Republic of Estonia: Selected Issues

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REPUBLIC OF ESTONIA

Selected Issues

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Approved by European Department

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I. COMPETITIVENESS AND SUSTAINABILITY IN ESTONIA[1]

A. Overview

1. **Estonia's currency board arrangement (CBA) and its commitment to adopting the Euro both require an ability to adjust to changing conditions without using the exchange rate.** This paper assesses Estonia's flexibility from two angles. The first is its performance under the CBA during the last decade and a half. Since the CBA imposes exactly the same discipline on policy as will membership of a currency union, performance during this period is a predictor of performance under the euro. The paper focuses on one aspect of that performance—the ability to sustain competitiveness. The second, more forward-looking, angle is the flexibility of Estonia's labor and product markets. Flexibility is necessary because the next phase of convergence will bring challenges that are different from those that were successfully met during the first phase. In particular, a significant current account adjustment will be needed in order to stabilize the ratio of external liabilities to GDP—which has risen rapidly during the decade. And this adjustment may need to come against the backdrop of slower growth resulting from the maturing of convergence, the elimination of cyclical unemployment, and the anticipated decline of the population.

2. **Estonia has made great progress in achieving real convergence in the last decade**. As a result, its living standard has risen from among the lowest in the EU's new member states (NMS) to solidly in the middle (Figure 1). This has been achieved through high investment rates, averaging 33 percent of GDP in the last five years, some 8 percentage points above the NMS average (Figure 2). With a saving rate of only 23 percent of GDP (still 3¾ percentage points above the NMS average), Estonia's average current account deficit has been the largest in the region, about 10 percent of GDP. This has contributed to a large negative net international investment position (NIIP), equivalent to almost 100 percent of GDP at end-2005.

3. **Current account deficits are integral to convergence**. They reflect both high rates of investment in response to relatively scarce capital and well-educated labor forces, and consumption smoothing by households in anticipation of higher future incomes. Both are facilitated by new or expanded access to credit. Stavrev (2003) found that these forces are capable of explaining most of the current account magnitudes seen in the Baltics in the last decade. Bems and Hartelius (2006) construct two-sector neoclassical growth models with

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[1] Prepared by Mark Lutz.

Figure 1. EU8 Member States: Progress in Income Convergence to EU25 Average,
1996–2005
(GDP per capita in Purchasing Power Standards (PPS))
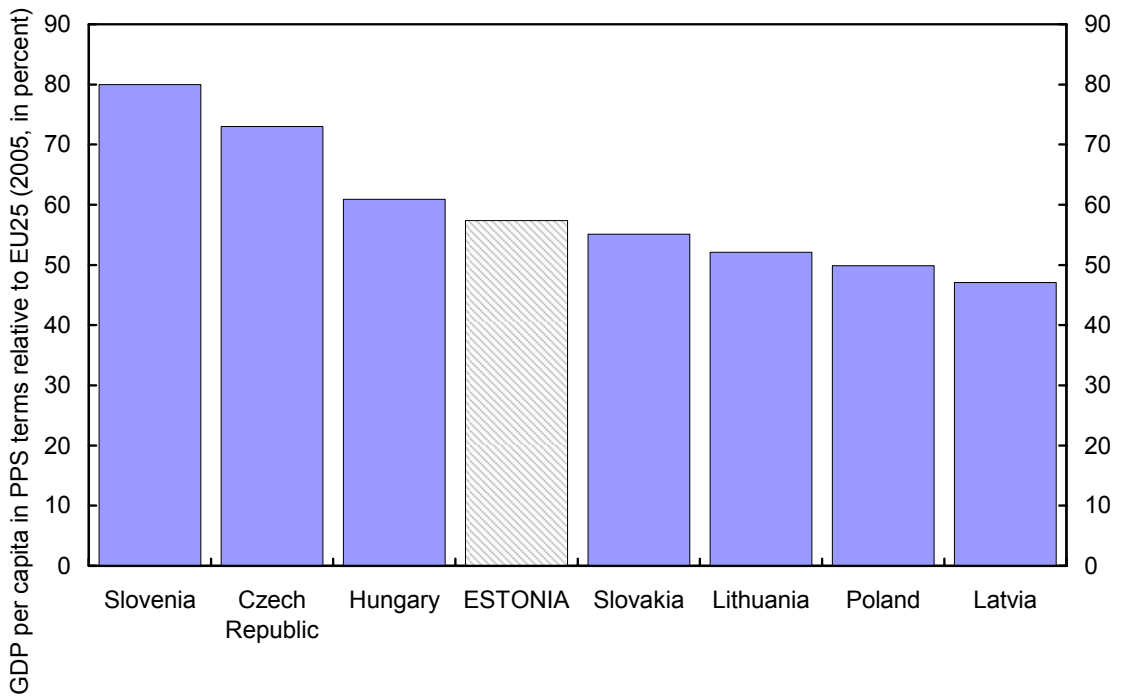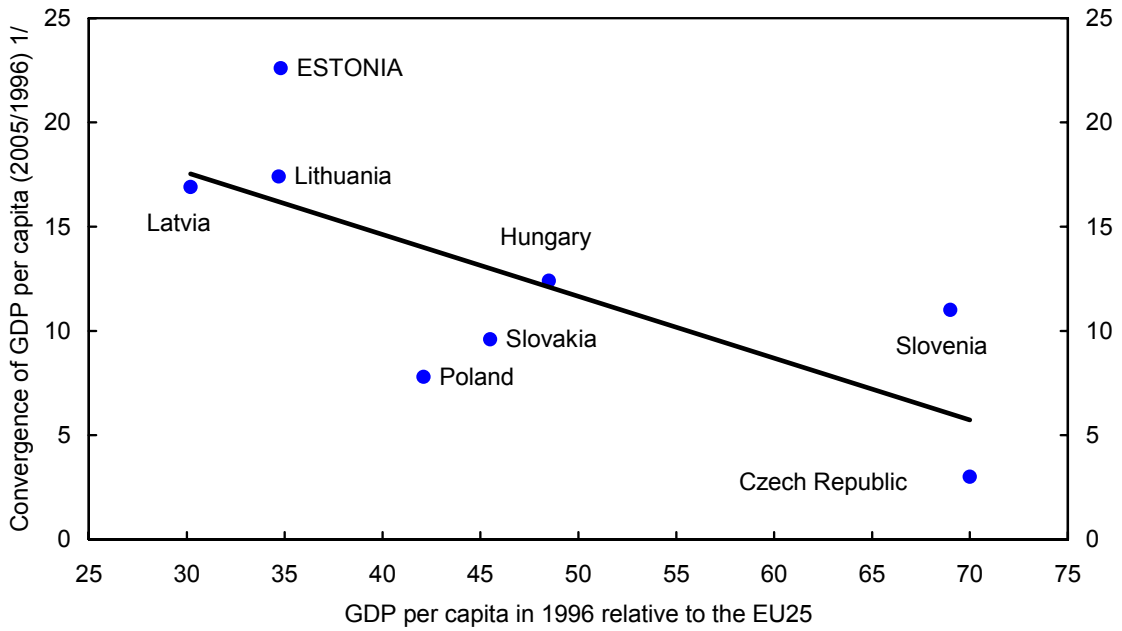
Sources: Eurostat; and staff calculations.
1/ Percentage point change in the ratio of per capita GDP to the average in the EU25.

Figure 2. Estonia: Investment, Saving and Current Account Shares, 1993–2005

Investment, Saving, and Current Account Shares
(2000-05 averages)

Cyprus | Czech Republic | Estonia | Euro area | Hungary | Latvia | Lithuania | Malta | Poland | Slovak Republic | Slovenia

□ Investment ▧ Saving ▨ Current account

Estonian Investment, Saving, and Current Account Shares

Investment

Saving

Current account

1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005

Sources: WEO; and staff calculation

dynamically optimizing households and enterprises, calibrated to data for the Baltic economies, and are also able to account for the observed magnitudes of the trade deficits experienced for 1995–2004. Moreover, as discussed further below, their model also generates an initial relative decline in the traded goods sector, as the nontraded sector blossoms, followed by a re-emerging traded sector necessary to service external debt. An IMF (2006) study of growth in EU NMS also notes the beneficial role of foreign saving in accelerating real income convergence.

4.   **A key question raised by this analysis is whether the large external imbalances, and the counterpart buildup in external obligations, will be smoothly reversed.** This depends in part on the current and prospective competitiveness of the tradable sector, and the flexibility of the economy—the two issues addressed next.

B. External Competitiveness Indicators

5.   **The standard approach to examining external competitiveness relies on measures of real effective exchange rates (REERs)**. Most of these are constructed by deflating nominal effective exchange rates by some relative price or cost measure. Each has merits and limitations, often trading off precision against data availability and timeliness. Lipschitz and McDonald (1992) present and analyze various measures, and recommend monitoring a range of indices as well as sectoral developments, thereby allowing for a richer and more firmly based set of inferences.

6.   **Estonia's real effective exchange rate has appreciated at a pace broadly comparable to those in other NMS, but this appreciation need not imply a loss of competitiveness.** Figure 3 examines various REERs, including ones based on deflators for overall GDP (REERgdp), and for value added in industry (REERind), as well as for unit labor costs in manufacturing (REERulcm).[2] All three measures show a slow but steady rise in Estonia of some 3½–6½ percent per year

External Competitiveness Indicators: Manufacturing
(2000 = 100)

Labor's relative labor share in value added

Unit labor cost REER

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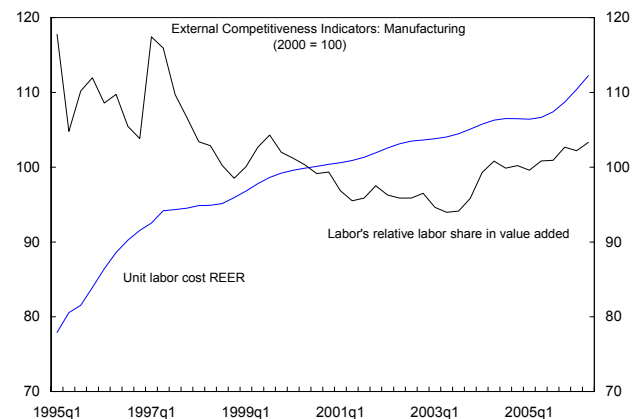
[2] REERgdp and REERulcm are provided directly by the European Commission (2006a). REERind is constructed by the author, using Eurostat data for industry deflators for Estonia and the EU12. Industry deflators are used because those for the manufacturing sector, its largest component, are not available. EU12 measures are used because employment data, needed to calculate labor productivity data, are not available for the EU25 prior to 2000. However, as the correlation coefficient between the various REERs for the EU12 and EU25 ranges between 0.97 and 0.99, it would appear that this would not influence the conclusions discussed below.

Figure 3.Estonia: Real Effective Exchange Rates, 1995–2006$^{/1}$

(2000 = 100)

