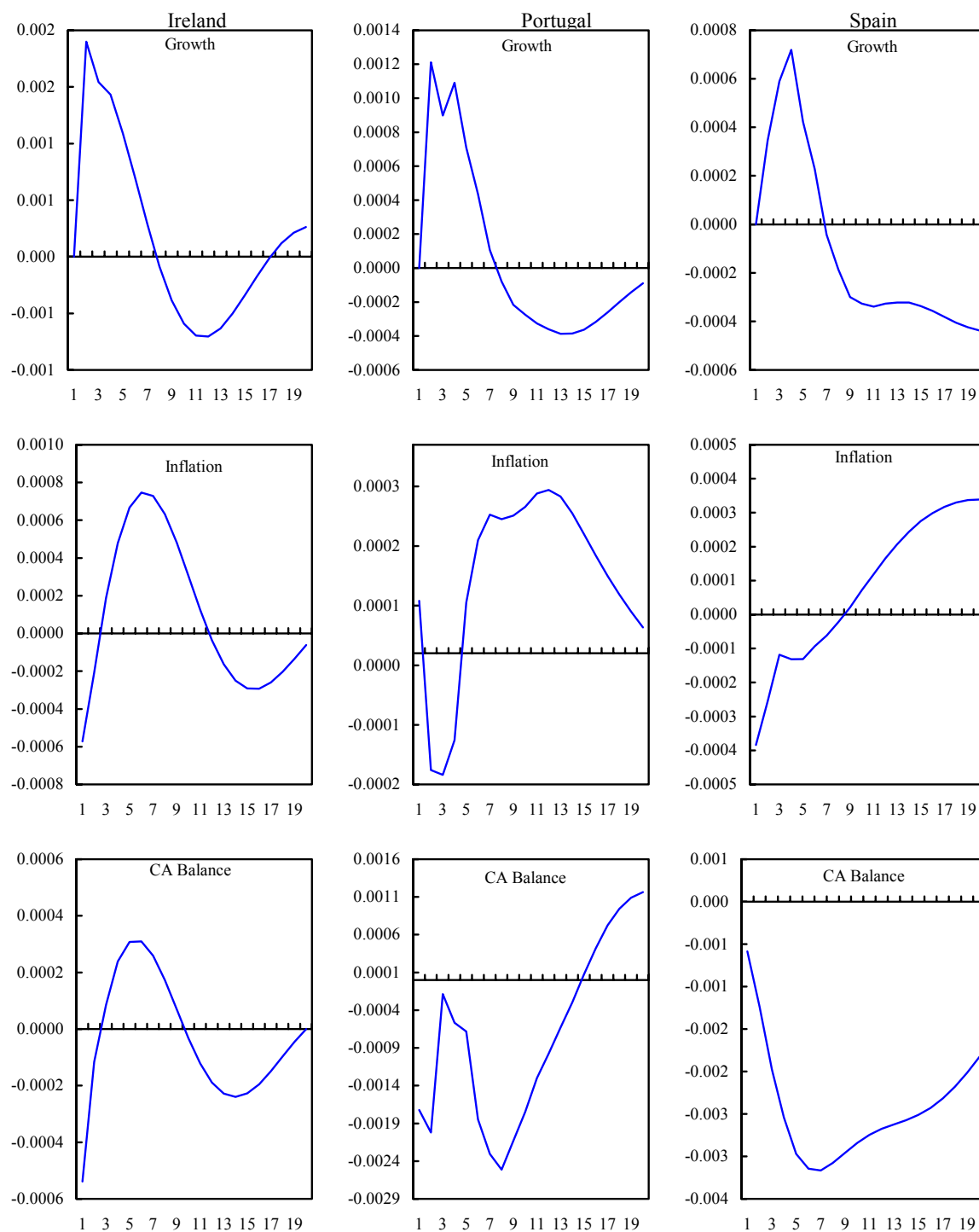
Figure 4. Latvia: The Role of Composition of Domestic Credit (Cholesky 1 S.D. Innovations) 1/



Source: Fund staff calculations.

1/ The shock is to total domestic credit and total domestic credit minus deposits for each column correspondingly. Quarters on horizontal axes.

