Republic of Lithuania: Selected Issues

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INTERNATIONAL MONETARY FUND

REPUBLIC OF LITHUANIA

Selected Issues

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Approved by the European Department

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I. INTRODUCTION

1.   **Lithuania's economy has performed strongly over the past few years, with robust growth and low inflation.** Recently, however, short-term inflation developments have moved into the spotlight as meeting the Maastricht criterion on inflation for early euro adoption has proven a challenge. The first chapter examines inflation dynamics over the past five years. A decomposition of inflation into its components provides clues to its main causes. It shows that energy price increases and convergence to EU-wide price levels have been important factors driving inflation, but that domestic demand pressures—and wage growth, in particular—have also contributed to inflation. To limit the upside risks to inflation, a conservative fiscal stance would be helpful.

2.   **More efficient delivery of government services can help contain short-term demand pressures and deal with medium-term fiscal challenges.** The types of possible efficiency gains are illustrated, in the second chapter, in the context of health care and social assistance. In the health care system, overcapacity and poor quality service coexist with queues and informal fees. Among other things, the introduction of co-payments could help formalize some of the informal payments and improve service delivery while protecting the most vulnerable groups. Social assistance is currently provided through many small benefits that, together, create labor market disincentives. These disincentives can be reduced by consolidating the benefits. Improved targeting of the existing resource envelope for social assistance could improve support for the most vulnerable groups.

3.   **While Lithuania does not face a serious ageing problem in the medium-term, long-term fiscal challenges arise from migration.** The third chapter examines migration and its long-term fiscal implications. Emigration, mostly driven by aspirations for higher incomes, has contributed importantly to the steady decline in Lithuania's population. Based on projections of the income gap between Lithuania and the EU-15 countries, emigration incentives may last for the next 25 years during which period around 8 percent of the current working-age population could emigrate. Since emigrants are mostly of working age, their departure creates pressures on the labor market and public finances, especially the pension and health insurance funds.

4.   **An expansion of the revenue base by drawing more economic activity out of the shadow economy could help ease mounting medium- and long-term fiscal pressures.** The fourth chapter provides a brief description of the shadow economy in Lithuania and examines possible policies to shrink its size. Three policy areas stand out as potentially effective: reducing the fiscal burden, easing labor market restrictions, and easing entry barriers for new businesses. The evidence suggests that the most effective policies are those that reduce the effective minimum wage and ease barriers to business entry. Less effective are cuts in personal income tax and social security contributions, which have the added disadvantage of causing substantial net revenue losses.

II. INFLATION IN LITHUANIA[1]

A. Introduction

5.   **Prudent macroeconomic policies have fostered almost a decade of strong growth and price stability.** Since the Russian crisis and its aftermath in 1999, growth has averaged 7.1 percent. Throughout this period, inflation has been low and at times even negative (Text Figure 1). This favorable macroeconomic performance has been supported by a strong currency board, a generally conservative fiscal stance, strong financial supervision of a foreign-dominated banking sector, and structural reforms.

Text Figure 1. Lithuania: Output and Inflation
(In percent)
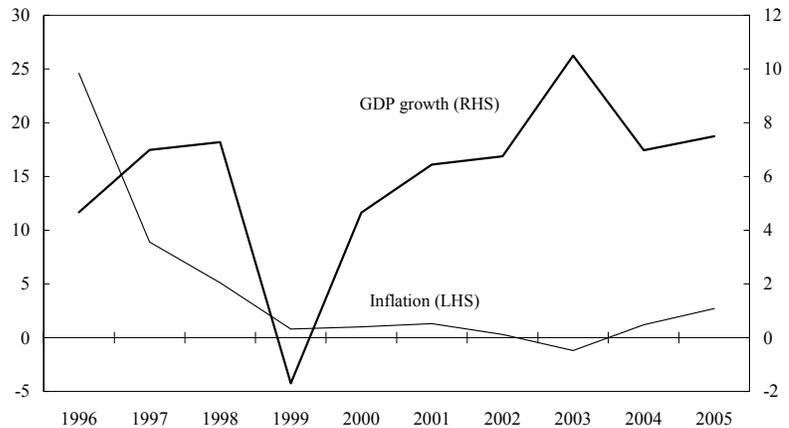
Source: Lithuanian Department of Statistics.

6.   **After a sharp rise in late 2003, inflation has stabilized at about 3 percent a year** (Text Figure 2). The rise in inflation in late 2003 followed a year and a half of deflation, reflected both in headline and in core inflation (excluding food and energy). A further inflationary impetus coincided with accession to the European Union (EU) in May 2004, which brought regulatory changes and accession to the customs union. This raises two questions. To what extent was inflation in 2004, which continued in 2005, driven by one-off convergence to EU price levels, and to what extent did reflect deeper underlying trends? What are the sources of inflationary pressures in 2006 and 2007?