REERgdp

Hungary
Slovakia
Czech Republic
Slovenia
Estonia
Poland
Latvia
Lithuania

REERulcm

Czech Republic
Hungary
Slovenia
Estonia
Slovakia
Latvia
Poland
Lithuania

REERind

Czech Republic
Slovakia
Poland
Estonia
Latvia
Lithuania

REERlab

Lithuania
Estonia
Slovakia
Latvia
Czech Republic
Poland
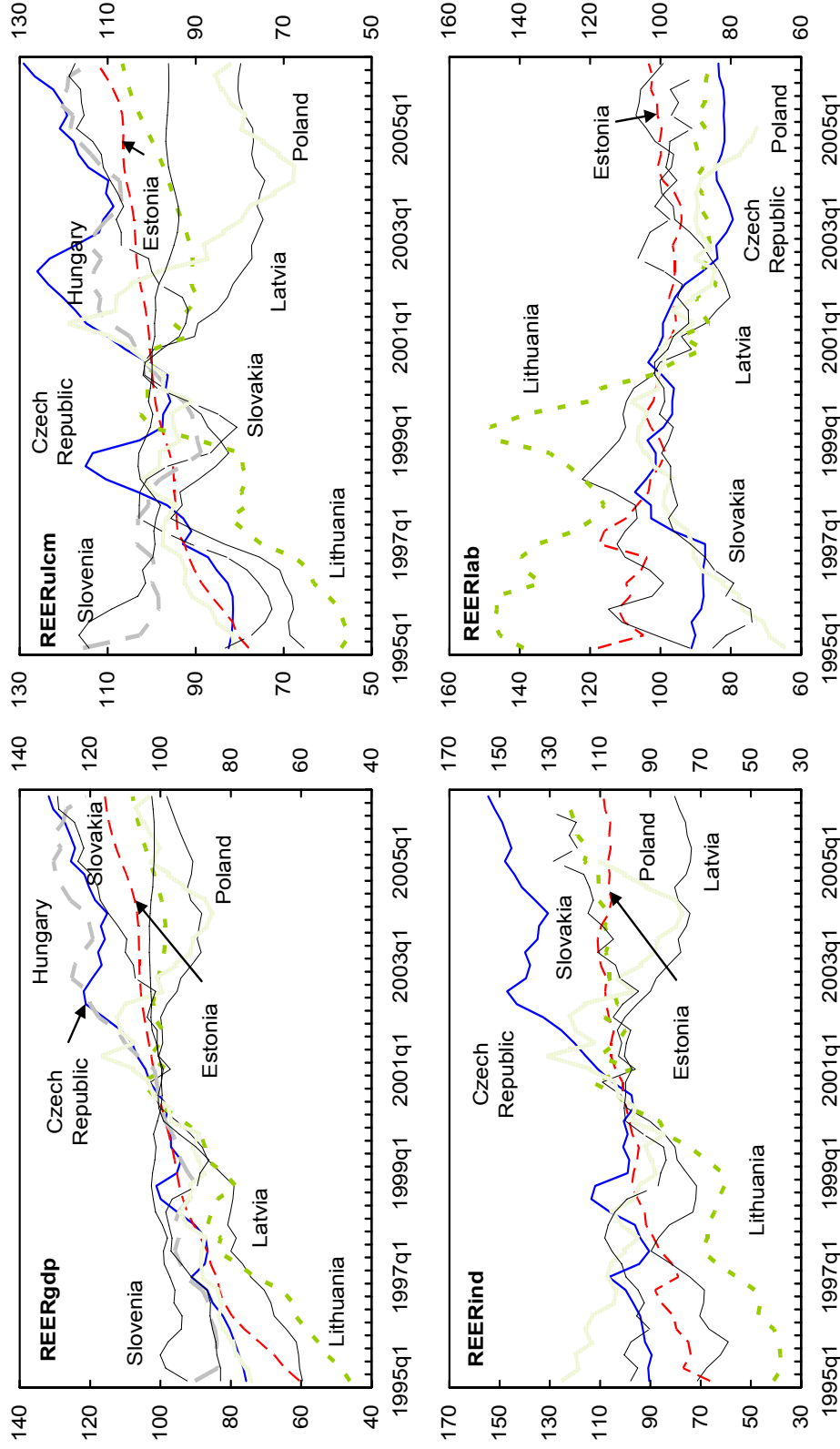
Sources: European Commission; and staff calculations.
1/ REERgdp is the real effective exchange rate against the EU12 based on relative GDP deflators, while REERulcm is based on unit labor costs in manufacturing, REERind is based on industry deflators, and REERlab is the ratio of REERulcm to REERind, and is identical to changes in an economy's labor income share in manufacturing relative to that in the EU12.

since 1995. The increases are broadly similar to those in other NMS: higher than in Poland, Hungary, Latvia and Slovenia, but lower than or the same as in the Czech Republic, Lithuania, and Slovakia. These increases, which appear to imply a loss of competitiveness, are also consistent with other possibilities. In particular, the rise in the GDP-based measure may reflect Balassa-Samuelson effects, as comparatively high productivity growth in the traded sector induces relatively higher price increases in nontraded sectors in the NMS compared with their trading partners. This is a natural concomitant to real convergence and would not suggest a worsening in external competitiveness. It is notable that the largest increases in this measure occurred in the rapidly converging Baltic states.

7.   **REER measures placing more weight on traded goods have also appreciated, although generally by less than the GDP deflator-based measure.** This is to be expected because the Balassa-Samuelson influences on these measures would be smaller. While the appreciation of these measures could signal losses in competitiveness, they may instead reflect compositional changes in the NMS's industrial sectors relative to those in their trading partners, and/or relative improvements in product quality, giving rise to higher export prices. As Estonia climbs the technological ladder in its exports, shifting from agricultural and textile products to higher technologically embodied products (including telecommunications equipment), its industrial deflator may have increased relative to its trading partners due to compositional changes. The shift in product mix is discussed in (Box 1).

8.   **The fourth, and most revealing, external competitiveness measure, which compares manufacturing labor's income share in the home country relative to those in its trading partners, suggests that Estonia's external competitive environment is becoming more demanding.** REERlab, which is calculated as the ratio of REERulcm to REERind, should not be systematically influenced by trend changes in export composition.[3] An increase in the index indicates falling profitability in an economy's traded goods sector relative to trading partners. This index has shown little variation over time in Estonia, and in fact declined slightly over the last decade. However, it has increased somewhat in the last two years, and calls for close monitoring. Since labor's economy-wide income share in Estonia has been stable during this period, the increase likely reflects an improvement in trading partner profitability (e.g., from Nordic and German wage moderation, Figure 4). This suggests that the external competitive environment is becoming more demanding.

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[3] While changes in export composition from climbing the technology ladder should be reflected in trend increases in the industrial deflator- and manufacturing unit labor cost-based REERs, taking their ratio should largely cancel out these trends, reflecting only changes in income shares in one economy compared to those in its trading partners.

Box 1. Estonia's Improving Export Composition

Estonia's economic restructuring has been evident in its export composition. The demise of the previous distorted trading system, both within the former Soviet Union as well within the CMEA, has resulted in a significant shift of productive factors toward areas with higher economic returns.

The change in export composition comprises both shifts in product mix and improvements in quality, a process underway to a relatively larger degree in Estonia than in most other new member states. The improvement in export composition and quality among EU new member states, taking advantage of comparatively well-educated workforces given prevailing wages, is well documented (see Zaghini (2005), Landesmann and Wörz (2006) and Fabrizio, Igan and Mody (2006)). In Estonia the shift was pronounced. The relative importance of animal and vegetable products and foodstuffs, which accounted for almost one-quarter of exports in the early 1990s, has declined substantially, as has to a lesser degree that of textiles. These products have been supplanted by machinery and equipment exports, especially for telecommunication goods. The share of "high-tech" exports increased rapidly in late 1990s, although it has subsequently slipped somewhat (Figure 5). Nevertheless, it compares well to developments in other new member states (Figure 6). Moreover, the improvement in the quality of exports implied by increases in the ratio of Estonia's export unit values to those of other exporters of similar products, has been among the highest in the region.

Estonia: Composition of Exports, 1993-2005
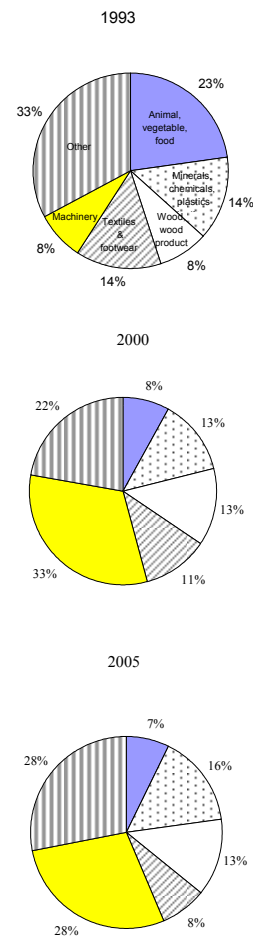
Sources: Statistical Office of Estonia; and staff calculations.

9.   **While the picture presented by the various REER measures is generally encouraging, it does not necessarily follow that the tradable sector is healthy.** Instead, it could reflect a "survival of the fittest," in which much of the tradable sector is buckling under severe competitive pressures, with declining market shares, and the "benign" REER developments merely reflect a shifting in the composition of exports toward those that are able to survive. It is important, therefore, as Lipschitz and McDonald (1992) argue, to supplement the standard REER measures with an examination of market shares and other indicators of sectoral developments. Estonia's WEO-based export share developments indicate that it has actually increased its market share, especially in the last few years, in part assuaging these concerns (Figure 7).

Figure 4. Estonia: Employee Compensation Share of GDP, 1993–2006

Estonia: Employee Compensation, 1993Q1-2006Q2
(Percent of GDP)

- not seasonally adjusted
- seasonally adjusted

1993Q1 1994Q4 1996Q3 1998Q2 2000Q1 2001Q4 2003Q3 2005Q2

58 56 54 52 50 48 46 44 42 40
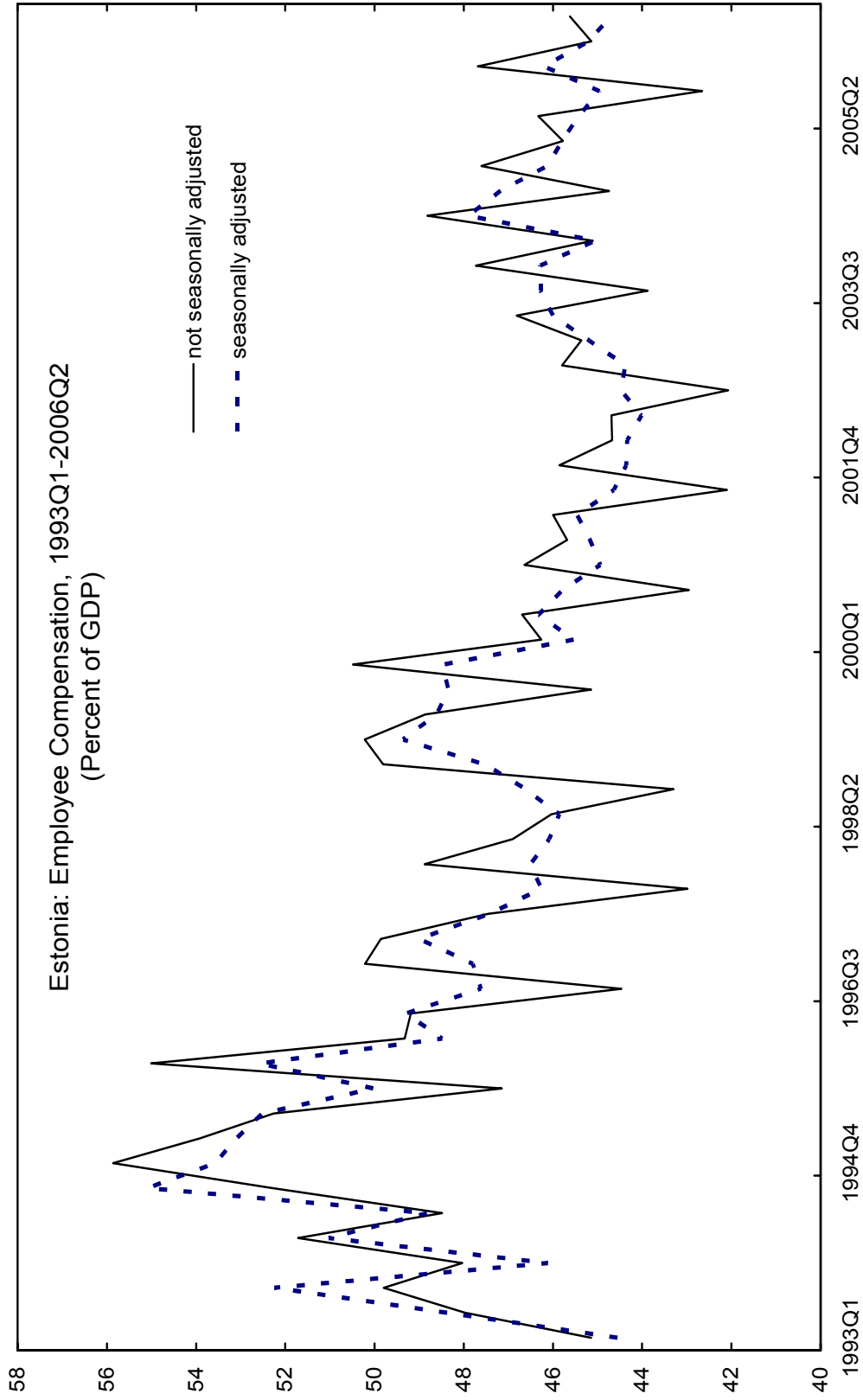
Sources: Statistical Office of Estonia; and staff calculations.