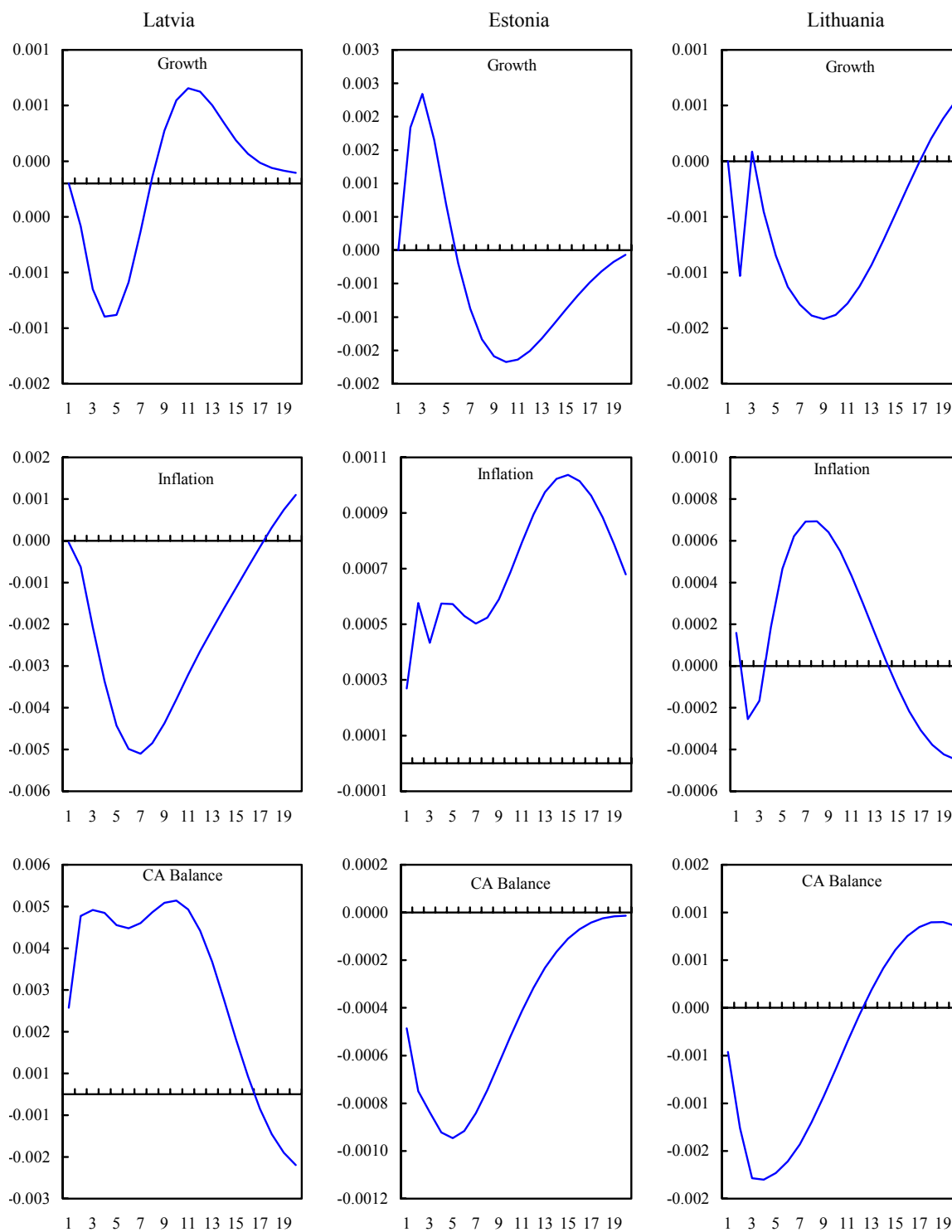
Figure 5. Latvia: Peripheral EU Countries: Response to Domestic Credit Shock
(Cholesky 1 S.D. Innovations) 1/



Source: Fund staff calculations.

1/ Quarters on horizontal axes.

Figure 6. Latvia: Baltics: Response to Domestic Credit Shock (Cholesky 1 S.D. Innovations) 1/



Source: Fund staff calculations.

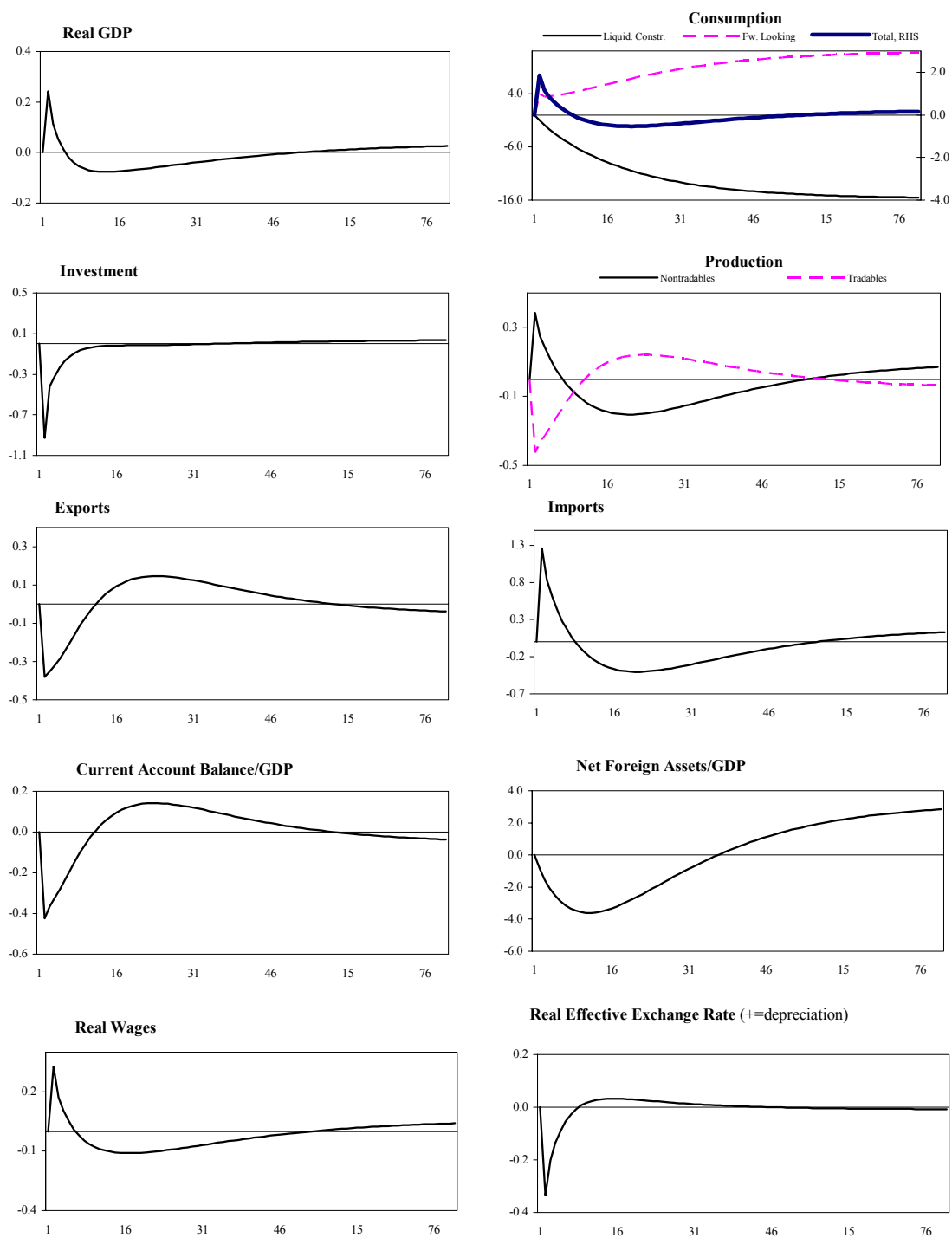
1/ Quarters on horizontal axes.