Text Figure 2. Lithuania: Inflation
(In percent)

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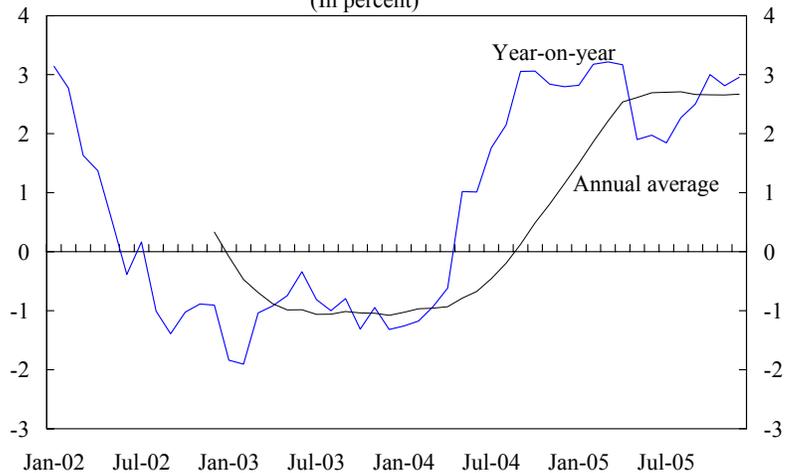
[1] Prepared by Franziska Ohnsorge (EUR).

7.   **The rise in inflation has put it above the Maastricht reference value.** The
Maastricht reference value
(Text Figure 3) is defined as
annual average inflation of the
three EU member countries
with the lowest inflation rates
plus 1.5 percent. Since the
accession to the EU of the eight
Central and Eastern European
countries (CEE-8) to the EU,
the criterion has largely been
defined by Denmark, Finland,
and Sweden. At end-December,
it stood at 2.6 percent,
compared with 2.7 percent
annual average inflation in

Text Figure 3. Lithuania: Inflation and the Maastricht Criterion
(Average annual percent change)

Lithuania. Lithuania's reference period for its recent application for euro adoption will be
March or April 2006, but it is unclear whether underlying inflationary pressures will have
eased sufficiently for compliance with the Maastricht criterion.
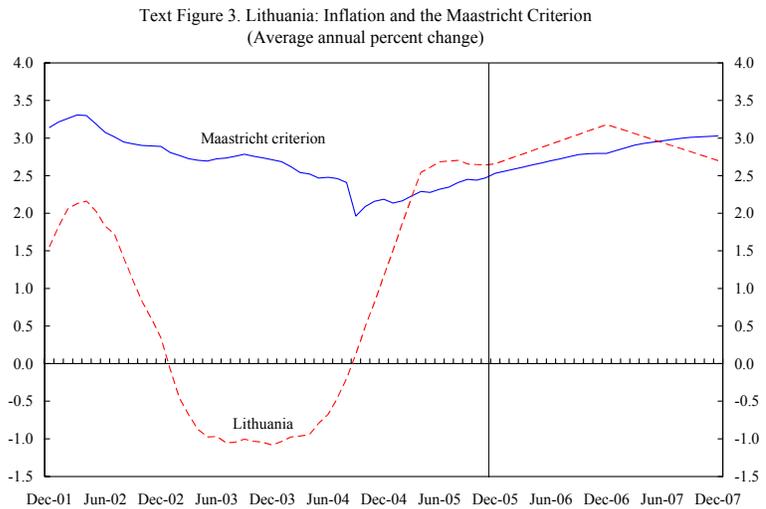
8.   **Further pressures on Lithuanian inflation will arise from an adjustment in gas
prices.** On January 1, 2006,
Gazprom raised prices on
Lithuanian gas imports by
40 percent as a step toward
world levels. Gas accounts
for about 1.2 percent of the
harmonized index of
consumer prices (HICP).
Estimates for the
persistence of inflation
from Bonato (2005) suggest
that a 40 percent consumer
gas price increase would
feed through into
substantial inflation for the
next two years
(Text Figure 4).

Text Figure 4. Lithuania: Increase of Year-on-Year Inflation Resulting from a
40 Percent Gas Price Increase Starting January 2006
(In percentage points)

Souce: IMF staff estimates.
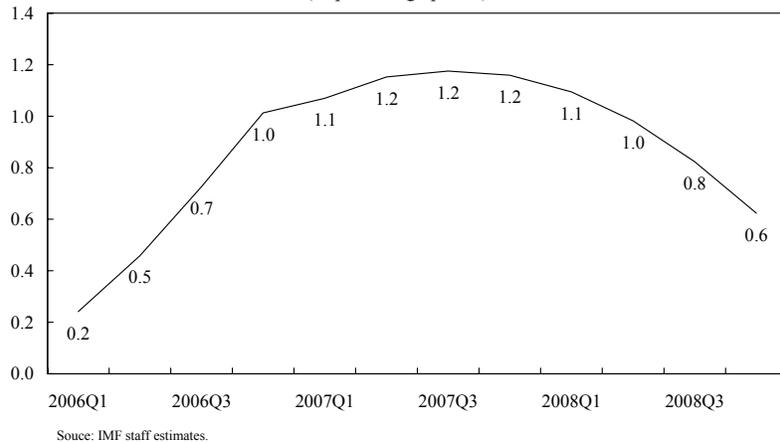
9.   **This paper attempts to uncover the main causes of recent inflation and provide a
medium-term outlook for inflation trends.** Kuodis (2005) argues that because Lithuania is
a small, open economy, inflation is largely driven by global developments or one-off factors.
In this view, the rise in inflation in 2004 and 2005 was driven by one-off factors rather than
deeper, underlying trends. These one-off factors included high oil prices that especially affect
inflation in Lithuania due to the large weight of oil in the consumption basket and EU