Figure 5. Estonia: Export Composition in the EU-15 Market, 1994–2004
(Share in percent of country exports-LHS; UVR-RHS)

All Products

High-Tech Products
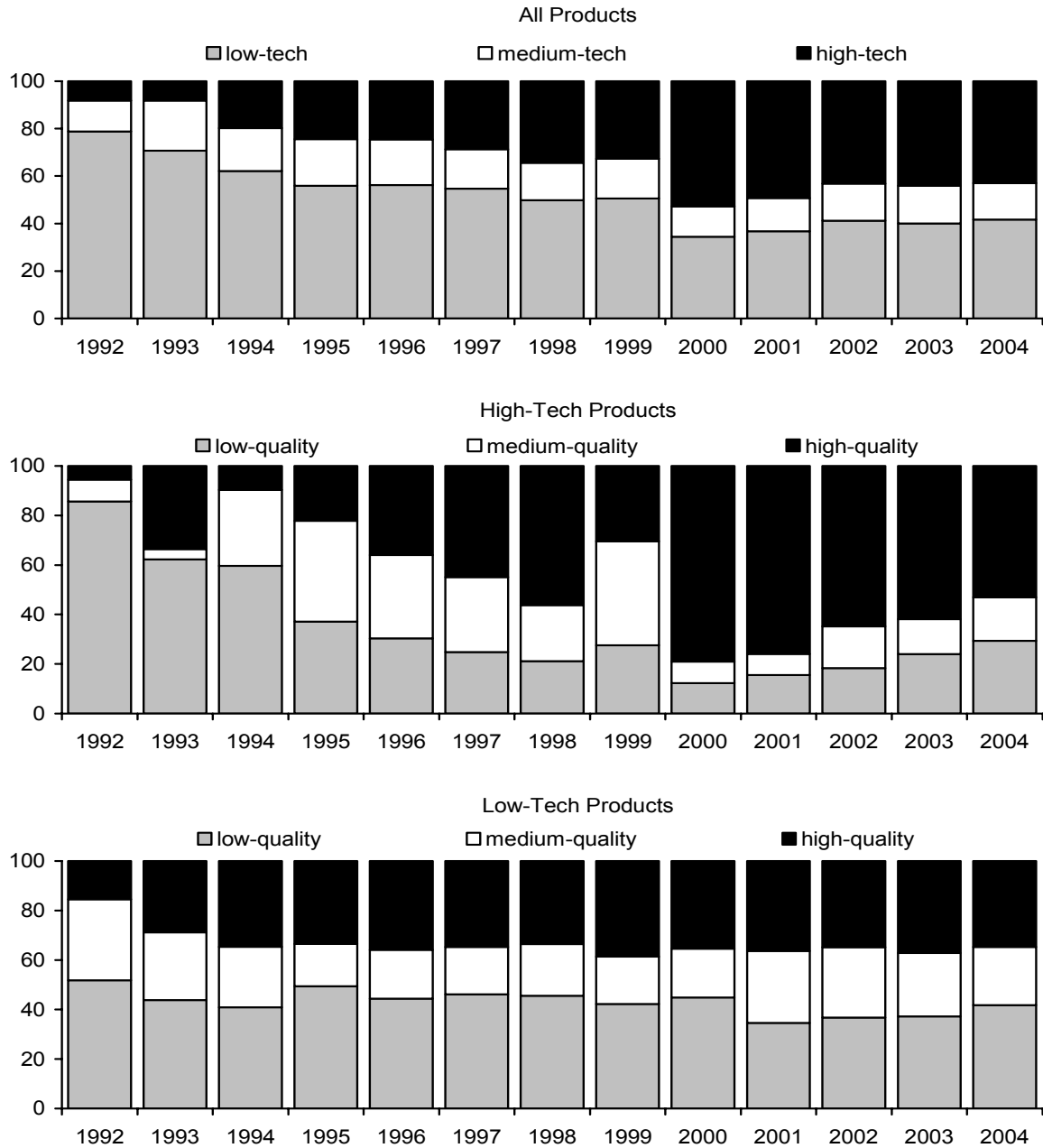
Low-Tech Products

Source: Fabrizio, Igan, and Mody (2006).
Note: Low technology industries include food products, beverages and tobacco, textiles, leather, wood and paper products, and basic metals. Medium technology industries are chemicals, plastics, and rubber. High technology industries comprised machinery, electrical and optical equiment, and transport equipment. Each insdustry is divided into three quality segments by ranging the products according to their unit values.

Figure 6. NMS: Moving Up the Technology and Quality Ladder, 1994–2004
(Share in percent of country exports-LHS; UVR-RHS)
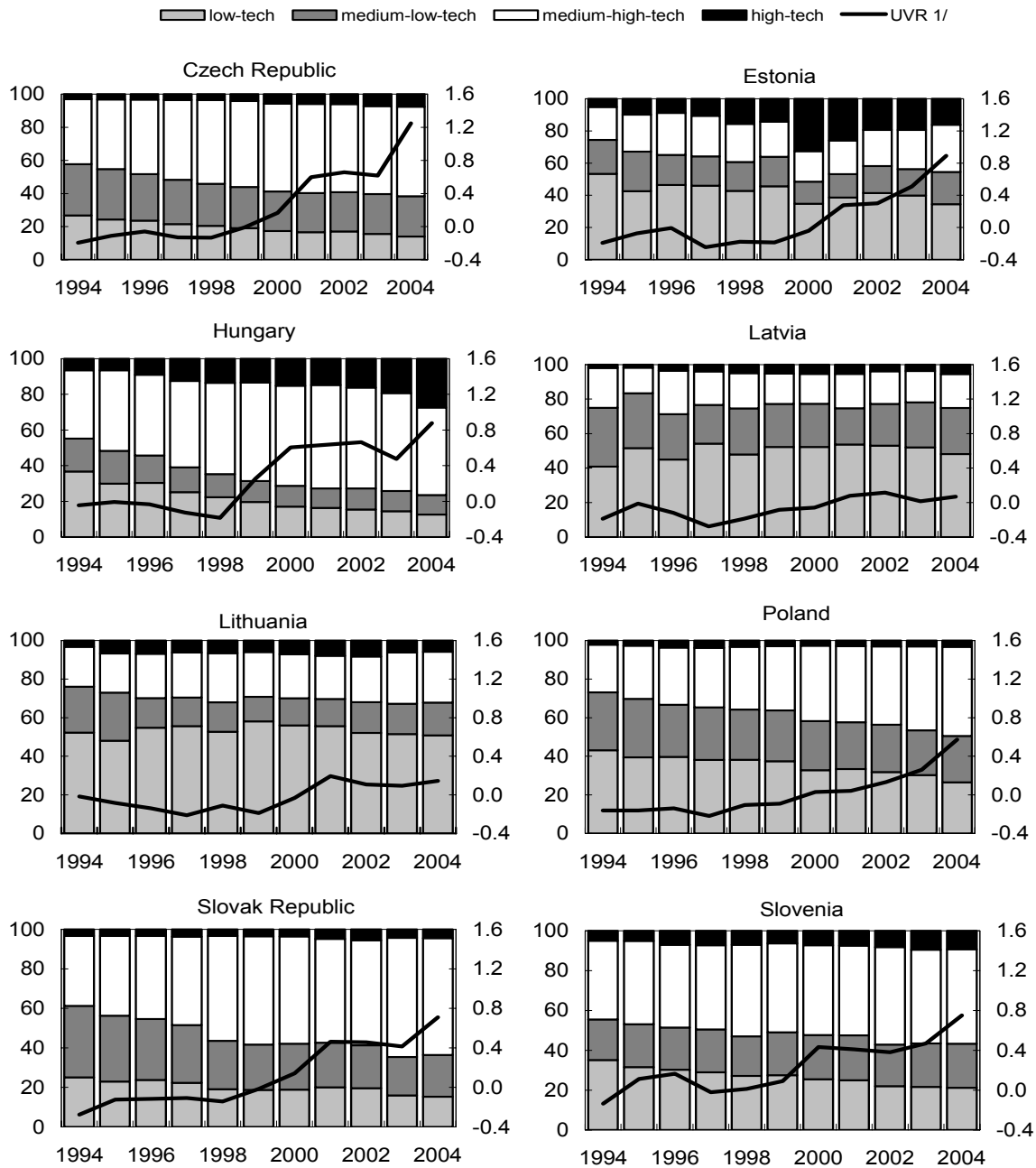
Sources: Fabrizio, Igan, and Mody (2006).
1/ UVR is the unit value of a country's exports divided by the unit value of world exports. Expressed in logarithm so that a value of zero means country unit value equals world unit value.

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Figure 7. Estonia: WEO-Based World Trade Shares, 1995–2005
(2000 = 100)
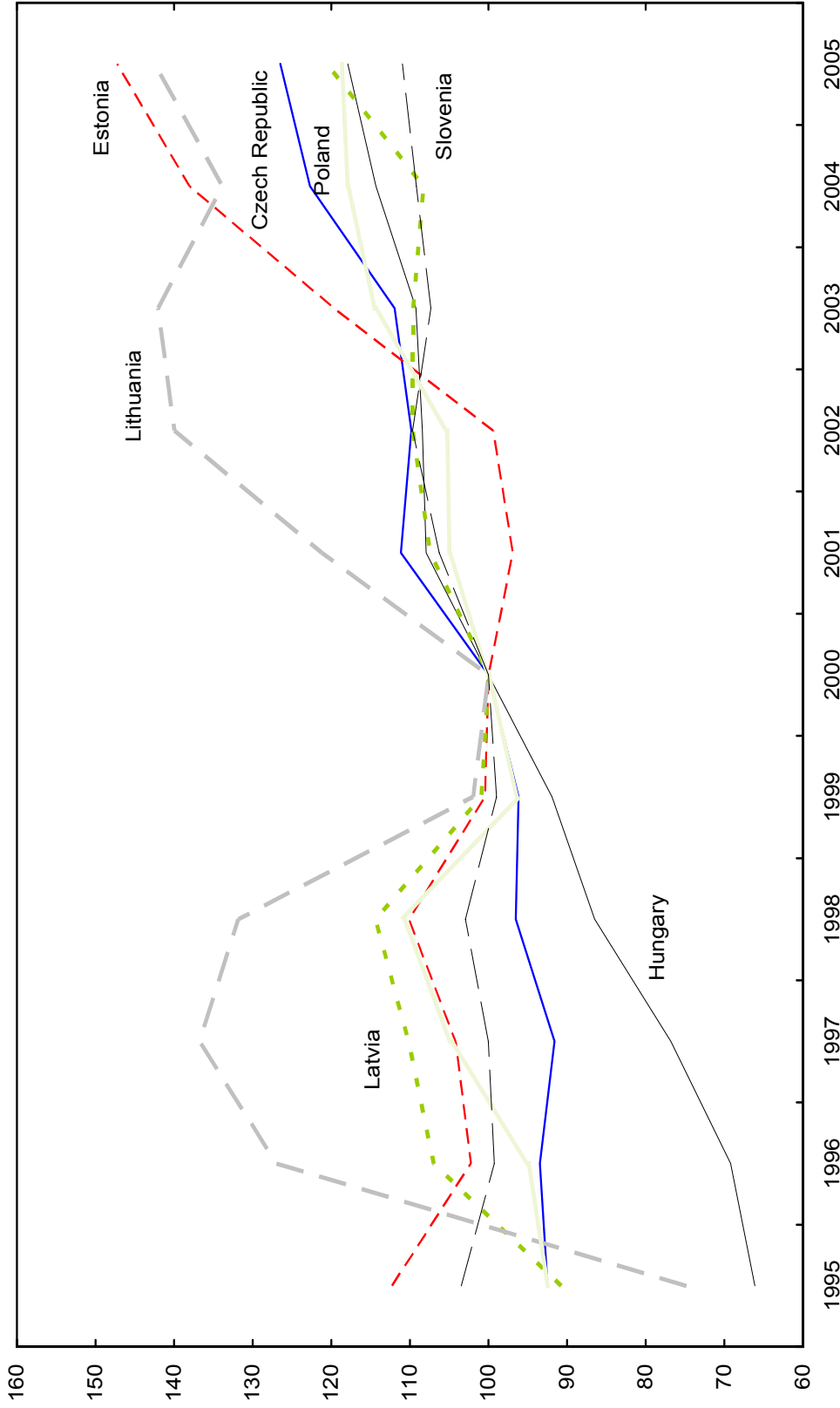
Sources: WEO database (Winter 2006); and staff calculations.

10.   **Moreover, the share of industry in the economy has grown in Estonia, as in most NMS (suggesting that the tradable sector growth is outpacing overall growth), while it is declining in the EU15's economy.** Economic growth in the NMS has outpaced that in the EU15 over the last decade, and, with the exception of Hungary and Latvia, their industrial sectors have exhibited an even larger relative expansion (Figure 8). The tradables sectors' command of a rising share of resources is consistent with higher relative profitability, as predicted by Bems and Hartelius (2006), suggesting adequate external competitiveness.

11.   **In sum, the evidence suggests that Estonia's external competitiveness is presently adequate.** However, as discussed in section E below, growing macroeconomic overheating pressures, reflected in rising inflation in nontradables, pose a risk that the trend shift of resources into the tradeables sector may come under pressure.

C. External Adjustment Requirements

12.   **Although the export sector is presently competitive, Estonia's current account deficit is too large to be sustained over the medium term, since external obligations are rising faster than GDP.** Stabilizing the ratio of external obligations to GDP will require a shift in the net export position—and in its counterpart, the domestic saving/investment balance. The magnitude of the required external adjustment depends on a number of factors, including the pace of economic growth, the return on external obligations, and the level at which the external stock position stabilizes as a share of GDP. While growing interest and dividend payments increase the current account deficit and the negative NIIP, economic growth reduces the relative burden of the NIIP. It can be shown that the change in the economy's NIIP position relative to GDP evolves according to the following equation:

$$\Delta(NIIP/GDP) = PCA/GDP + (i - g)*NIIP/GDP, \tag{1}$$

where PCA is the primary current account deficit, i is the effective net nominal interest rate (including dividends for FDI) on external claims and obligations, and g is the economy's nominal growth rate.[4] When the NIIP share is stabilized, the equation can be rewritten as:

$$- PCA/GDP = (i - g)*NIIP/GDP \tag{2}$$

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[4] The primary current account is defined as the current account less net income flows relating to net foreign financial claims. However, it also includes net capital transfers. See Lane and Milesi-Ferretti (2006) for a fuller discussion.