able to borrow against future income, while domestic interest rates decline toward EU levels, is shown to raise overall consumption and GDP growth relative to baseline over the medium term (Figure 7). The increase in consumption, met in part by higher production of nontradables, results in higher inflation and an appreciation of the real exchange rate. The real appreciation, in turn, lowers exports and raises imports, causing a deterioration of the current account and accumulation of net foreign liabilities—the counterpart to higher domestic credit. Due to higher indebtedness, households must eventually increase saving to service their debt. Therefore, over the longer term, consumption and GDP growth dip below the baseline, while the current account balance improves, and net foreign assets are accumulated. These cyclical patterns from the simulations are consistent with those displayed in the VAR analysis of net credit (foreign-financed credit).

F. Conclusions

17. **This paper demonstrates that domestic credit is an important determinant of economic activity in Latvia.** In particular, both the VAR and model approaches, while depicting somewhat different time profiles, suggest that eventually domestic credit increases domestic demand and could potentially result in overheating, especially when it is foreign financed. This conclusion is supported by inflation and current account balance paths—both indicators of macroeconomic imbalances in a small open economy. The funding source, sectoral distribution, and how domestic credit is used are shown to affect the macroeconomic consequences of credit expansion. Specifically, external financing of domestic credit results in higher inflation and economic growth, and a larger current account deficit. Furthermore, credit to enterprises may be used to expand production capacity, lowering inflation and improving the current account, while credit to households leads to a faster increase in inflation and a more rapid deterioration of the current account.

Figure 7. Permanent 15 Percentage Point Decline in the Share of Liquidity Constrained Consumers 1/
(Percent or percentage point deviation from baseline)



Source: Fund staff calculations.
1/ Number of years on horizontal axis.

Summary of the Model

Overview

1. **The model is fully theoretically founded and derived on the basis of microeconomic optimizing behavior.** It is a two-country new-open-economy-macro model with overlapping generations (OLG) structure. The world consists of two countries (home and foreign) each populated with overlapping generations of agents with finite planning horizons. Capital accumulation and labor are endogenously supplied, and there is monopolistic competition in tradable and nontradable goods.
2. **The model provides a suitable and theoretically rich framework for evaluating the relaxation of liquidity constraints on macroeconomic variables.** This is made possible by assuming two types of consumers: (i) rule-of-thumb (liquidity constrained) consumers who consume out of their after-tax labor income and, (ii) forward-looking consumers, who can smooth consumption by borrowing against their future income. The analytical framework is augmented by the presence of multi-sectoral and multi-country dimensions that account for different channels through which relaxation of liquidity constraints could affect macroeconomic variables.

Consumers

3. **There are OLG consumers in both countries with finite planning horizons.** Each consumer faces a constant probability of death, which is identical in the two countries. Agents have constant elasticity of substitution (CES) utility function and optimize over consumption, leisure, and real money balances, given their budget constraints. Aggregate demand functions for tradable and nontradable goods and supply of labor are derived by solving the consumer optimization problem.

Firms

4. **Firms produce tradable and nontradable goods using a CES production function.** Firms maximize the net present value of dividends subject to the CES production function and the law of motion of capital, given consumer demands. The supply functions for product varieties in both tradable and nontradable sectors are derived by solving the firms' optimization problem.

Parameterization

5. **Values of the parameters used in the model are calibrated.** In the calibration exercise we use empirical and theoretical estimates available in the literature and data for key macroeconomic ratios to achieve the desired steady-state characteristic of the two economies. When calibrating the model, our primary attention was on its steady-state properties; we also aimed to find plausible dynamic adjustment paths for key macroeconomic variables. Baseline parameters and initial steady-state ratios are shown in Tables A1 and A2, respectively.

Table A1: Main Baseline Parameters

Parameters	Value
Discount rate	1.05
Depreciation rate of capital	0.10
Share of tradables in consumption basket	0.40
Steady-state inflation	0.02
Size of the home economy	0.01
Probability of living	0.90
Share of rule-of-thumb consumers	0.95
Intertemporal elasticity of substitution	0.20
Elasticity of substitution between home and foreign goods	0.40
Elasticity of substitution between capital and labor	0.80

Table A2: Initial Steady-State Ratios 1/

Variables	Value
GDP ratios:	
Tradables	0.30
Nontradables	0.70
Labor income of tradables	0.60
Labor income of nontradables	0.60
Private consumption	0.63
Forward looking	0.03
Rule-of-thumb	0.60
Investment	0.24
Government consumption	0.20
Exports	0.44
Imports	0.55
Real interest rate	0.03

1/ Calibrated using data for 2003.

REFERENCES

- Blanchard, O.J, and F. Giavazzi, 2002, “Current Account Deficits in the Euro Area: The End of the Feldstein-Horioka Puzzle?,” Working Paper 03–05 (Cambridge, Massachusetts: MIT, Department of Economics, September).
- Botman, D., D. Laxton, D. Muir, and A. Romanov, 2005, “A New Open-Economy Macro Model for Fiscal Policy Evaluation,” *mimeo*.
- Laxton, D., P. Isard, H. Faruquee, E. Prasad, and B. Turtleboom, 1998, “Multimod Mark III: The Core Dynamic and Steady-State Models,” IMF Occasional Paper, 98/164.
- Schadler, S., P. Drummond, L. Kuijs, Z. Murgasova, and R. van Elkan, 2005, “Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration,” IMF Occasional Paper, 05/234.