accession-related developments. The implication of this view is that policies affecting domestic demand are reflected mainly in the current account deficit rather than inflation. This paper, while acknowledging the role of episodic developments, provides another view—one that allows more room for domestic demand factors and policies to affect inflation.

10.   **The main conclusion of this paper is that the average inflation rate disguises important trends that point to underlying demand pressures.** While the average Lithuanian inflation rate appears to have converged to the EU average, a decomposition into its components paints a more nuanced picture. Food price inflation and rising energy prices, important contributors to recent inflation, were driven by external developments (in the case of food price inflation by the EU accession process). Prices of nontradable goods and services have, however, increased significantly as well. This is true for both regulated and unregulated nontradables. These developments suggest that domestic demand pressures— reflected especially in wage pressures—have been at play.

11.   **The plan of the paper is as follows:** Inflation developments in Lithuania are briefly sketched in Section B. Section C lays out a simple framework, based on Marimon and Zilibotti (1998), to distinguish between externally- and domestically-driven inflation. The main results obtained by applying this framework are described in Section D. Further results, based on a panel data regression analysis of inflation into tradables and nontradables, are reported in Section E. Tentative conclusions for the inflation outlook are put forward in Section F.

B.   A Brief Description of Recent Inflation Developments

12.   **Year-on-year inflation has hovered around 2¾−3 percent since mid-2005.** The flattening, following the rise in late 2004 and early 2005, is visible both in annual average inflation and in year-on-year inflation. Different subcategories of inflation, however, have behaved very differently from this trend (Text Figure 5). This allows us to point to three distinct causes of inflation: EU accession, energy price increases, and domestic demand pressures. EU accession affected mainly food prices and other traded goods, while energy prices affected regulated and unregulated tradables prices, and domestic demand pressures affected all categories of goods. During the course of 2005, food price inflation was replaced as the main contributor to inflation by other categories of goods as inflation became more widespread. Increasingly, nontraded goods inflation contributed to overall inflation. At end-2005, nontradables inflation accounted for 0.9 percentage point out of 3 percent overall year-on-year inflation—almost on par with the contribution of energy price increases (1.4 percentage points).[2]

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[2] Several regulated prices were adjusted in 2004 and 2005. In May 2004, excise taxes on fuel and tobacco and the value added tax (VAT) rate on heating energy (previously at 9 percent) were raised, and, in January 2005, excise taxes on electronics were increased. In 2004, public transport prices were also raised.

Text Figure 5. Lithuania: Contribution to Year-on-Year Inflation 1/
(In percent)
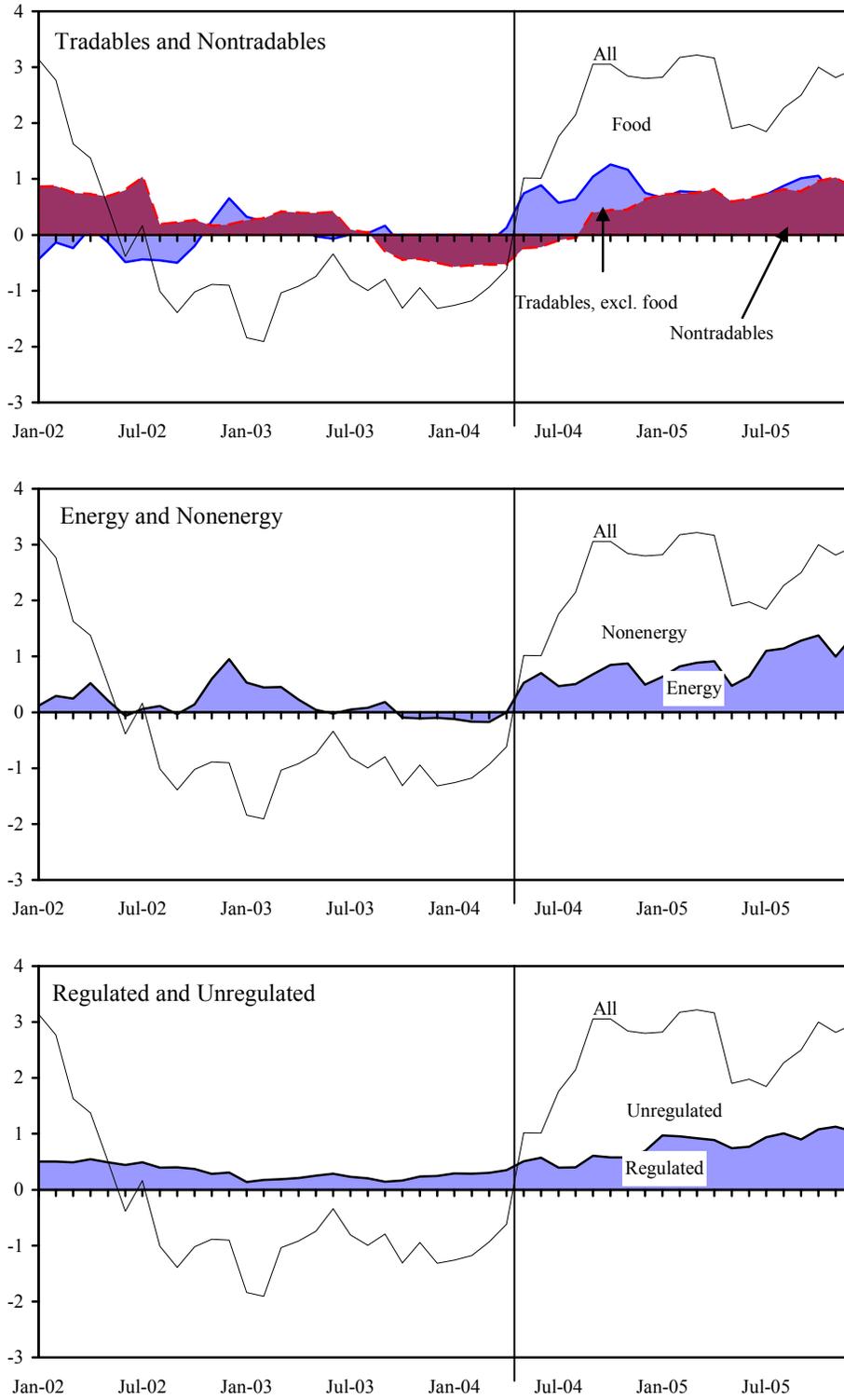
Sources: Eurostat; and IMF staff estimates.