Figure 8. Estonia: Relative Output Developments, 1995–2006
$(2000 = 100)$
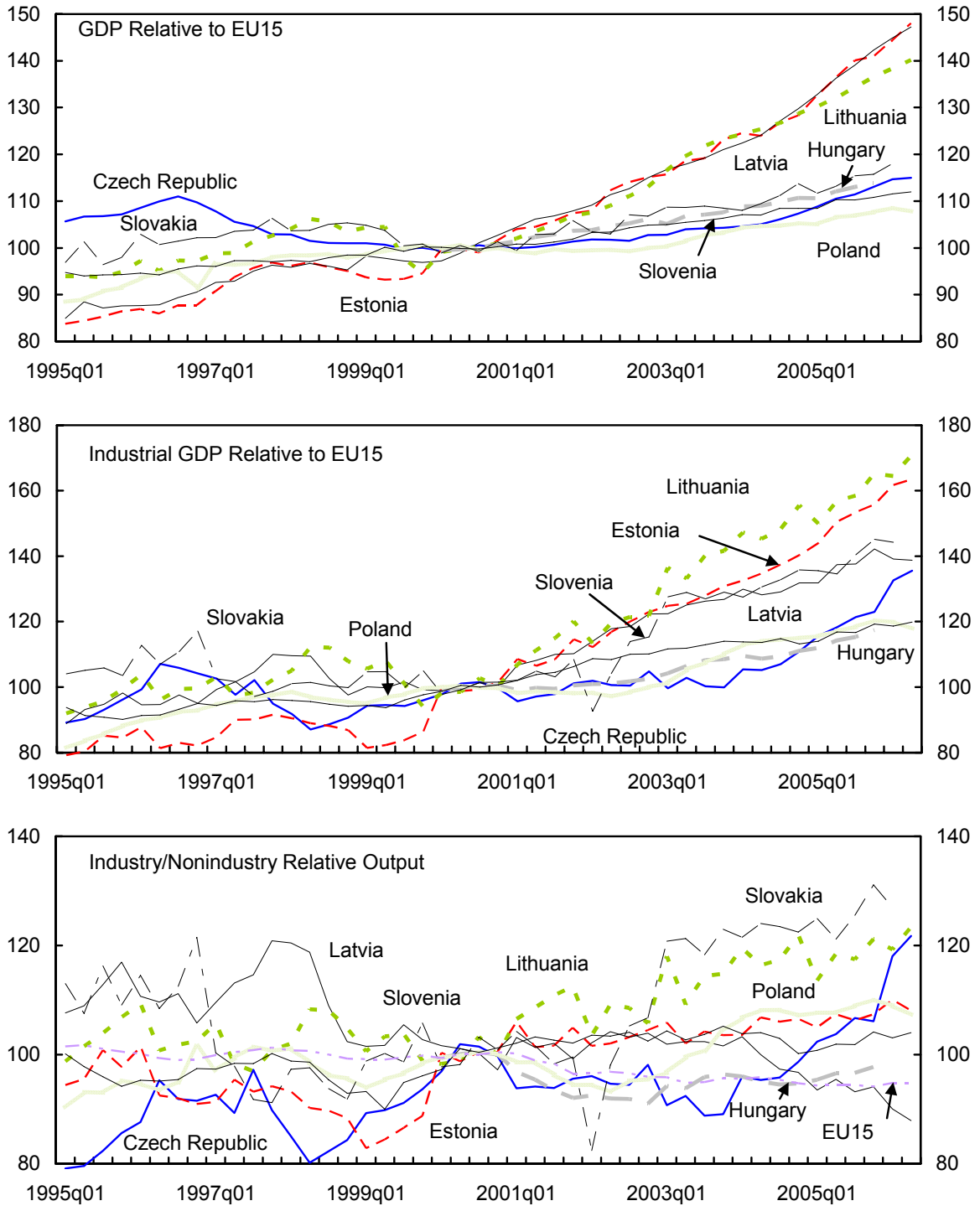
Sources: European Commission; and staff calculations.

Stabilizing the NIIP to GDP ratio requires a primary current account balance that is large enough to offset NIIP servicing obligations, adjusted by the economy's growth rate. The higher the debt service the stronger is the primary current account required to stabilize the NIIP ratio. On the other hand, the higher is the economy's long-term growth rate, which acts to reduce the NIIP ratio by increasing the economy's size, the lower is the required adjustment. The table below shows the adjustment in the primary current account required for Estonia for various combinations of "interest rate-less-growth rate" factors and the stabilized NIIP ratio. Under current conditions, an NIIP ratio of 100 percent of GDP and (i – g) equal to about -2¼ percentage points on average over the last decade (owing to strong growth and low interest rates),

Primary Current Account Adjustment Needed to Stabilize the NIIP
(percentage points of GDP)

NIIP share (NIIP/GDP)	interest rate less growth rate (i - g)				
	-5	-2.5	0	2.5	5
-50	2.1	3.3	4.6	5.8	7.1
-75	0.8	2.7	4.6	6.5	8.3
-100	-0.4	2.1	4.6	7.1	9.6
-125	-1.7	1.5	4.6	7.7	10.8
-150	-2.9	0.8	4.6	8.3	12.1
-175	-4.2	0.2	4.6	9.0	13.3
-200	-5.4	-0.4	4.6	9.6	14.6

shaded area denotes recent averages

an improvement in the primary current account of only about 2¼ percentage points of GDP from an end-2005 deficit of 4.6 percent of GDP would be required to stabilize the NIIP ratio. However, were the (negative) NIIP ratio to increase, and were the "interest rate-less-growth rate" differential to increase (both likely outcomes), the amount of required adjustment would be larger, perhaps 5–10 percentage points of GDP.

13. **The ease of effecting the needed shifts in the net export position will depend largely on the economy's growth potential and the flexibility of its factor and product markets.** If past borrowing has been invested profitably, then one should expect to see a smooth reduction in investment rates as capital-output ratios approach those in the rest of the EU. Similarly, household saving rates should begin to rise with rising incomes in order to repay earlier borrowing for consumption smoothing. This is apparent in the Baltic-calibrated model of Bems and Hartelius (2006), which suggests that trade balances should become positive around 2010. However, continued high investment in Estonia, including in residential construction, spurred in part by low interest rates, and rapid import growth associated with economic overheating may be delaying the projected improvement in the trade balance. Nevertheless, eventual shifts of resources will be easier the more flexible are product and factor markets. In addition, continued strong growth will both help to reduce the scale of NIIP servicing obligations, and reduce the need to shift resources out of the nontraded sector, which would simply need to grow less rapidly than the tradable sector.

D. Institutions and Flexibility

14. **International comparisons and Estonia-specific studies suggest that its labor and product markets are flexible, easing the transfer of factors of production in response to evolving opportunities, and facilitating rapid real income convergence.**

Product Markets

15.   **Estonia ranks favorably on institution-based measures of the competitiveness of the business climate** (Table 1). On many measures, Estonia ranks in the top half of EU25 economies, and among the best of the NMS. For some of the component rankings, Estonia's high scores may be attributable as much to efficient government activities as to enterprise efficiency (e.g., low licensing requirements and the ease of paying taxes—where many are now effected electronically). In some areas where Estonia ranks less highly, the rankings are puzzling. Business startup and closing regulations appear to be comparatively onerous on the basis of these rankings. However, Masso, Eamets, and Philips (2004a) document high rates of firm turnover (the sum of entry and exit rates) by international standards, higher even than in the United States, suggesting that startup and closing regulations have not been unduly burdensome in practice.[5] Similarly, while Estonia comes out as a negative outlier in hiring and firing costs, its high job turnover (discussed below) would suggest that these costs are not decisive. A third anomalous finding is that bank credit is difficult to obtain—Estonia ranks sixth among the ten NMS. This is difficult to understand in light of 65 percent growth in bank credit to nonfinancial enterprises in 2005–06.

Labor Markets

16.   **Estonia's labor market institutions promote considerable flexibility.** These measures include time-limited, job search-conditional, and relatively low unemployment benefits, minimum wages set low enough relative to average earnings to not price out low-productivity workers, flexible wage bargaining to reflect individual/regional idiosyncrasies (often best achieved through firm-level bargaining), and less demanding employment protection legislation. Tables 2 and 3 present internationally comparable data on minimum wages and unemployment benefit systems, suggesting that the institutional setting supports labor market flexibility in Estonia. Minimum wages, while they have increased in the last decade, are still the second lowest (as a share of average gross wages) in the EU (after Spain). Unemployment benefits are among the lowest in the EU—while this ratio was increased in 2003, eligibility requirements were also tightened. As regards wage bargaining, Backé,

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[5] Masso, Eamets, and Philips (2004a) also note that Estonian entry and exit rates substantially exceed those in the Slovenian manufacturing sector. See also De Loecker and Konings (2003).

Table 1. Estonia: Selected Institutional Competitiveness Indicators

	Overall Ranking	Among EU25	Among NMS10 1/	Total Ranked
Institution				
Institute for Management Development 2006				
Overall	20	8	1	61
Economic performance	12	4	1	61
Government efficiency	11	4	1	61
Business efficiency	22	8	1	61
Infrastructure	35	17	3	61
World Economic Forum 2006	25	11	1	125
Fraser Institute Economic Freedom of the World	12 2/	4 2/	1	132
Heritage Foundation 2006	7	4	1	164
Transparency International Corruption Perception	27	15	2	159
IBRD Doing Business in 2007	17	7	2	175
Starting a business	51	11	3	175
Dealing with licenses	13	2	1	175
Employing workers	151	19	8	175
Registering property	23	7	3	175
Getting credit	48 3/	15	6	175
Protecting investors	33 4/	5	1	175
Paying taxes	29	4	1	175
Trading across borders	6	3	1	175
Enforcing contracts	20	9	4	175
Closing a business	47	16	4	175
IBRD Governance Indicators 2005				
Voice and accountability	31	17	4	208
Political stability	70	16	8	213
Government effectiveness	37	14	2	210
Regulatory quality	19	9	1	203
Rule of law	49	16	3	208
Control of corruption	41	13	2	204

Sources: IMD; WEF; Fraser Institute; Heritage Foundation; Transparency International; IBRD; Kaufman, Kraay, and Mastruzzi; and staff
1/ European Union (EU) new member states.
2/ Tied with Austria, Finland, and the Netherlands.
3/ Tied with 16 other economies, including Belgium, Slovenia, and France.
4/ Tied with 12 other economies, including Portugal.

Table 2. Estonia: Minimum Wages as a Percent of Average Gross Wages,
1995–2004

	1995	2001	2004
Belgium	52	46 1/	...
Czech Republic	27	34	37
Cyprus	...	...	...
Estonia	26	29	34
France	47-48	47-48	46-48 2/
Greece	...	...	47
Hungary	31	39	36
Ireland	...	51	51
Latvia	31	38	38
Lithuania	28	44	38
Malta	52	43	44
Netherlands	48	45	...
Poland	41	37	36
Slovak Republic	34	40	41
Slovenia	41	41	44
Spain	42	35 3/	33
United Kingdom	...	37	40

Source: Eironline (2005)
1/ 2002.
2/ 2003.
3/ 2000.

Table 3. Estonia: Main Features of Unemployment Benefit Systems in Central and Eastern European Countries

	Date	Reference period	Required min.	Max. duration of benefits	Relation to gross earnings (in percent)	Unemployment benefit levels (minimum and maximum, expressed in % of minimum wage)	
						minimum	maximum
Czech Republic	1998	3 years 1/	12 months	6 months	50 first 6 months, 40 following 6 months (60 in case or retraining course)	None (but 70 of MLS if not employed before) 2/	150-180 of MLS
Estonia	1995	1 year	180 days	6 months (3 months extensions considered on individual bases)	Flat rate - 60 of minimum wage		
	2001	3/ 2 years	1 year	1 year	50 in the first 100 days, 40 thereafter	40 of average wage	150 percent of average wage
Hungary	1997	4 years	90 days	1 year	65 4/	90 of minimum old-age pension	180 of minimum old-age pension
Latvia	1993			6 months	90 of minimum wage (70 for new entrants)	70 of minimum wage	140 of minimum wage
Lithuania	1993			6 months	70, later reduced to 60 and 50		
Poland	1997	18 months	1 year	18 months	Flat rate at 378.2 cz	None	None
Slovak Republic	1997	3 years	12 months	12 months	60 first 3 months, 50 following 9 months	None	None

Source: Vodopivec, Worgotter, and Raju (2005).
1/ Not required if enrolled in a training course.
2/ MLS (minimum living standard).
3/ Effective 2003.
4/ Unemployed earnings from casual work not more than half of the minimum wage per month remains entitled to full unemployment benefits.