II. A BALANCE SHEET APPROACH TO MACROPRUDENTIAL VULNERABILITIES IN LATVIA¹

A. Introduction

1. **The balance sheet approach to macroprudential vulnerabilities was developed as a complement to “third generation” models of currency and banking crises.** These models emphasize the links between flow imbalances (current accounts and fiscal deficits) and stock vulnerabilities (including currency and maturity exposures) (Dornbusch, 2001). The existence of vulnerabilities does not necessarily indicate that a crisis is imminent. However, the size and nature of vulnerabilities, and how they are distributed across sectors, indicates how a crisis would play out and its potential macroeconomic costs in the event that a crisis is triggered.

2. **The chapter is organized as follows. Section B presents the results of a balance sheet analysis of Latvia’s main sectors and points to several existing vulnerabilities.** Section C highlights the role of nonresident deposits (NRDs) in Latvia’s banking sector and their contribution to vulnerabilities. Sections D and E examines whether NRDs will continue to remain a stable funding source and the macroeconomic impact of a slowing or reversal of NRDs. Section F looks at possible parallels with the buildup in vulnerabilities in Uruguay. Some conclusions are offered in the final section.

B. The Balance Sheet Framework

3. **Analysis of sectoral and economy-wide balance sheets is useful in detecting macroeconomic vulnerabilities stemming from the level and structure of debt and from linkages among sectors that may not be apparent in aggregate data.** The literature identifies four key varieties of balance-sheet vulnerabilities: (i) *maturity* mismatch between short-term liabilities and long-term assets; (ii) *currency* mismatch whereby exchange rate movements lead to capital losses; (iii) *capital structure imbalance* where heavy reliance on debt instead of equity renders a bank or firm vulnerable to revenue shocks; and (iv) *solvency* problems whereby assets (including the present value of future revenues) are (or are perceived to be) insufficient to cover liabilities (including contingent liabilities).² Analysis of sectoral balance sheets can help identify channels through which problems may propagate or even become magnified owing to financial linkages between sectors, even if, in isolation, an individual sector has no explicit vulnerability of its own.

¹ Prepared by Francesco Luna.

² See Hamann et al. (2002) and Allen et al. (2002).

4. **Latvia's sectoral balance-sheet mismatches are fairly limited, with the exception of enterprises (foreign currency) and banks (maturity).** Compiling for Latvia the template for examining balance sheet data and intersectoral linkages (see Rosenberg et al., 2005)

relied heavily on banking survey and external debt data. The standard table (Table 1) is augmented to include a breakdown of the private nonbanking sector into households and enterprises.³ In the summary text table, "Maturity" encompasses two columns: total and foreign currency. The latter refers to the maturity mismatch between foreign-currency-denominated assets and liabilities. The table reveals that: (i) the public sector (government and Bank of Latvia (BoL)) appear rather insulated against rollover risk⁴ and—to a lesser extent—exchange rate shocks; (ii) banks seem protected against exchange rate risk but, inherent to financial intermediation, their maturity mismatch is significant; and (iii) the corporate sector appears prone to exchange rate fluctuations.

Balance-Sheet Mismatches, 2004 (In percent of GDP)			
	Maturity 1/ Foreign		Foreign Currency 2/
	Total	Currency	
Government and Bank of Latvia	2.1	0.8	8.2
Banks	-24.9	-16.4	1.7
Private sector	23.9	4.2	-30.1
Enterprises	5.0	-2.8	-25.6
Households	18.9	7.0	-4.5
Memorandum items (in percent of GDP):			
Households FX assets			7.3
Households FX liabilities			11.7
Enterprises FX assets			11.3
Enterprises FX liabilities			36.9

Sources: Bank of Latvia; and Fund staff calculations.

1/ Liquid assets minus short term liabilities.

2/ Foreign-exchange denominated assets minus liabilities (all maturities).

5. **The main conclusions from the balance sheet analysis are:**

- The limited direct exposure of banks to exchange rate movements reflects a shifting of currency risk to enterprises. However, it is unclear to what extent enterprises have hedged their currency risk. But with bank lending to the corporate sector concentrated in services (mainly nontradables) suggests that relatively few debtor-firms will be naturally hedged through export revenues.

³ Some estimates were made owing to partial data on maturities of loans to enterprises and on government securities held by the private sector.

⁴ A maturity mismatch exposes the debtor to *rollover risk*. However, even without a maturity mismatch, agents may be subject to interest rate risk unless both assets and liabilities are at either fixed or variable interest rates.

Table 1. Latvia: Intersectoral Asset and Liability Position
(At end-2004 as a percent of GDP)

Issuer of Liability (Debtor)	Holder of Liability (Creditor)				
	Public Sector	Financial Private Sector	Nonfinancial Private Sector		Rest of the World
			Enterprises	Households	
Public Sector (incl. Central Bank)					
Monetary Base		3.0	3.7	5.7	
Total Other Liabilities		5.3	0.9	1.7	3.3
Short-term		1.0	0.0		0.0
Domestic Currency		1.0			
Foreign Currency		0.0			
Medium- and Long-term		4.3	0.9	1.7	3.3
Domestic Currency		3.3	0.9	1.4	
Foreign Currency		1.0	0.0	0.3	3.3
Financial Private Sector					
Total Liabilities	3.0			20.8	58.4
Short-term	3.0		10.2	10.7	43.5
Domestic Currency	2.2		6.9	8.5	
Foreign Currency	0.8		3.3	2.2	43.5
Medium- and Long-term	0.0		0.0		14.6
Domestic Currency					
Foreign Currency					14.6
Equity					0.4
Nonfinancial Private Sector					
Total Liabilities	0.0	51.3			17.9
Short-term	0.0	8.9			9.3
Enterprises		6.6			
Domestic Currency		2.8			
Foreign Currency		3.8			9.3
Households		2.3			
Domestic Currency		2.3			
Foreign Currency		0.0			
Medium- and Long-term	0.0	42.3			8.6
Enterprises		26.5			8.6
Domestic Currency		11.3			
Foreign Currency		15.2			8.6
Households		15.8			
Domestic Currency		4.0			
Foreign Currency		11.7			
Equity		0.1			
Rest of the World					
Total Liabilities	16.2	40.1	8.0		
Currency and Short-term	15.9	34.4	7.0	0.0	
Medium- and Long-term	0.3	5.7	1.0	0.0	
Memorandum Items:					
Households FX assets	7.3				
Households FX liabilities	11.7				
Enterprises FX assets	11.3				
Enterprises FX liabilities	36.9				