1/ The bar marks EU accession.

13.   **Food price inflation, the largest contributor to inflation until recently, has mostly remained in the range of 3−6 percent since its step increase in May 2004** (Text Figure 6). In May 2004, Lithuania entered the customs union, which restricted previous imports from Lithuania's Eastern European neighbors outside of the union. At the same time, harmonized of most of its food safety regulations with EU regulations opened new export markets in the old EU members. As a result, food price inflation jumped by 2½ percentage points in May 2004 and has remained high since. At its peak, food price inflation contributed

Text Figure 6. Lithuania: Food Price Inflation
(Year-on-year percent change)
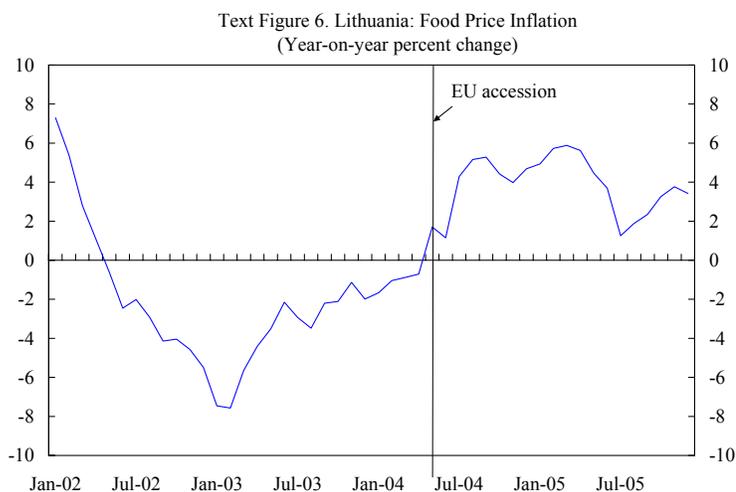
EU accession

1.7 percentage points to inflation in 2005. Because food price inflation has been affected by EU accession more than most other categories of tradable goods, it is considered separately and excluded from the category of tradable goods in the rest of this paper.

14.   **Among other tradables, energy and nonenergy goods have behaved very differently.** Price competition in nonenergy traded goods reduced year-on-year inflation between 0.1 and 0.4 percentage point during most of 2005 (Text Figure 7). Price reductions were concentrated in the textiles, footwear, and furniture sectors. The decline in textile prices coincided with the termination of the Multifibre Arrangement. These effects swamped the 0.9 percent average

Text Figure 7. Lithuania: Contribution of Nonenergy and Energy
Tradable Goods to Year-on-Year Inflation
(In percent)