Thimann and others (2004) report that, as in most other Central and Eastern Europe Countries (CEECs), wage bargaining occurs at the company level, minimizing risks that local conditions are not taken into account.[6]

17.   Most studies find that labor markets are more flexible in CEEC economies than in other EU economies, with Estonia's labor market among the most flexible. Ederveen and Thissen (2004) examine various aspects of labor market institutions, including unemployment benefits, active labor market policies, taxes, the role of unions, employment protection legislation, and minimum wages, and conclude that on balance the institutional setting is more supportive of flexible labor markets in the CEEC than in the EU15, with Estonia among the most liberal of CEEC economies. Backé, Thimann and others (2004) emphasize the need for labor market flexibility (including downward nominal wage flexibility) in an optimal currency area. They conclude that employment protection legislation (EPL) is less strict in the accession economies than in the euro area. They also note that nominal wage flexibility was apparent in some sectors in Baltic economies after the Russia crisis. They contend that Estonia and Hungary have the most flexible labor markets, because of weak EPL (in contrast to the assessment in Table 1), limited roles for trade unions, low levels of social protection, and high levels of wage flexibility.

18.   **Estonia-specific studies also find that the labor market is flexible**. Haltiwanger and Vodopevic (2002) examine job turnover patterns during 1991–94, the initial period of economic restructuring. Job destruction at first far outpaced job creation, with a rapid rise in unemployment. In the latter part of this period, however, job destruction slacked off while creation picked up to about the same pace, with job reallocation (i.e., redundancies) accounting for slightly more than one half of worker reallocation, a pattern remarkably similar to that observed in the United States. Moreover, many transitions were characterized by job-to-job flows, rather than transitions through unemployment spells or periods outside the labor market.[7] Masso, Eamets, and Philips (2004b) update Haltiwanger and Vodopevic's analysis using data for 1995–99, and confirm that the patterns exhibited in the middle of the 1990s have persisted through the end of the century. Lehmann, Philips, and Wadsworth

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[6] It is not possible to undertake a standard analysis of regional unemployment disparities in Estonia and the other Baltic states (as well as in Slovenia), as they are each one NUT2 region. County-wide unemployment rates do diverge in Estonia, and has generally been the highest in the northeast (Ida-Virumaa), an area where many firms were rendered uncompetitive with the demise of the CMEA trading system, and which is heavily populated by non-native Estonian speakers, In contrast, the unemployment rate is the lowest in the county containing the capital city. Nevertheless, the unemployment rate fell sharply in all but one county in 2005, with further reductions in the first half of this year, including in the northeast.

[7] The authors contrast these patterns with those observed in Slovenia, where labor market institutions were much less conducive to rapid job creation and reallocations, and which experienced much lower rates of job-to-job transitions.

(2005) examine the 1989–99 period, and conclude that worker displacement rates fell rapidly to levels experienced in developed market economies shortly after the initial restructuring shock. Moreover, they found that Estonian displaced workers were quite similar to those in developed economies, disproportionately represented by the less skilled and those with short job tenures. Finally, about half of displaced Estonian workers found new jobs within two months, and there was less evidence of wage penalties for job losses than in some western economies.

E.   Potential Risks and Future Challenges

19.   **Estonia's restructuring and real convergence have been impressive, but these very successes are creating new challenges.** Economic growth has recently surged, exceeding 10 percent in 2005, and is set to do the same in 2006, creating overheating pressures that could endanger external competitiveness and possibly divert resources needed to service growing external obligations. Moreover, recent research by Fabrizio, Igan, and Mody (2006) suggests that initial gains in export shares in the previous decade by NMS from restructuring and technological improvements were comparatively "easy" in light of low initial conditions, suggesting that continued "catching up" and economic convergence will require more intensified efforts.

20.   **Recent signs of economic overheating threaten to interrupt or even unwind the ongoing gradual shift of resources to the tradable sector.** Interest rates in the euro area, to which Estonian rates are closely linked under the CBA, have been too low from a domestic perspective. This, combined with exuberant confidence, has led to economic expansion at a pace well above underlying potential, and a booming housing market. There is a risk that household expectations may become overly optimistic in projecting future increases in income, leading to excessive borrowing to smooth anticipated consumption paths. With cyclical unemployment largely exhausted, labor shortages may draw limited labor resources from the tradable sector. Moreover, pressures for wage increases in excess of productivity gains are rising, also threatening external competitiveness.

21.   **In addition, borrowing on the basis of expectations that are not subsequently borne out could lead to a protracted period of low growth, worsening the burden of servicing debt, and increasing vulnerabilities to unforeseen shocks**. Borrowing that turns out to have been excessive could result in tepid domestic demand growth during the (possibly prolonged) interval while private sector balance sheets are restructured, as in Japan in the 1990s and more recently in Portugal.[8] Despite Estonia's high return to investment and its flexible product and factor markets, this possibility cannot be ruled out, as external shocks (such as sizable increases in natural gas prices, or contagion effects of shocks elsewhere)

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[8] See Cardoso (2005) for a brief note on Portuguese developments.

could alter perceptions of sustainability in light of Estonia's large, and rapidly growing external liability position. The length and severity of such a downturn would depend in part upon the response of real wages to weak domestic demand, and the ease with which resources could be channeled to the relatively more vibrant tradeables sector. Thus, it remains important to limit the risks from overexuberant expectations through continued conservative macroeconomic policies, and to maintain the economy's flexibility through liberal economic institutions.

22.   **Aside from cyclical considerations, it will be increasingly difficult to achieve continued convergence in living standards by climbing the technological ladder.** Given Estonia's worsening demographic prospects, with the working-age population set to begin declining in coming years, continued improvements in living standards will increasingly depend on technological improvements. Shifting comparative advantages and rising local wages, both natural results of economic convergence, threaten the competitiveness of sectors that depend on low wages. While Estonia's shifting export composition has been comparatively impressive, continued gains will require dedicated efforts including continued investments in human capital. The educational system can be strengthened (especially at the vocational level) to meet rapidly changing employer demands. The level of research and development expenditures is also comparatively low. These shortcomings are identified and addressed in the authorities' *Action Plan for Jobs and Growth* for implementing the Lisbon strategy. The proportion of university graduates should be increased (BNS 2006) in order to provide the basis for eventual increases in domestic research and development (R&D).[9] These improvements would aid in competing with more technologically demanding trading partners.

F.   Summary and Conclusion

23.   **Estonia's CBA and supportive macroeconomic and structural policies have helped foster rapid increases in living standards, but continued convergence will be increasingly demanding.** While high investment has come at the cost of rising external obligations that must be serviced, it has also boosted export capacity. Indeed, Estonia's exports remain competitive, and are moving up the technology ladder, albeit with some reversals. Indicators suggest that product and factor markets are flexible, which should facilitate the further expansion of the tradable sector that is necessary to stabilize net external liabilities. While the progress to date has been smooth, a number of risks stemming from economic overheating deserve careful monitoring. Moreover, continued technological

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[9] Gros (2006) argues that a higher proportion of university graduates is a precondition for effectively increasing R&D spending. While Estonia's R&D spending, at 0.91 percent of GDP in 2004 is above the 0.78 percent of GDP NMS average, it sizably lags the 1.92 percent of GDP EU15 average (Eurostat database). A similar picture emerges in examining the share of the employed engaged in R&D activities.

progress will require increased efforts to boost human capital. Estonia's macroeconomic stability and flexible institutions provide an excellent foundation for meeting the challenge—it still will be important to preserve these achievements while fostering an environment where innovation and technological improvements can flourish.

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II. ASSESSMENT OF BALANCE SHEET EXPOSURES IN ESTONIA[10]

A. Introduction

1. **Estonia's impressive economic performance has coincided with a build-up of large balance sheet exposures and debt-related vulnerabilities.** The external current account deficit has remained above 10 percent of GDP in the past few years, and net external liabilities have piled up, approaching 100 percent of GDP by end-2005. While the use of foreign savings has underpinned strong growth, it has also led to heightened vulnerabilities. The presence of vulnerabilities does not imply that a crisis is inevitable or even likely. Still, they need to be studied in order to understand how shocks , should they occur, could affect balance sheets and through what channels such effects could propagate through the economy.

2. **The balance sheet approach (BSA) uses an integrated and consistent framework to analyze debt-related risks.** The economy is divided in sectors and data on inter-sectoral financial claims are pulled together in a single matrix. This matrix allows the identification of sectoral vulnerabilities and cross-sectoral linkages that could facilitate the transmission of shocks across sectors.[11] Typically, the matrix helps detect vulnerabilities associated with mismatches in maturity, currency, and capital structure, as well as mismatches between a sector's total financial assets and liabilities.[12]

3. **This paper applies the BSA to Estonia.** Data from various sources were used to put together two matrices with identical formats summarizing cross-sectoral financial positions in the economy at two points in time (Section B), and the matrices were studied to identify mismatches that indicate the presence of vulnerabilities (Section C). The paper does not discuss the likelihood of the shocks that could affect the economy through these vulnerabilities: such a discussion would be speculative and beyond the scope of the paper's more factual exercise. Two other new EU member states, Latvia and Hungary, have been recently studied from the perspective of the balance sheet approach; a brief comparison between this paper's and these studies' results is made (Section D) before providing a few concluding remarks (Section E).

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[10] Prepared by Nada Choueiri.

[11] By construction, the BSA—and, therefore, this paper—has two main shortcomings. First, it excludes nonfinancial assets, which implies that a sector's net worth is underestimated. Second, and perhaps more importantly, it does not allow detecting within-sector vulnerabilities since intra-sectoral positions are consolidated out.

[12] See Allen and others (2002) or Rosenberg and others (2005) for a more detailed background on using balance sheets to identify vulnerabilities.

B. The Aggregate Balance Sheet Matrix

4.   **The balance sheet matrix compiled for Estonia identifies five sectors and five groups of instruments.** The sectors are the general government (GG), the central bank (EP), the private financial sector (banks and leasing companies, hereafter referred to as banks), the other—that is, nonbank and non-leasing companies—private sector (NBPS), and nonresidents (NR). The matrices were assembled using banking sector balance sheet data and international investment position statistics compiled by Eesti Pank (Estonia's central bank), and data on general government assets and liabilities provided by the Ministry of Finance, as explained in the data appendix.[13] The financial instruments included in the matrix are classified in five categories: short-term and long-term domestic currency instruments, short-term and long-term foreign currency instruments, and equity.[14] The first four categories comprise cash and all non-equity financial instruments (such as loans, deposits, bonds, and notes). The fifth is included to shed light on the capital structure of assets and liabilities, allowing for the identification of possible capital structure imbalances.

5.   **To assess the evolution of vulnerabilities over time, balance-sheet matrices were compiled for both end-2001 and end-2005** (Tables 1 and 2). The choice of these two years allows the paper to focus on the evolution of vulnerabilities during a period when the current account deficit widened into double digits (from 5.2 percent of GDP in 2001) and the reliance on international capital inflows increased significantly. The data for 2005 are the most recent currently available.

C. Estonia's Balance-Sheet Vulnerabilities

Overall Sectoral and Cross-Sectoral Positions

6.   **The balance sheet matrices for 2001 and 2005 testify to a continued strong public sector position and a robust underpinning of the currency board arrangement (CBA).** Both the central bank and the government continue to maintain significant financial cushions (Figure 1). At above EEK 25 billion, Eesti Pank's foreign currency assets cover more than 100 percent of its domestic currency liabilities, in line with the rules of the CBA. Also, Eesti Pank's net asset position vis-à-vis nonresidents is large enough to cover its liability position vis-à-vis each sector in the domestic economy. As for the government,

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[13] Aside from the data used in this paper, Eesti Pank and the Statistical Office of Estonia compile two separate sets of financial accounts for Estonia, to be transmitted to the ECB and to Eurostat respectively. The Statistical Office publishes a partial set of these data on its website, and most recent data cover the period up to 2004 only, whereas Eesti Pank's data are as yet unpublished. Both institutions plan on publishing the complete datasets on their websites in the near future.

[14] Equity includes both direct investment and portfolio equity.