Sources: Bank of Latvia; and Fund staff calculations.

- In the aggregate, households are rather protected against exchange rate fluctuations. However, this reflects both large foreign-currency deposits and large foreign-currency loans, especially mortgages, which have grown extremely rapidly in recent years. Since loans are concentrated among a relatively small share of households, whereas deposits are likely to be held much more widely, some individual households may face large currency risks.
- The positive exchange rate mismatch for the public sector is mainly due to the high foreign exchange reserves of the BoL—about 16 percent of GDP at end-2004.⁹
- Foreign currency exposure for the entire economy (at about 22 percent of GDP) is smaller than for the private sector alone. This reflects primarily the BoL's large stock of official reserves.

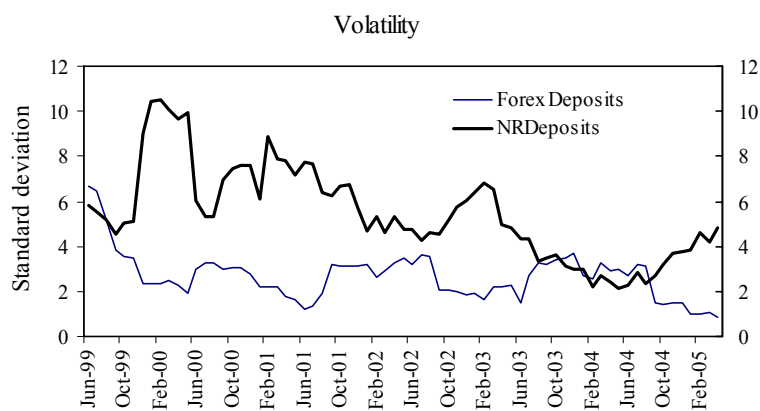
C. Nonresident Deposits: Contribution to Banking Sector B-S Mismatches

6. **Nonresident deposits are a significant feature of Latvia's financial sector and, therefore, an important determinant of financial stability.** Some key characteristics of NRDs and their implications for macroprudential stability are presented below.

- *Size and other characteristics of NRDs*

During 1996–2004, NRDs in Latvia grew tenfold in dollar terms and four times as a percent of GDP reaching 45 percent. About 80 percent of NRDs are demand deposits. While

aggregate volatility is low and declining (at least until the end of 2004), turnover is thought to be relatively high, with the average duration of a deposit estimated at less than one week, consistent with funds in transit.¹⁰ These deposits have



Sources: Bank of Latvia; and Fund staff calculations.

⁹ However, a small aggregate mismatch of either sign may not guarantee against all exchange rate shocks since it does not preclude large open positions in individual foreign currencies.

¹⁰ Average turnover is derived from the stock of NRDs and the ECB “Blue Book” data on the value of cashless payment instruments.

traditionally been denominated in U.S. dollars, but euro deposits have recently increased. Fees and other net income from NRDs contribute about one-third of banking sector profits.

- *Why are NRDs in Latvia?*

Latvia has traditionally played the role of a regional financial hub for CIS residents owing to its well-developed financial sector with established international linkages and its high proportion of Russian-speaking citizens. Most NRDs have beneficial owners of Russian or other CIS origin. Recently, however, NRDs from Western Europe have increased in view of Latvia's attractiveness as a gateway to the CIS.

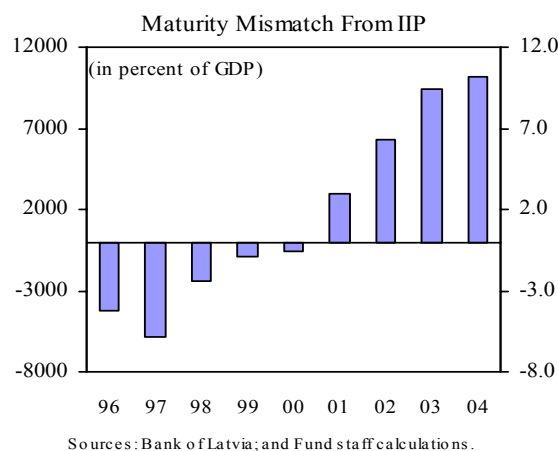
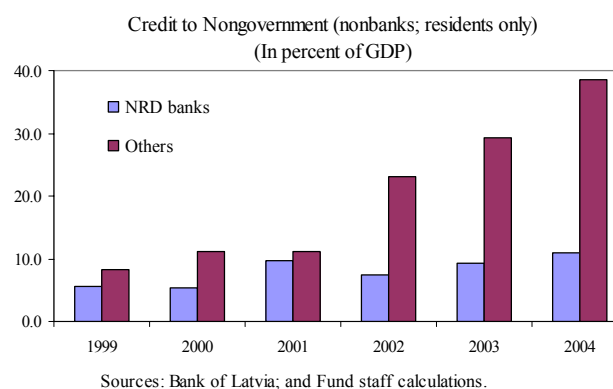
- *What do banks do with NRDs?*

Traditionally, most NRDs have been reinvested abroad in liquid, high-quality securities and deposits. However, domestic intermediation of NRDs has gradually increased, with NRD-intensive banks increasing their credit to nonbank private residents from about 6 percent of GDP in 1999 to nearly 11 percent of GDP in 2004.