Energy tradables

Nonenergy tradables

nominal effective depreciation in 2005. The decline in nonenergy traded prices was, however, offset by the increase in energy prices.
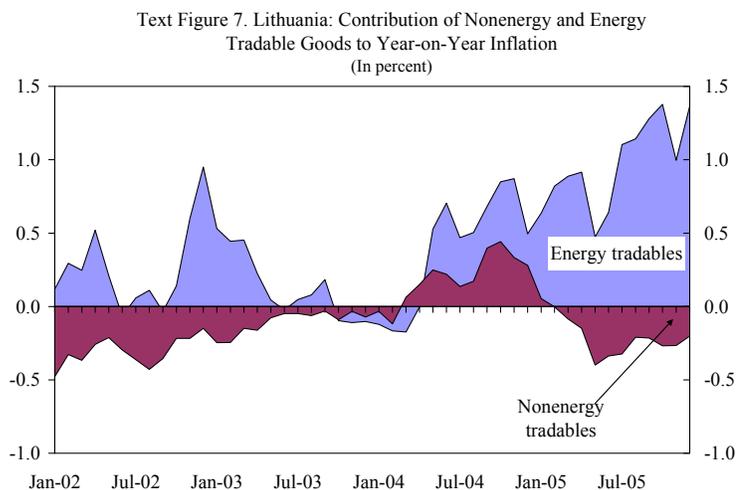
15.   **Energy price increases contributed between 0.5 and 1.4 percentage points to year-on-year inflation in 2005.** Starting in 2005, price caps for electricity supplied to consumers were raised by 15−20 percent, leading to an immediate increase in overall inflation of 0.2−0.3 percentage point.[3] Regulated energy prices lagged behind unregulated ones (Text Figure 8). This suggests that regulated prices may need to rise in the future to catch up with costs.

Text Figure 8. Lithuania: Energy Prices
(Index, December 2000=100)
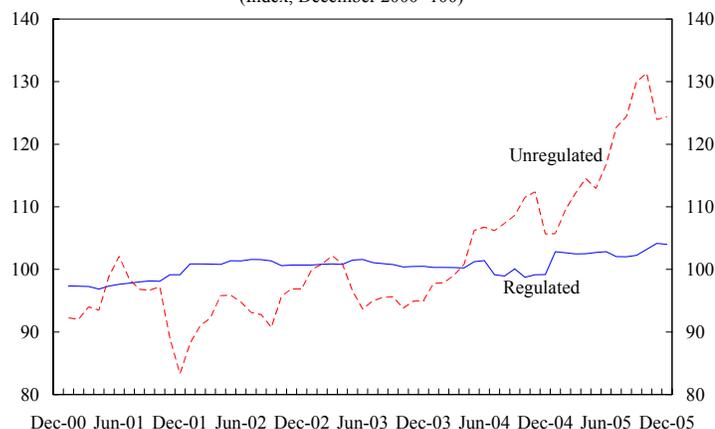
16.   **The relatively large weight of energy in Lithuania's CPI basket compared with that in the EU-15 implies a significant transmission of world energy price increases to inflation.** It should be noted, though, that, despite a similarly high—and in 2004 even higher share of energy in the CPI— Sweden has been among the three countries with the lowest average annual inflation. Only if the weight of energy in Lithuania's CPI basket had been as low as that in Finland (the second lowest in the euro zone after Italy), would Lithuania have met the Maastricht criterion at end-2005 (Text Figure 9).[4]

Text Figure 9. Lithuania: Inflation Using Various Weights of Energy in the CPI
(Year-on-year percent change)

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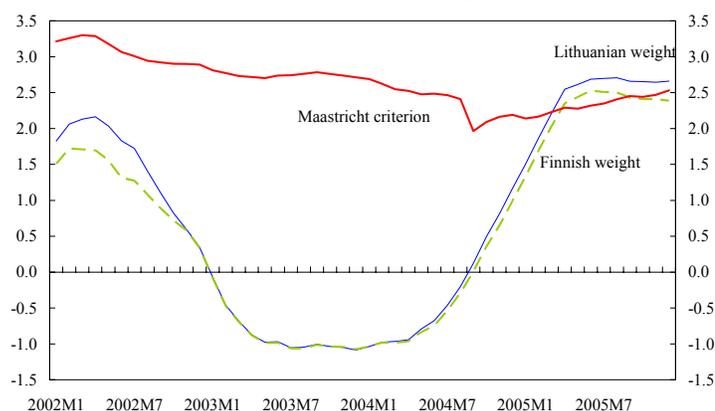
[3] A one-off revaluation of electricity distribution companies' assets from historical to market prices raised asset values—and, therefore, depreciation—three-fold and reduced profits to below the "normal" rate of return (defined as the yield on 10-year government bonds plus 3 percent). This forced the energy price regulator to raise price caps on electricity consumption. Municipalities could, but needed not, raise electricity prices to their caps.

[4] In 2005, the weight of energy in Lithuania's CPI basket was 13.1 percent. In Denmark, it was 10.7 percent, in Finland 7.4 percent, and in Sweden 11.8 percent.

17.   **Nontradable goods inflation has been on an increasing trend since May 2004**
(Text Figure 10). This inflation has been driven, in part, by regulated price increases, of
which about one third reflected
increases in public transportation
prices. These were raised by
13−19 percent year-on-year
during 2005 to offset wage
pressures and fuel price increases.
Unregulated nontradables inflation,
though rising, was kept low by
price reductions in telephone
services (about one-fifth of
unregulated nontradables); among
the remaining more labor-intensive
subsectors, inflation was about
twice as high, rising to 4¾ percent
in 2005.