Table 1. Estonia: Intersectoral Asset and Liability Positions, December 2001
(In millions of EEK)

Instrument Holder / Counterpart Sector	Eesti Pank			General Government			Banks			Nonbank Private Sector			Nonresidents		
	Assets 1/	Liabilities 1/	Net 1/2/	Assets 1/	Liabilities 1/	Net 1/2/	Assets 1/	Liabilities 1/	Net 1/2/	Assets 1/	Liabilities 1/	Net 1/2/	Assets 1/	Liabilities 1/	Net 1/2/
Eesti Pank															
In domestic currency				1	0	1	8	4929	-4921	489	6991	-6502	0	1442	-1442
Short term				0	0	0	8	4929	-4921	75	6991	-6916	0	0	0
Medium & Long term				1	0	1	0	0	0	414	0	414	0	1442	-1442
In foreign currency				0	8	-8	0	0	0	0	0	0	14556	252	14305
Short term				0	8	-8	0	0	0	0	0	0	14556	252	14305
Medium & Long term				0	0	0	0	0	0	0	0	0	0	0	0
Equity				0	2890	-2890	0	0	0	0	0	0	1457	0	1457
General Government															
In domestic currency	0	1	-1				3181	360	2821	31	121	-90	22	0	22
Short term	0	0	0				1620	4	1616	0	0	0	0	0	0
Medium & Long term	0	1	-1				1561	355	1206	31	121	-90	22	0	22
In foreign currency	8	0	8				434	1312	-878	0	0	0	3585	2986	599
Short term	8	0	8				228	1	227	0	0	0	685	0	685
Medium & Long term	0	0	0				206	1311	-1105	0	0	0	2899	2986	-86
Equity	2890	0	2890				0	0	0	27653	0	27653	0	66	-66
Banks															
In domestic currency	4929	8	4921	360	3181	-2821				27282	27485	-203	2271	1113	1158
Short term	4929	8	4921	4	1620	-1616				3404	17438	-14035	2	760	-758
Medium & Long term	0	0	0	355	1561	-1206				23878	10046	13832	2268	353	1915
In foreign currency	0	0	0	1312	434	878				31662	7003	24659	10960	18983	-8023
Short term	0	0	0	1	228	-227				3399	3791	-393	7477	6831	646
Medium & Long term	0	0	0	1311	206	1105				28263	3211	25052	3483	12152	-8669
Equity	0	0	0	0	0	0				3441	7333	-3892	3309	18180	-14871
Nonbank Private Sector															
In domestic currency	6991	489	6502	121	31	90	27485	27282	203				0	0	0
Short term	6991	75	6916	0	0	0	17438	3404	14035				0	0	0
Medium & Long term	0	414	-414	121	31	90	10046	23878	-13832				0	0	0
In foreign currency	0	0	0	0	0	0	7003	31662	-24659				13911	18419	-4507
Short term	0	0	0	0	0	0	3791	3399	393				9533	8806	727
Medium & Long term	0	0	0	0	0	0	3211	28263	-25052				4378	9613	-5235
Equity	0	0	0	27653	0	27653	7333	3441	3892				3447	44788	-41341
Nonresidents															
In domestic currency	1442	0	1442	0	22	-22	1113	2271	-1158	0	0	0			
Short term	0	0	0	0	0	0	760	2	758	0	0	0			
Medium & Long term	1442	0	1442	0	22	-22	353	2268	-1915	0	0	0			
In foreign currency	252	14556	-14305	2986	3585	-599	18983	10960	8023	18419	13911	4507			
Short term	252	14556	-14305	0	685	-685	6831	7477	-646	8806	9533	-727			
Medium & Long term	0	0	0	2986	2899	86	12152	3483	8669	9613	4378	5235			
Equity	0	1457	-1457	66	0	66	18180	3309	14871	44788	3447	41341			

Sources: Authorities data, and IMF staff calculations and estimates.

1/ Column sub-headings indicate assets, liabilities, or net positions of the sector identified in the corresponding row vis-à-vis the sector identified in the column.

2/ Net position: assets minus liabilities.

Table 2. Estonia: Intersectoral Asset and Liability Positions, December 2005
(In millions of EEK)

Counterpart Sector / Instrument Holder	Eesti Pank			General Government			Banks			Nonbank Private Sector			Nonresidents		
	Assets 1/	Liabilities 1/	Net 1/2/	Assets 1/	Liabilities 1/	Net 1/2/	Assets 1/	Liabilities 1/	Net 1/2/	Assets 1/	Liabilities 1/	Net 1/2/	Assets 1/	Liabilities 1/	Net 1/2/
Eesti Pank															
In domestic currency				0	0	0	31	13338	-13307	505	9074	-8569	0	1235	-1235
Short term				0	0	0	31	13338	-13307	47	9074	-9027	0	0	0
Medium & Long term				0	0	0	0	0	0	458	0	458	0	1235	-1235
In foreign currency				0	5	-5	0	0	0	0	0	0	25784	45	25739
Short term				0	5	-5	0	0	0	0	0	0	25784	45	25739
Medium & Long term				0	0	0	0	0	0	0	0	0	0	0	0
Equity				0	3869	-3869	0	0	0	0	0	0	1246	0	1246
General Government															
In domestic currency	0	0	0				6144	1396	4748	-356	0	-356	1307	0	1307
Short term	0	0	0				2354	59	2296	0	0	0	0	0	0
Medium & Long term	0	0	0				3790	1338	2452	-356	0	-356	1307	0	1307
In foreign currency	5	0	5				4069	2969	1100	5882	0	5882	13118	3928	9190
Short term	5	0	5				468	4	464	0	0	0	7902	0	7902
Medium & Long term	0	0	0				3601	2965	635	5882	0	5882	5216	3928	1288
Equity	3869	0	3869				0	0	0	30345	0	30345	148	110	38
Banks															
In domestic currency	13338	31	13307	1396	6144	-4748				50802	57917	-7115	1013	2766	-1753
Short term	13338	31	13307	59	2354	-2296				869	38821	-37952	41	2201	-2160
Medium & Long term	0	0	0	1338	3790	-2452				49933	19096	30837	971	564	407
In foreign currency	0	0	0	2969	4069	-1100				95849	15371	80478	35575	79892	-44317
Short term	0	0	0	4	468	-464				3131	8839	-5709	18045	21122	-3077
Medium & Long term	0	0	0	2965	3601	-635				92719	6532	86187	17530	58770	-41240
Equity	0	0	0	0	0	0				5187	11630	-6443	11954	76940	-64986
Nonbank Private Sector															
In domestic currency	9074	505	8569	0	-356	356	57917	50802	7115				0	0	0
Short term	9074	47	9027	0	0	0	38821	869	37952				0	0	0
Medium & Long term	0	458	-458	0	-356	356	19096	49933	-30837				0	0	0
In foreign currency	0	0	0	0	5882	-5882	15371	95849	-80478				37035	25247	11788
Short term	0	0	0	0	0	0	8839	3131	5709				12972	16193	-3221
Medium & Long term	0	0	0	0	5882	-5882	6532	92719	-86187				24063	9054	15009
Equity	0	0	0	0	30345	-30345	11630	5187	6443				106931	26197	80734
Nonresidents															
In domestic currency	1235	0	1235	0	1307	-1307	2766	1013	1753	0	0	0			
Short term	0	0	0	0	0	0	2201	41	2160	0	0	0			
Medium & Long term	1235	0	1235	0	1307	-1307	564	971	-407	0	0	0			
In foreign currency	45	25784	-25739	3928	13118	-9190	79892	35575	44317	37035	25247	11788			
Short term	45	25784	-25739	0	7902	-7902	21122	18045	3077	12972	16193	-3221			
Medium & Long term	0	0	0	3928	5216	-1288	58770	17530	41240	24063	9054	15009			
Equity	0	1246	-1246	110	148	-38	76940	11954	64986	106931	26197	80734			

Sources: Authorities data, and IMF staff calculations and estimates.

1/ Column sub-headings indicate assets, liabilities, or net positions of the sector identified in the corresponding row vis-à-vis the sector identified in the column.

2/ Net position: assets minus liabilities.

Figure 1. Estonia: Net Overall Position by Sector, 2001 and 2005 1/
(In percent of GDP)

Central Bank

Government

Banking Sector

Nonbank Private Sector
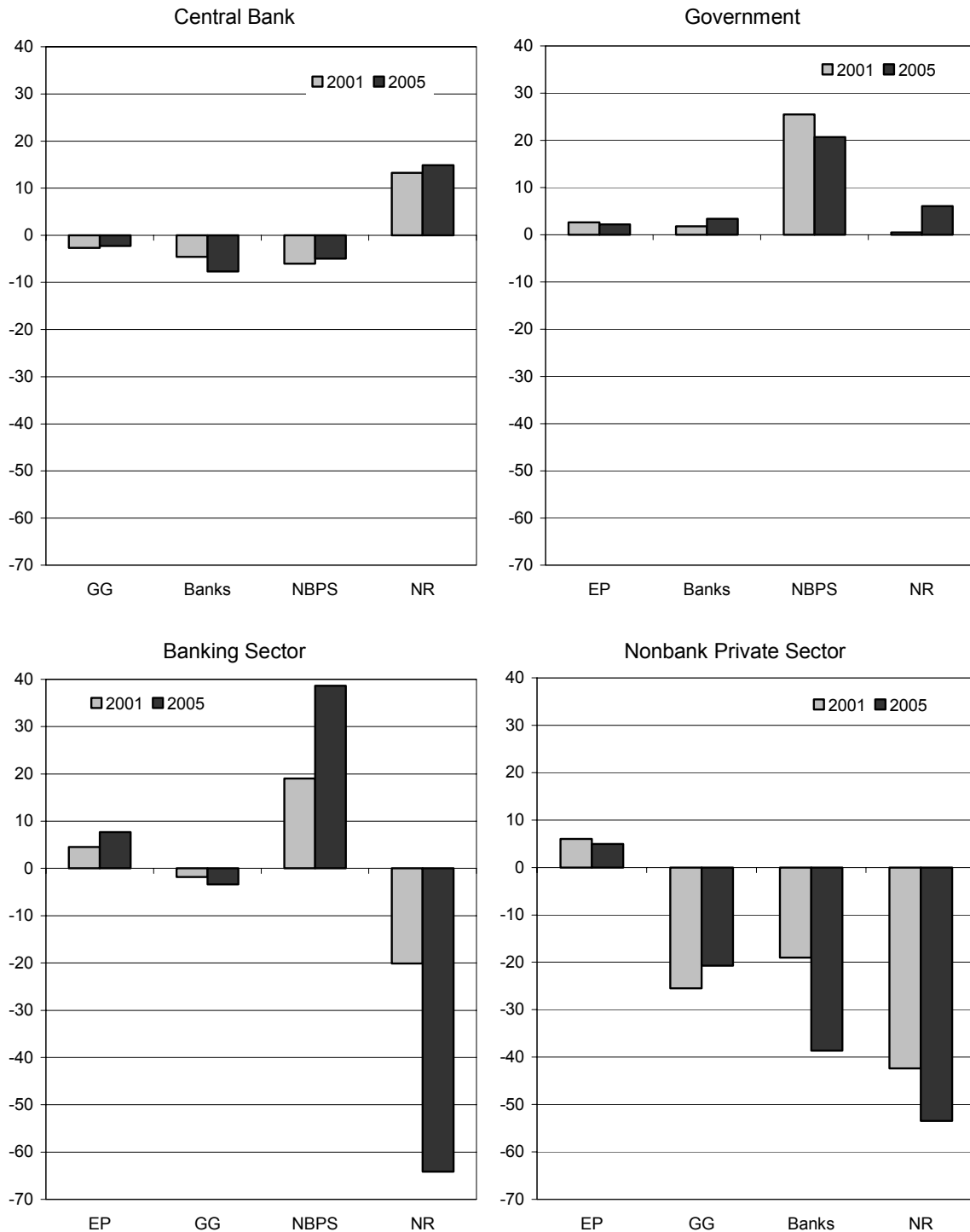
Sources: Authorities data and Fund staff calculations and estimates.

1/ GG: general government; EP: Eesti Pank (Estonia's central bank); Banks: private sector banks (inlcuding leasing companies); NBPS: non-bank private sector; NR: nonresidents.

it continues to be, in 2005 as in 2001, a net creditor vis-à-vis all other sectors—including the external sector. This results from a series of consecutive government budget surpluses which are evidence of a political consensus in favor of fiscal prudence and the CBA.

7.   **In contrast to the public sector's strong position, Estonia's private sector indebtedness has been on the rise.** Banks have a net liability position with the nonresident sector and a net asset position with the domestic nonbank private sector. This reflects their important and increasing role in intermediating the transfer of foreign funds—largely from parent banks—to domestic residents in the form of bank loans. The nonbank private sector is the one sector to have a net financial liability position vis-à-vis nearly all other sectors.[15]

8.   **The concentration of private sector liabilities in the hands of nonresidents is striking** (Figure 2). As previously noted, Estonia's net indebtedness to the rest of the world doubled between 2001 and 2005 to almost the size of GDP. Partly reflecting large and increasing foreign ownership of Estonia's banking sector, banks' liabilities were the major driving force of the rapid build-up of this indebtedness, and banks now account for about two-thirds of the net exposure to nonresidents. The net liabilities of the nonbank private sector to nonresidents are also large and rising.