Nonetheless, these banks' liquidity (defined as the sum of cash, net claims on financial institutions, and fixed-income securities) has remained about stable at 57 percent of deposits, significantly higher than at other Latvian banks, but well below 100 percent.

- *Contribution of NRDs to banks' B-S mismatches*

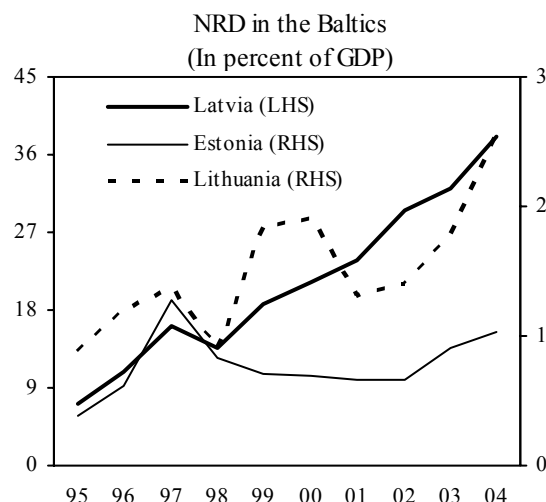
About one third of banks' foreign currency-denominated maturity mismatch (about 10 percent of GDP) comes from Latvia's relations with the rest of the world, as recorded in the country's International Investment Position. Some 7 percentage points is due to the large volume of nonresident



deposits that are not matched with liquid foreign assets.¹¹

D. Stability of NRDs: Will it Continue?

7. While NRDs have displayed remarkable stability in recent years, it is possible that NRDs could become a less reliable income source for banks in the future. With NRDs growing continuously and having proven their resilience to economic volatility in Russia,¹² some observers expect NRDs to remain a relatively permanent feature of Latvia's financial sector. However, factors other than macroeconomic conditions in Latvia or its neighbors could slow—or even reverse—the growth in NRDs. While Latvia has so far received the largest amount of NRDs in the Baltics, competition from neighboring countries—which share many of the same characteristics that drew NRDs to Latvia—could increase. Another risk is that the financial and administrative costs of enforcing anti-money laundering (AML) regulations, both at Latvian banks and at foreign correspondent banks, could make



Sources: National Central Banks; and Fund staff calculations.

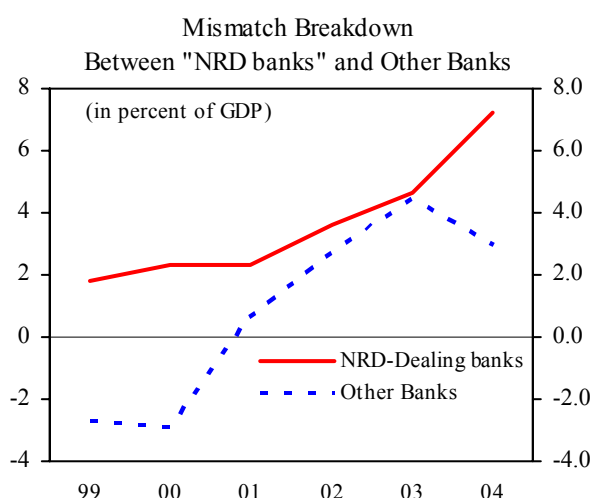
¹¹ The mismatch is calculated as the difference between short-term foreign liabilities and liquid foreign assets of commercial banks, as reported in Latvia's International Investment Position. Short term is defined as up to 12-months on a residual maturity basis.

¹² Banks maintain that NRDs are related to the business activities of the account holders. To test this hypothesis, the level of NRDs was regressed on Ukrainian industrial production and on a composite index of oil prices and industrial production in Russia, as a proxy for Russian economic activity. These variables were found to explain a substantial part of movements in Latvia's NRDs, with an adjusted R squared above 90 percent. A similar regression on trade indices with the same countries turned out to give poorer results, suggesting that Latvian NRDs are not related to direct trade with those countries. However, the error correction specification required by the integrated variables involved did not give acceptable results from a short-term perspective.

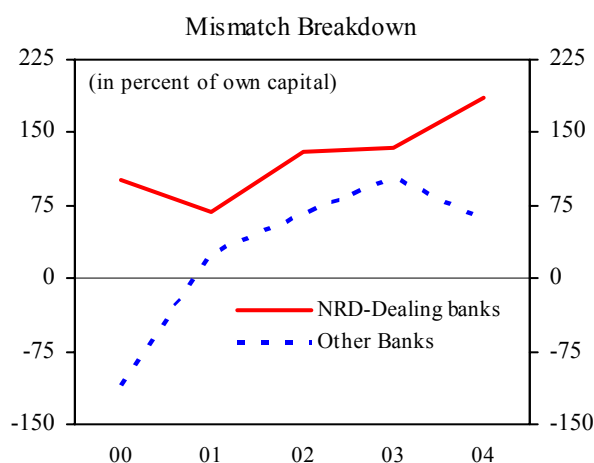
these transactions unprofitable.¹³ Indeed, at least one U.S. bank has decided to terminate correspondent activity with *all* Latvian banks. Finally, changes in financial markets and regulations in NRD-source countries could also reduce Latvia's NRDs in the future.

E. Potential Effects of a Slowdown or Withdrawal of NRDs

8. **A slowing or withdrawal of NRDs could impact macroeconomic stability through its impact on the banking sector and by drying-up a source of external financing.** Banks heavily involved in NRDs (defined as banks where NRDs are more than 20 percent of liabilities) account for about 45 percent of the total banking sector's capitalization (Table 2), while net short-term liability flows (mostly due to NRDs) have covered on average 40 percent of current account deficits during the past four years.