Text Figure 10. Lithuania: Inflation in Nontradable Prices
(Year-on-year percent change)
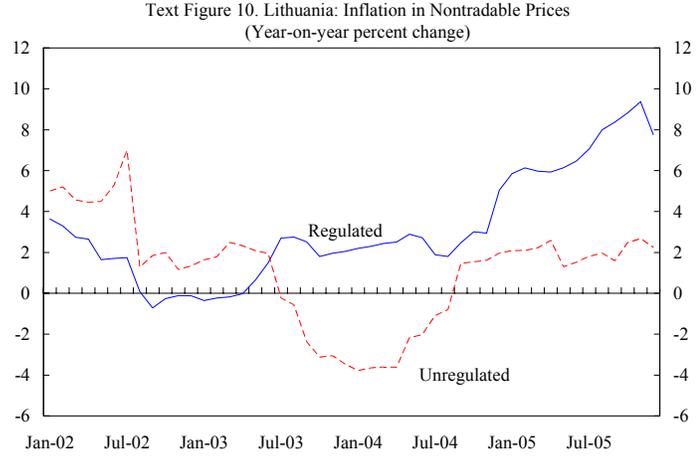
C. Methodology for Decomposing Price Movements into
External and Domestic Factors

18.   **For each four-digit commodity, the inflation rate is decomposed into a
component common to all EU-25 countries and a country-specific rate.** First, the four-
digit commodities are divided into the following, overlapping, groups: tradables and
nontradables, energy and nonenergy, regulated and unregulated goods (Appendix). This
yields 51 three-digit commodity groups of tradables and nontradables. To find the
commodity-specific 12-month inflation (12-month log difference in price indices) that is
common to all countries, we decompose inflation in the following regression as in Marimon
and Zilibotti (1998):

$$\pi(i,n,t) = \sum_1^I \beta_j^{comm} comm(j) + \sum_1^T \beta_s^{time} time(s) + \sum_1^I \sum_1^T \beta_{j,s}^{comm\_time} comm\_time(j,s)$$
$$+ \sum_1^I \sum_1^N \beta_{j,m}^{comm\_cy} comm\_cy(j,m) + \sum_1^N \sum_1^T \beta_{m,s}^{cy\_time} cy\_time(m,s) + \varepsilon(i,n,t)$$

(1)

$i, j = 1,...I,$ $n, m = 1,...N,$ $t, s = 1,...T,$

where

$\pi(i,n,t)$ = year-on-year inflation rate (end of period) for commodity i in country n at time t;
$comm(j)$ = dummy variable with 1 for commodity j, else 0;
$time(s)$ = dummy variable with 1 at time s, else 0;
$comm\_time(j, s)$ = dummy variable with 1 for commodity j at time s, else 0;
$comm\_cy(j, m)$ = dummy variable with 1 for commodity j in country m, else 0;

cy_time(m, s) = dummy variable with 1 for country *m* at time *s*, else 0;
$\varepsilon(i, n, t)$ = error term for commodity *i* in country *n* at time *t*.

19.   **The dummy variables in this model capture EU-wide, country-wide, and industry-wide business cycles, as well as commodity-specific and country-specific trends.** The time trend *time(s)* describes the overall EU-wide business cycle. In addition to this business cycle, each industry can undergo a separate business cycle, *comm_time(j,s)*. The underlying trend inflation in each commodity, around which its commodity-specific business cycle fluctuates, is captured by the commodity-specific effects *comm(j)*. Countries may also undergo a countrywide business cycle, as captured by *cy_time(m, s)*. Finally, each commodity may be undergoing a different trend in different countries, captured by *comm_cy(j, m)*.

20.   **Because all averages are normalized to zero, all coefficients other than that on the commodity dummy *comm(j)* are interpreted as deviations from the average.** The dummy variables in equation (1) are perfectly collinear: for example, a linear combination of all *comm(j)* and *time(s)* dummies yields the dummy *comm_time(j,s)*. To be able to identify the coefficient estimates, therefore, additional restrictions have to be imposed. The restrictions chosen here are a normalization of all averages to zero, yielding $2I+2T+N+1$ restrictions, of which $2I+2T+N-1$ are linearly independent.[5]

$$
\begin{aligned}
\sum_{1}^{N} \beta_{j,m}^{comm\_cy} = 0 & \qquad \forall j = 1,...,I; \\[2mm]
\sum_{1}^{T} \beta_{j,s}^{comm\_time} = 0 & \qquad \forall j = 1,...I; \\[2mm]
\sum_{1}^{I} \beta_{j,s}^{comm\_time} = 0 & \qquad \forall s = 1,...T; \\[2mm]
\sum_{1}^{T} \beta_{m,s}^{cy\_time} = 0 & \qquad \forall m = 1,...N; \\[2mm]
\sum_{1}^{N} \beta_{m,s}^{cy\_time} = 0 & \qquad \forall s = 1,...,T; \\[2mm]
\sum_{1}^{T} \beta_{s}^{time} = 0. &
\end{aligned}
\tag{2}
$$