**Capital Structure Mismatches**

9.   **Equity investment was the main driver of the build-up of external liabilities—a feature which helps mitigate associated risks.** About two-thirds of the increase in banks' net foreign liabilities and virtually all of the increase in net foreign liabilities of the nonbank private sector between 2001 and 2005 are explained by foreign equity investment (Table 3). A significant part of these increases is capital gains on existing equity investment— particularly in the banking sector.[16] Also, as of end-2005, net foreign equity investment represented 59 percent (87 percent) of banks' (the nonbank private sector's) net external liability position. This large part of the economy's external liabilities is not subject to rollover risks, and less-than-expected returns on such liabilities would have a direct effect only on the nonresident owner of the associated asset.

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[15] Data soon to be published by Eesti Pank (see footnote 4) reveals that nonfinancial corporations are responsible for the net liability position of the nonbank private sector, as households' financial assets—the bulk of which is in the form of currency, deposits, shares and other equities—covered 133 percent of their liabilities at end-2005.

[16] Equity investment data are recorded at market values. Thus both new flows as well as capital gains on existing stocks raise the stock of such investments. While estimates of this breakdown are not available, capital gains are believed to have been particularly significant in the banking sector in recent years—indeed, the market values of the shares of two major banks in Estonia were, as of end-2005, more than 5 times and 20 times higher than their respective book values.

Figure 2. Estonia: Net Position vis-à-vis Nonresidents, 2001 and 2005 1/
(In percent of GDP)
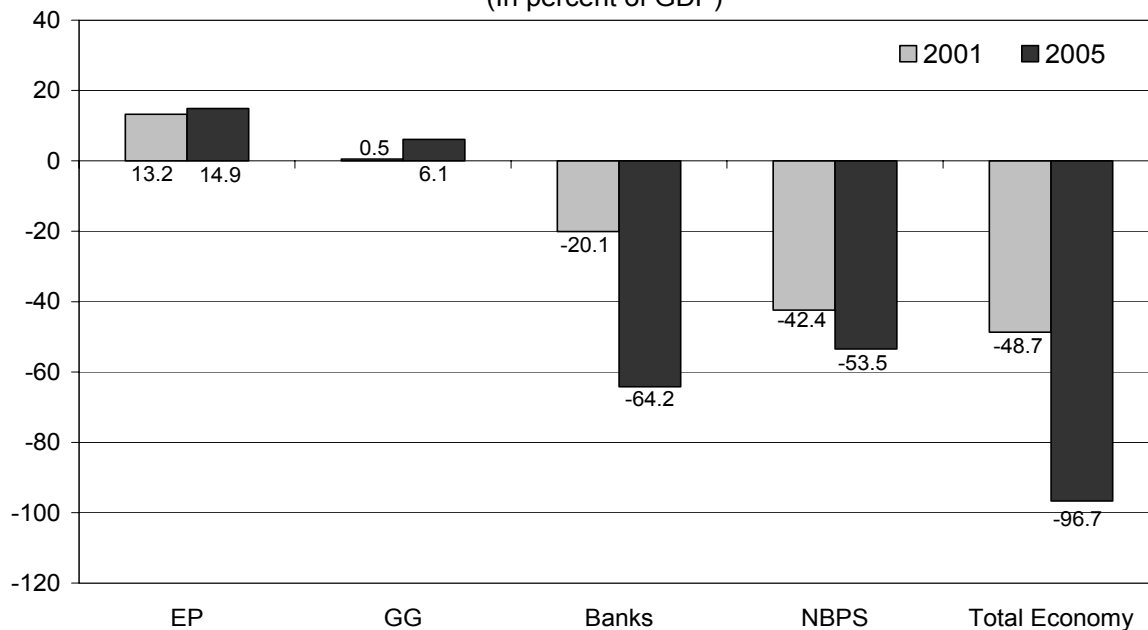
Sources: Authorities data and Fund staff estimates and calculations.
1/ See footnote number 1 in Figure 1 for the definition of the x-axis labels.

Table 3. Estonia: Change in the Net Position vis-à-vis Nonresidents between 2001 and 2005[*]
(In percent of GDP)

Banks	-44.1
Nonequity, in EEK	-2.1
short-term	-0.5
med-long term	-1.5
Nonequity, in FX	-18.2
short-term	-2.4
med-long term	-15.8
Equity	-23.8
Nonbank Private Sector	-11.1
Nonequity, in EEK	0.0
Nonequity, in FX	-2.6
short-term	1.2
med-long term	-3.8
Equity	-8.4

Sources: Authorities' data and Fund staff estimates and calculations.
[*] A negative sign indicates an increase in the net liability position or a decline in
the net asset position vis-à-vis nonresidents.

10.   **Banks' reliance on debt finance gives rise to sudden-stop risks which are,
however, mitigated by the fact that much of the funding is from parent institutions.**
Only about a third of banks' funding is in the form of equity investment—slightly more than
was the case five years ago (Table 4). Hence two-thirds of bank liabilities are debt-funded. In
particular, short-term instruments represent 29 percent of bank liabilities; this is nearly

8 percentage points lower than at end-2001 but still large enough to create vulnerability to sudden-stop risks.[17] Medium and long-term instruments are also an important source of funds for banks, but most of these funds are believed to come from parent institutions abroad. These funds are more FDI-like than regular financing instruments, and are thus likely sheltered from rollover risks.

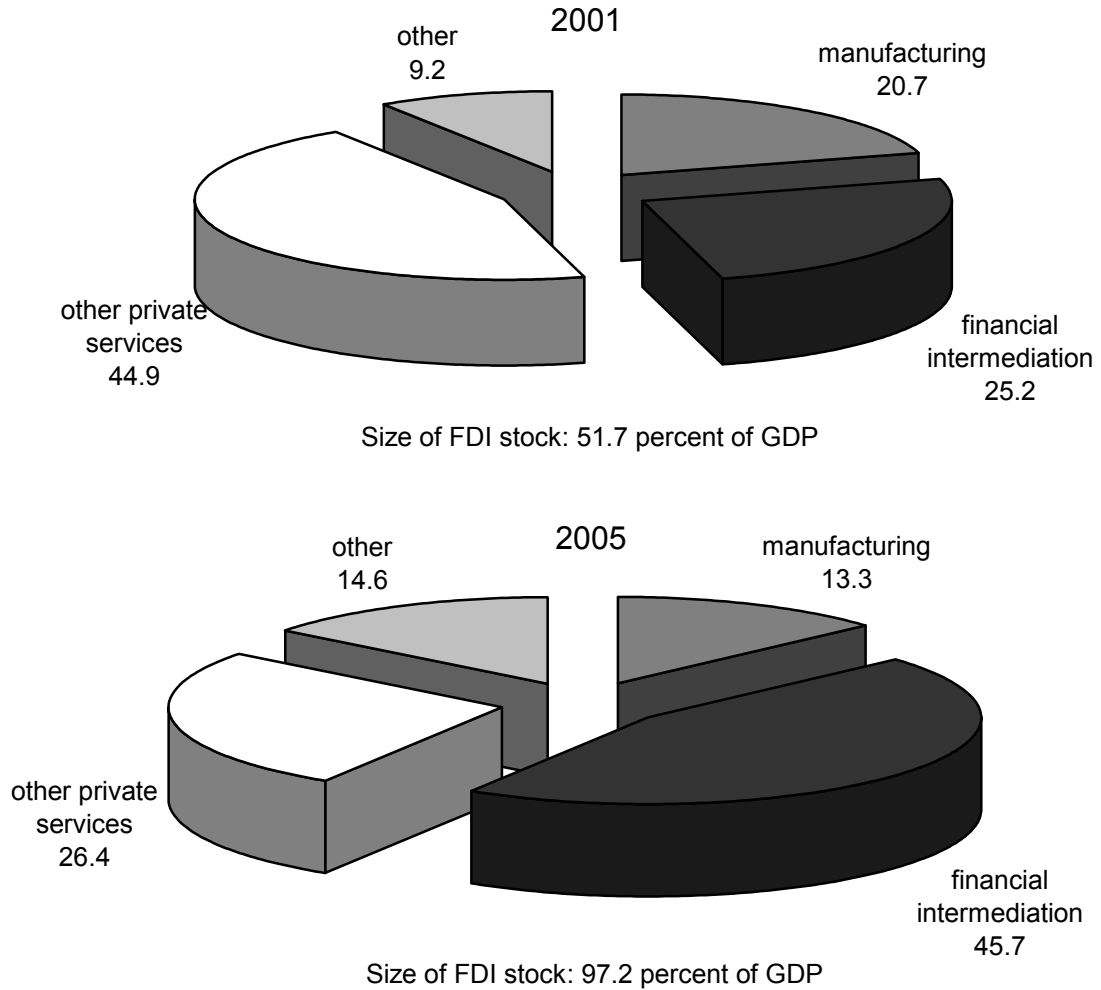Table 4. Estonia: Banking Sector Liabilities
(In units as indicated)

	2001	2005
Structure of bank liabilities (in percent of total)		
Short-term nonequity instruments	36.6	29.0
Of which held by nonresidents	9.1	9.2
Medium & long-term nonequity instruments	32.9	36.3
Of which held by nonresidents	14.9	23.3
Equity	30.5	34.8
Of which held by nonresidents	21.7	30.2
Total bank liabilities held by nonresidents (in percent of total)	45.7	62.6
Contribution to growth of liabilities between 2001 and 2005 (in percent):		
Short-term nonequity instruments		51.6
Medium &long-term nonequity instruments		77.4
Equity		75.3
Total liability growth between 2001 and 2005		204.3

Sources: Authorities' data and Fund staff estimates and calculations.

11.   **Debt finance is also more important than equity finance for the nonbank private sector, although equity forms the bulk of the sector's nonresident funding.** The role of equity investment in funding the nonbank private sector has diminished in recent years—indeed most equity investment from abroad is now financing the banking sector (Figure 3). The larger part of nonbank private sector debt is in the form of medium- and long-term instruments (Table 5)—mainly loans from domestic banks, but also loans from international institutions, such as the EIB, including borrowing with government guarantees—which are less prone to roll-over risks than are short-term instruments; the latter constitute only about 5 percent of total funding sources of the nonbank private sector.

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[17] This vulnerability is reduced, however, by the extent to which these are short-term deposits protected by the existing deposit insurance scheme or are deposits from parent banks.

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Figure 3. Estonia: Composition of FDI, 2001 and 2005
(In percent)

2001

other
9.2

manufacturing
20.7

other private
services
44.9

financial
intermediation
25.2

Size of FDI stock: 51.7 percent of GDP

2005

other
14.6

manufacturing
13.3

other private
services
26.4

financial
intermediation
45.7

Size of FDI stock: 97.2 percent of GDP

Sources: Authorities data and Fund staff estimates and calculations.

Table 5. Estonia: Nonbank Private Sector Liabilities
(In units as indicated)

	2001	2005
Structure of Liabilities (in percent of total)		
Short-term nonequity instruments	10.2	5.1
Of which held by nonresidents	5.7	3.9
Medium & long-term nonequity instruments	40.5	52.4
Of which held by nonresidents	6.3	7.2
Equity	49.3	42.9
Of which held by nonresidents	29.1	32.2
Total nonbank private sector liabilities held by nonresidents (in percent of total)	41.1	43.3
Contribution to growth of liabilities from 2001 to 2005 (in percent):		
Short-term nonequity instruments		1.6
Medium & long-term nonequity instruments		133.5
Equity		79.5
Total liability growth between 2001 and 2005		214.6

Sources: Authorities' data and Fund staff estimates and calculations.

Currency Mismatches

12.   **All sectors are long in foreign currency except for the nonbank private sector, which has a large short position.** The foreign currency assets of both Eesti Pank and the government exceed their respective foreign currency liabilities by a comfortable margin, and this is also the case for their short-term instruments considered separately (Tables 6–7). Eesti Pank and the government would thus be vulnerable to an appreciation of the exchange rate. Banks' overall foreign exchange position is also positive and large, whereas their position in short-term foreign exchange assets became negative in 2005, compared to zero in 2001. The reverse holds for the nonbank private sector, which has a positive and increasing short-term foreign exchange position but an overall foreign exchange position that is large, negative, and deteriorating.

13.   **Several factors likely contributed to these private sector positions.** The credibility and robustness of the currency board arrangement and a positive—though small and diminishing[18]—differential between interest rates on the kroon and those on the euro encouraged Estonians to make kroon deposits in banks but borrow in euros. Indeed, about 80 percent of bank loans but only 26 percent of banks' long-term deposits (and 13 percent of short term deposits) are in euros. The absence of limits on open euro positions means that banks could lend extensively in euros, giving rise to large foreign currency positions as a

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[18] In fact, in October 2005 some spreads became negative between kroon and euro denominated instruments.

percent of capital (Table 8). The hard peg of the kroon to the euro through the CBA mitigates the risks from euro positions for all sectors in Estonia.[19] However, only when the euro is adopted will the residual vulnerability associated with net positions in that currency be entirely eliminated.