9. **Withdrawals of NRDs could create liquidity shortfalls at banks with a large amount of these deposits.** Two small banks recently identified as possibly involved in money laundering activities have seen their NRDs drop rapidly by more than 50 percent and sold part of their loan portfolio to acquire needed liquidity. The scale of potential liquidity needs can be seen from the size of the IIP maturity mismatch at NRD banks (about 7 percent of GDP—about half of BoL reserves—and nearly



Sources: Bank of Latvia; and Fund staff calculations

¹³ Recently two Latvian banks contracted international accounting firms to audit measures they implement to prevent money laundering activities. Such action can be seen as shifting the cost of AML enforcement to Latvian banks in order to encourage continued business with foreign correspondent banks.

Table 2. Latvia: Selected Banking Indicators by Type of Bank, 2002-04
(In percent; unless otherwise stated)

	Banks Dealing with NRD 1/		Other Banks	
	2002	2004	2002	2004
Own capital/total own capital of the banking system	40.4	44.0	59.6	56.1
Assets/total assets of the banking system	50.5	48.7	49.5	51.3
Net foreign assets, mln lats	-126.7	-238.8	-299.0	-1,031.5
Total reserves/total deposits	24.5	20.9	5.9	4.2
Excess reserves/total reserves	1.5	1.8	2.0	2.2
Loans/deposits (banks and non-banks; residents only)	135.3	149.5	129.4	157.7
Loans/deposits (banks and non-banks; total)	78.4	88.1	97.0	98.8
Loans (banks and non-banks; residents only) / total assets	23.9	24.9	68.1	76.7
Loans/total assets (banks and non-banks; total)	68.7	76.9	77.6	83.8
Share of long-term loans issued to non-banks/total non-bank loans (residents only)	80.3	87.5	85.0	85.0
Share of long-term loans issued to non-banks/total non-bank loans (total)	75.3	82.1	83.9	84.0
Credit to nongovernment/GDP (banks and non-banks; residents only)	8.3	12.5	24.6	40.3
Credit to nongovernment/GDP (banks and non-banks; total)	25.8	39.6	28.1	44.1
Credit to nongovernment/GDP (non-banks; residents only)	7.3	10.9	23.0	38.7
Credit to nongovernment/GDP (non-banks; total)	10.1	16.6	24.2	40.7
Liquidity test 2/	56.9	56.8	-2.2	-36.7
Capital adequacy ratio 3/	12.9	12.6	13.2	11.1
Nonperforming loans/total loans	3.2	1.5	1.4	1.0
Loan-loss provisioning/total loans	2.3	1.7	1.2	0.9
Return on equity 4/	13.8	21.0	19.4	21.9
Return on assets	1.1	1.7	2.0	1.8
Effective rate of interest on deposits	5.4	4.4	4.5	4.2
Effective rate of interest on credits	7.9	6.1	8.4	6.4
Net commissions from operations with non-residents/total profits	91.3	64.4	5.0	3.5
Profits from Forex Transactions/total profits	50.3	44.0	28.3	22.1

Source: Latvian Financial and Capital Markets Commission.

1/ Banks for which non-resident deposits account for more than 20% of their liabilities.

2/ Liquidity test is defined as: (cash + claims on the central bank + claims on other credit institutions + fixed-income government bonds - liabilities to the central bank - liabilities to other credit institutions) / deposits.

3/ End-December values based on nonaudited financial statements.

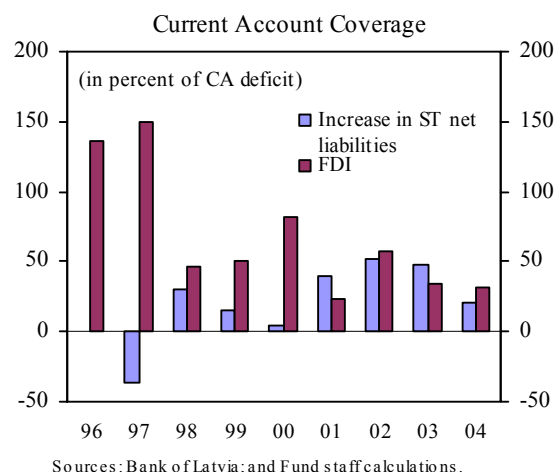
4/ Return on equity is defined as the ratio of profits to the value of bank-issued equity.

200 percent of own capital)¹⁴ and from the significant lending by these banks to resident nonbanks. Systemic risks from NRDs should be contained to the extent that most NRD banks are not active on the domestic interbank market. However, a number of large banks with a

¹⁴ An additional 3 percentage points of banks' IIP maturity mismatch reflects short-term borrowing from foreign parent banks. This amount has recently declined following the widening of the reserve requirement base in January 2005 to include banks' short-term foreign liabilities.

strong presence in the domestic market have a substantial NRD base, raising concerns about the potential contagion from one type of depositor to another within a bank. Recently, at least one of these large banks has greatly increased its funding from foreign borrowing, thereby reducing its reliance on NRDs.