21.   **Overall virtual inflation is constructed as the inflation rate that would have prevailed in each country had inflation rates for all 51 commodity groups been at their EU average.** For each of the 51 commodities, a virtual inflation rate is constructed as the

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[5] One of the $I+T$ restrictions on the averages of *comm_time(j,s)* is a linear combination of the other restrictions and, hence, not linearly independent. The same holds for one of the $N+T$ restrictions on *cy_time(m,s)*.

average European inflation trend in that commodity, the average overall European business cycle, and the average European business cycle specific to that commodity:

$$\pi^{VIRT}(i,n,t) = \beta_i^{comm} + \beta_t^{time} + \beta_{i,t}^{comm\_time}$$

The virtual inflation rates for each of the 51 commodities therefore extract the European average inflation in each of these commodities, excluding all country-specific effects. The virtual inflation rates for the 51 commodities are then aggregated into an overall virtual CPI index for each country, using each country's weights in the HICP. ***Country-specific inflation is the difference between actual and virtual inflation rates.***

22. **The data are the monthly HICP index for January 2001−December 2005, as published by Eurostat.** For several industries, some countries do not report data for either the whole time span or parts of it.[6] If any part of a country-commodity series was missing, it was excluded from the sample.

D. Country-Specific Inflation in Lithuania

23. **Set against the background of inflation developments in the EU-25, Lithuania's inflation has been largely country-specific.** Actual inflation rates in Lithuania have differed substantially from virtual inflation, with some convergence since EU accession in May 2004 (Figure 1). Within four months of EU accession, inflation accelerated from −0.6 percent to 3.1 percent and has since stabilized. Lithuania's current inflation is broadly in line with the level Lithuanian inflation would be at, if all commodity groups had inflation at their EU averages, that is, its virtual inflation (Text Figure 11). However, the averages are

Text Figure 11. Lithuania: Country-Specific Inflation
(Year-on-year percent change)

Overall — Regulated nontradables --- Tradables ---
Food — Unregulated nontradables

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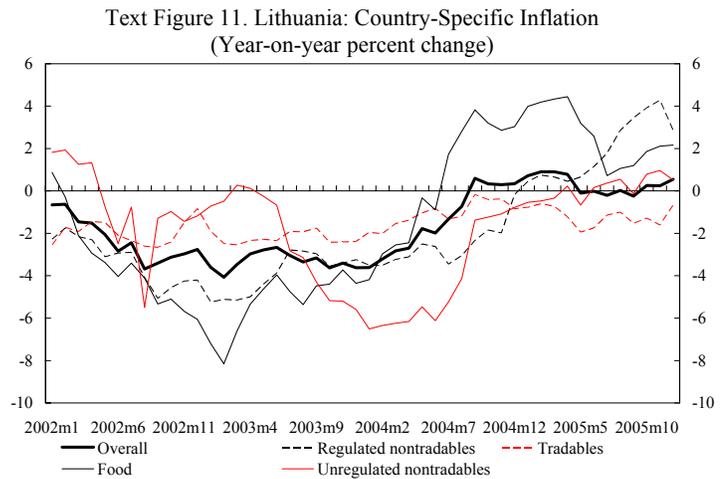
[6] The following data are missing: other service related to dwellings (Belgium, Luxembourg, Malta, Slovenia, and the United Kingdom); water supply, refuse, and sewage collection (Slovenia); liquid and solid fuels (Malta and the Netherlands); repair of furniture, furnishings, and floor coverings (Austria, Belgium, Estonia, Greece, Luxembourg, Malta, Spain, Slovenia, Sweden, and the United Kingdom); repair of household appliances (Latvia); domestic services and household services (Slovenia); hospital services (Estonia, Hungary, the Slovak Republic, and Slovenia); maintenance and repair of other major durables for recreation and culture (all but Ireland, Lithuania, Luxembourg, Netherlands, Portugal, and Sweden); major durables for indoor and outdoor recreation, including musical instruments (Estonia, Latvia, and Spain); social protection (Estonia, Hungary, Latvia, and Lithuania); and other financial services (Cyprus).

misleading. Positive Lithuania-specific inflation in food products and regulated nontradables is offset by negative Lithuania-specific inflation in tradables (despite large energy price increases). Meanwhile, Lithuania-specific inflation in unregulated nontradables has risen to 0.5 percent. A similar rise in country-specific inflation of nontradables, often beyond virtual inflation, occurred in the other CEE-8 countries, except Slovenia, either in the run-up to or following EU accession;[7] in most countries, however, the inflation rate in this subgroup has returned to, or fallen below the virtual rate.

24.   **Other CEE-8 countries also experienced country-specific food price inflation.** EU accession coincided with a rise in food prices in seven of the CEE-8 countries, including Lithuania, from June 2003 to August 2004 (Figure 2). As a result, food prices in the CEE-8 converged to the prices in the EU-15, while EU-15 food prices declined somewhat. In most CEE-8 countries, except Latvia and Lithuania, food price inflation declined sharply again within a year of the surge. While Lithuania's food price inflation has temporarily declined, it is not yet down to a level that indicates that the inflationary impetus has been eliminated.