Table 6. Estonia: Short-term Foreign Exchange Positions
(In percent of GDP)

	2001	2005
Eesti Pank	13.2	14.9
Government	0.9	4.8
Banks	0.0	-5.3
Of which vis-à-vis nonbank private sector	*-0.4*	*-3.3*
Nonbank Private Sector	1.0	5.2

Sources: Authorities' data and Fund staff estimates and calculations.

Table 7. Estonia: Overall Foreign Exchange Positions
(In percent of GDP)

	2001	2005
Eesti Pank	13.2	14.9
Government	-0.3	9.3
Banks	16.2	20.3
Of which vis-à-vis nonbank private sector	*22.8*	*46.5*
Other Private Sector	-27.0	-56.7

Sources: Authorities' data and Fund staff estimates and calculations.

Table 8. Estonia: Banking Sector Positions
(In units as indicated)

	In percent of GDP		In percent of net own funds [1]	
	2001	2005	2001	2005
Foreign exchange position	16.2	20.3	245.3	242.8
short term	0.0	-5.3	0.4	-64.1
long term	16.2	25.6	244.9	306.8
Overall short-term position	-10.6	-22.2	-160.5	-265.6
Overall long-term position	29.6	42.2	448.5	506.2
Net direct investment	-17.3	-41.3	-262.8	-494.6

Sources: Authorities' data and Fund staff estimates and calculations.
1/ Bank's first and second level capital.

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[19] Unfortunately, the data available was not sufficient to decompose the sectors' foreign currency positions into positions in euros and positions in other currencies to better qualify the assessment of vulnerabilities stemming from foreign currency mismatches.

14.   **While banks' own foreign currency position is long, this strong position is offset by their exposure to credit risk arising from the short foreign currency position of nonbanks.** Banks' net positive foreign exchange position is large—20.3 percent of GDP at end-2005. But this results from their large foreign exchange claims (46.5 percent of GDP) on the nonbank private sector, which is highly exposed in foreign currency. Indeed, this sector has a net foreign exchange liability position of nearly 57 percent of GDP, much of which is likely unhedged. This vulnerability of the nonbank private sector is transmitted to the banking sector in the form of credit risk.

15.   **Since a large share of bank loans is mortgages, banks could be also vulnerable to a real estate market shock.** Mortgages have grown at an average pace of above 60 percent per annum over the past 5 years, and now constitute about 84 percent of total household private sector liabilities. They are responsible for more than three-fourths of the growth in bank credit between 2001 and 2005, and are largely denominated in euros. A downturn in the real estate market would not in itself affect the performance of these loans unless some borrowers were relying on real estate capital gains to meet their financial obligations. However, if a severe economic downturn hits households' incomes and thus their ability to service mortgage debt, the rapid growth of nonperforming loans could adversely affect the banking system's capitalization.

Maturity Mismatches

16.   **The banking sector is the only sector vulnerable to risks stemming from maturity mismatches.** The government and the nonbank private sector have positive net short-term positions, in both local and foreign currencies (Figure 4), and Eesti Pank's positive net short-term foreign exchange position more than covers its net short-term kroon liabilities. Given their role in maturity transformation, banks have sizable and growing net negative short-term position, largely in kroon—but recently also in foreign currency—which exposes them to both roll-over and interest rate risks (Table 9). Their exposure to interest rate risk is, however, mitigated by the fact that most mortgages have floating rates—tied to 6-months EURIBOR rates—and are therefore akin to short-term instruments in terms of frequency of repricing.

D. Comparison with Other Countries

17.   **Comparing balance sheet vulnerabilities in Estonia with those in other new EU member states is a complicated exercise.** A systematic comparison is beyond the scope of this paper, not least because of the difficulty of finding data on balance sheet items

Figure 4. Estonia: Net Positions by Maturity, 2001 and 2005
(In percent of GDP)
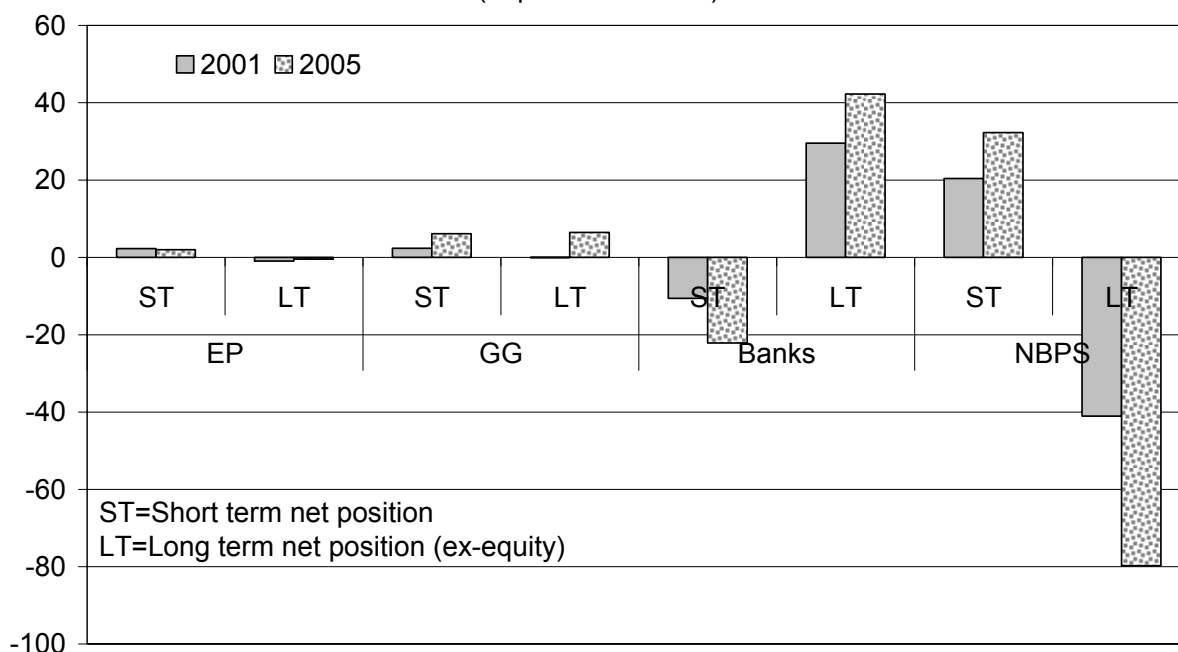
Sources: Authorities data and Fund staff estimates and calculations.
1/ See footnote number 1 in Figure 1 for the definition of the x-axis labels.

consistently defined across countries. However, two other new EU member countries, Latvia[20] and Hungary[21], were separately subject to balance sheet analyses recently, and the conclusions of these studies provide some basis for comparisons with Estonia. Since the studies make use of different—country-specific— data sources to compile sectoral assets and liabilities, and may have defined the sectors slightly differently, the comparison is subject to caveats.

18.   **In some respects, the vulnerabilities underlying Latvia's financial positions are similar to those in Estonia.** Latvia's public sector is also long in foreign currency, particularly for short-term instruments, and hence is not exposed to exchange rate depreciation risks. Also like Estonia, Latvia's private sector mismatches are significant and rising—foreign exchange mismatches for the nonbank private sector and large maturity mismatches for banks which, as noted earlier, are inherent to a bank's business.

19.   **But in other respects Estonia's vulnerabilities appear less acute than Latvia's.** While Latvia's net foreign liabilities are smaller than Estonia's (but have also risen rapidly in

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[20] See Luna (2005) and Gray (2006).

[21] Box 3 in IMF Country Report No. 06/379.

recent years), their capital structure is not as favorable. The bulk of Latvia's foreign liabilities is in the form of debt—particularly nonresident deposits and loans from parent banks—whereas more than 85 percent of Estonia's are in the form of equity.[22] Therefore although Latvia's overall net external liabilities are smaller than Estonia's, its greater reliance on debt raises its vulnerability to sudden stops compared to Estonia's. Another difference is that Estonian banks have long foreign currency positions, whereas Latvian banks have growing short positions.

Table 9. Estonia: Net Positions by Maturities and Currencies[1]
(In percent of GDP)

	2001	2005
Eesti Pank		
Short term	2.3	2.0
In foreign currency	13.2	14.9
In EEK	-10.9	-12.9
Long term	-1.0	-0.4
In foreign currency	0.0	0.0
In EEK	-1.0	-0.4
General Government		
Short term	2.3	6.2
In foreign currency	0.9	4.8
In EEK	1.5	1.3
Long term	0.0	6.5
In foreign currency	-1.1	4.5
In EEK	1.1	2.0
Banks		
Short term	-10.6	-22.2
In foreign currency	0.0	-5.3
In EEK	-10.6	-16.8
Long term	29.6	42.2
In foreign currency	16.2	25.6
In EEK	13.4	16.6
Nonbank Private Sector		
Short term	20.4	32.3
In foreign currency	1.0	5.2
In EEK	19.4	27.1
Long term	-41.1	-80.5
In foreign currency	-28.0	-61.9
In EEK	-13.1	-18.6

Sources: Authorities' data and Fund staff estimates and calculations.
1/ Excludes equity instruments.

[22] Differences in equity stocks between the two countries reflect in part that in Estonia equity of at least two major banks accrued large capital gains as noted in footnote 7, whereas in Latvia foreign banks are mostly unlisted (with FDI recorded at book values).

20.   **The most striking difference between Estonia's sectoral balance sheets and Hungary's concerns the balance between public sector and private sector exposures.** The Hungarian public sector's balance sheet is more exposed to sudden stop risks than the private sector's, whereas Estonia's public sector balance sheet is impressively strong. Indeed, the Hungarian public sector's assets (excluding equity) were only 34 percent of liabilities at end 2005. The financial sector has a very small positive net foreign exchange asset position but, as is the case for Estonia, it is likely indirectly exposed to foreign exchange risks through loans to the nonfinancial private sector which has a net liability position in foreign exchange. Banks seem also to be vulnerable to interest risk because of a maturity mismatch between their assets and liabilities. But, in contrast to Estonia, the nonfinancial private sector has a positive net financial asset position, and households especially have sizable domestic currency assets acting as a financial buffer.

E. Conclusion

21.   **Although the public sector's balance sheet is extremely robust, the private sector's balance sheets are exposed to market risks and, to some extent, sudden-stop risks.** The nonfinancial private sector has a significant exposure to exchange rate risk, which makes banks vulnerable to credit risk by virtue of their large claims on that sector. Large and rising maturity mismatches in the banking sector could imply vulnerability to rollover and interest rate risks, although the data may exaggerate this vulnerability given that mortgages generally have floating rates. The private sector's net liabilities are very high and rising, but they are largely driven by equity investment, as well as long-term debt instruments from parent companies, notably in the banking sector, and these are not subject to roll-over risks.

22.   **These vulnerabilities need to be put in the broader economic and institutional context of Estonia.** Balance sheet analysis can be mechanistic if not complemented by an assessment of country-specific circumstances, as these may reveal important features, beyond balance sheet data, that mitigate vulnerabilities and should therefore be taken into consideration in interpreting these vulnerabilities. A full-fledged assessment of Estonia's features lies beyond the scope of this paper. Nonetheless, the strength of the currency board arrangement, which derives from its design, robust public finances, and a strong political consensus should be emphasized since it mitigates the risks stemming from the mismatches observed in the sectoral balance sheets. Also, the close links between domestic banks and parent institutions abroad complicate the assessment of vulnerabilities faced by the banking sector. Indeed, for branches and for subsidiaries that may be viewed by parent institutions as branch-like it may be more meaningful to make such an assessment on consolidated basis.

Appendix I: Data Appendix

Assets and liabilities of Eesti Pank, commercial banks, and leasing companies were derived from the central bank's balance sheet and from the consolidated balance sheets of commercial banks and leasing companies. Assets and liabilities of the nonresident sector were derived from data on Estonia's international investment position. All of these data are available online at http://www.bankofestonia.info/frontpage/en. Data on government assets and liabilities were provided by the Ministry of Finance and are on ESA 95 basis. Where needed, assumptions were made to classify the assets and liabilities by type of instruments. But the reliance on such assumptions was minimal because, overall, the data sources just mentioned provided reasonably sufficient information on breakdown by currency and by maturity.

The financial sector balance sheet data and the loans and deposits components of the data on the international investment position are compiled based on book value. Data on securities and equity investment are compiled based on market value to the extent that such information is available, otherwise book value is used. Therefore the matrices compiled in this paper mix the two types of data. Such a mix in the data is not uncommon in a balance-sheet study and is likely to be a caveat to the analysis in most studies implementing the balance sheet approach.

The nonbank private sector could not be broken down into a corporate sector and a household sector—but such a breakdown should be facilitated in any follow-up work by the data that Eesti Pank and the Statistical Office are planning to make publicly available in the near future.

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