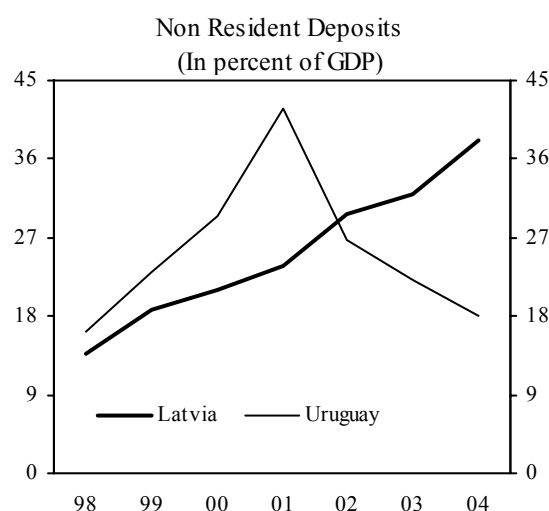
10. **In addition to their strong presence in the banking sector, NRDs have also helped finance the current account deficit, especially in recent years.** With only a relatively small part of NRDs thought to be the counterpart to external trade, and with rising onlending to residents, NRDs (the bulk of banks' short-term foreign liabilities) make a net positive contribution to the balance of payments. Therefore, in the event of a drying up of NRDs, alternative capital inflows would be needed to maintain unchanged the current account deficit.



F. Uruguay's NRD Crisis: What Parallels for Latvia?

11. **Uruguay provides an interesting case study of how balance sheet mismatches associated with NRDs can spill over to the rest of the financial system and eventually precipitate a currency crisis.** While the trigger for the 2002 crisis (the freezing of foreign-currency accounts at Argentinean banks) is specific to the Uruguayan example, there are nonetheless several parallels with Latvia in terms of underlying balance sheet structures that reflect the buildup of vulnerabilities.

12. **Uruguay's banking sector was about 90 percent of GDP and highly dollarized.** Banks' net currency exposures, however, were quite small owing to approximately matched foreign-currency denominated loans and deposits at both onshore and offshore banks. NRDs, mainly from Argentina and denominated in U.S. dollars, accounted for nearly 40 percent of system-wide deposits. However, a substantial liquidity mismatch in foreign currency existed at banks, amounting to about 63 percent of GDP. This was aggravated by foreign-currency lending to domestic entities that did not have foreign-currency denominated incomes.



13. **The widespread withdrawal of NRDs from Uruguayan banks triggered a run on foreign currency deposits by residents.** Given banks' shortage of foreign currency liquidity, the drawdown of NRDs prompted domestic depositors to also withdraw their funds and, with freely-available official reserves used to cover the resulting liquidity shortfall,¹⁵ official reserves were depleted. In the event, the Bank of Uruguay was unable to defend the peso, a problem compounded by the falling due of a large amortization payment on government foreign debt.

NRDs in Latvia and Uruguay (in percent of GDP, unless otherwise stated)		
	Latvia 2004	Uruguay 2001
Size of banking system 1/	67	90
Foreign currency deposits	49	86
nonresident	38	41
resident	11	45
Liquidity mismatch in foreign currency 2/		
Banks	-16	-63
Banks and Central Bank 3/	0	-54
Memorandum item		
External public debt	8	31

Sources: For Latvia: Monetary authorities and Fund staff calculations.

For Uruguay: Rosenberg et al. (2005).

1/ Total deposits.

2/ Liquid foreign currency assets minus short-term foreign currency liabilities.

3/ Banks' liquidity mismatch in foreign currency plus freely available reserves of the central bank.

14. **Despite a number of similarities with the Uruguayan case, Latvia's risks from NRDs are mitigated by stronger liquidity coverage.** Prior to the freezing of Argentine foreign-currency deposits, Uruguay's banking sector had benefited from previous crisis episodes affecting Argentina. As in Latvia during the Russia crisis, financial turmoil in a large neighbor had increased the attractiveness of Uruguay as a safe haven for savings. This may have created the impression that NRDs would remain a stable funding source and that banks' maturity mismatch in foreign currencies carried little risk. However, unlike in Uruguay, where official reserves were insufficient to cover the drawdown in foreign-currency deposits of residents and nonresidents, in Latvia official reserves are adequate to fill the foreign currency liquidity mismatch of banks, provided that no additional calls on reserves are triggered. The low level of public external debt also offers reassurance.

G. Conclusions

15. **A balance sheet analysis of Latvia's macroprudential vulnerabilities reveals mismatches in some sectors.** Specifically, enterprises have large foreign currency exposures, as might individual households to the extent that borrowers are distinct from savers. In addition, banks face a substantial maturity mismatch in foreign currency, which is largely attributable to banks with a significant share of NRDs and—to a lesser degree—to short-term borrowing from foreign parent banks.

16. **When assessing the results of a balance sheet analysis, one should keep in mind the distinction between vulnerabilities and crisis triggers.** The extent of vulnerabilities

¹⁵ Freely-available official reserves are defined as gross reserves excluding gold and the counterpart to banks' foreign-currency deposits at the central bank.

identified by the balance sheet approach indicates the scale of potential damage in the event a crisis takes place. It does not, however, speak to the possible range of crisis triggers, or to their likelihood of occurrence. While one can do little to affect the probability of a triggering event, the economic costs of a crisis can be effectively lowered by reducing balance sheet mismatches.

REFERENCES

- Allen, Mark, C. Rosenberg, C. Keller, B. Setser, and N. Roubini, 2002. "A Balance Sheet Approach to Financial Crisis," IMF Working Paper 02/210.
- Dornbusch, Rudiger, 2001. "A Primer on Emerging Market Crises", NBER Working Paper: 8326 (2001).
- Hamann, J., K. Kochhar., T. Lane, G. Meredith, J. Odenius, D. Ordoobadi, H. Poirson, and D. Robinson, 2003. "Assessing Crisis Vulnerabilities in Latin America," in C. Collins and G. R. Kincaid eds. *Managing financial Crises: Recent Experience and Lessons for Latin America*, International Monetary Fund Occasional Paper 217.
- Rosenberg, C., I. Halikis, B. House, C. Keller, J. Nystedt, A. Pitt, and B. Setser, 2005. "Debt-Related Vulnerabilities and Financial Crises—An Application of the Balance Sheet Approach to Emerging Market Countries," IMF Occasional Paper, forthcoming.