25.   **The inflation rate of nonfood tradables rose to match the EU—or "virtual"— rates, but within this category, the energy and nonenergy subgroups differed in their trends** (Figure 3). As in the other CEE-8 countries, Lithuanian energy inflation has moved broadly in line with EU-wide energy inflation, although at a lower level (Figure 4). At a time of rising global energy prices, this slower-than-average energy inflation partially offset the effect of the higher-than-average weight in the CPI basket on Lithuanian inflation. In the nonenergy tradables subgroup, the gap between actual and virtual inflation narrowed because of convergence, but this later reversed somewhat as nonenergy tradables prices fell relatively steeply (Figure 5).

26.   **The trend to watch is that of nontradables inflation, which has been on the rise since end-2003 and has surpassed virtual inflation** (Figure 6)**.** Within the nontradables group, the continued upward trend can be attributed significantly to regulated price increases. Regulated prices are based on the cost of regulated services, even if adjusted infrequently. Therefore, they respond to domestic demand pressures as well as energy price increases. The demand pressures are reflected in the excess of country-specific regulated nontradables inflation over country-specific energy price inflation that persisted throughout the sample period. The data since January 2001 shows that the rise in regulated prices can be only partially attributed to the rise in energy prices.[8] Turning to unregulated prices, country-specific unregulated nontradables inflation has increased and is currently slightly above the level of virtual inflation (Figure 7). Between end-2002 and end-2005, country-specific year-on-year inflation has increased from -1.8 percent to +0.5 percent. This contrasts with the

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[7] The Slovak Republic is an exceptional case because EU-related and other tax changes raised inflation rates in 2003 and 2004.

[8] For example, between end-2002 and end-2005, regulated nontradables prices increased by 14.8 percent compared to energy price inflation of 12.4 percent over the same period.

decline in country-specific inflation in unregulated nontradables in other CEE-8 countries (the Czech Republic, Hungary, Poland, and the Slovak Republic), once the EU accession-related inflation surge subsided. In Poland, the decline has taken unregulated nontradables inflation even below virtual inflation.

27.   **The trend increase in country-specific inflation has coincided with increasing wage pressures since the first quarter of 2004.** It has followed a period of rapid credit growth, which slowed briefly but has since bounced back. At least for the period 2003−04, Kasperavičius (2005) finds that rapid credit growth has been the leading cause of inflation.

E. Regression Analysis

28.   **A panel regression is used to assess the impact of demand pressures on nontradables inflation.** The approach is similar to Honohan and Lane (2003), who run a panel regression of overall inflation differentials for 1999−2001 data on catch-up effects, nominal appreciation, the fiscal balance, and the output gap. The regression presented here expands on their analysis in three ways. First, the data set is updated to include the period before and after EU accession by the CEE-8. Second, the analysis is based on the Philipps curve, as in Galí and Gertler (1999), and allows for an effect of expectations on inflation. Third, by using virtual inflation, we control for the differential effects of CPI baskets.

29.   **The model follows Galí and Gertler (1999), where some firms are forward-looking while others are backward-looking.** This allows the inclusion of inflation persistence, which Angeloni and Ehrmann (2004) and Bonato (2005) find to be important among members of the Economic and Monetary Union. The resulting regression equation is a Philipps-curve-style equation that includes lagged and leading inflation and the deviation of real marginal cost from the steady state equilibrium:

$$\pi_t = \alpha\, rmc_t + \beta\pi_{t-1} + \gamma E_t\left(\pi_{t+1}\right)$$

While the real marginal cost has often been approximated by measures of the output gap, Galí and Gertler (1999) argue that direct measures of real marginal cost are more appropriate. Here, both measures are used. Since we are interested in the determinants of country-specific inflation, we use deviations from the EU-25 average or the euro zone for all independent variables. Cost-push factors are real wages and the real effective exchange rate. The potential demand-pull pressures are general government consumption growth and credit growth. We also include the deviation of unemployment from the Non-Accelerating Wage Rate of Unemployment (NAWRU) as a quarterly measure of the output gap. We allow for catch-up processes beyond immediate cost-push and demand-pull factors, including the lagged price level relative to the EU-25.

30.   **Since inflation is persistent, the Arellano-Bond estimator is used to estimate the following panel regression:**

$$\left(\pi_{n,t}^{actual} - \pi_{n,t}^{virtual}\right) = \rho\left(\pi_{n,t-1}^{actual} - \pi_{n,t-1}^{virtual}\right) + \sigma\left(\pi_{n,t+1}^{actual} - \pi_{n,t+1}^{virtual}\right)$$

$$+ \beta_t real\ wage_{n,t} + \gamma_t reer_{n,t} + \sum_{s=1}^{4}\mu_{t-s} growth\ in\ consumption_{n,t-s}^{government}$$

$$+ \sum_{s=1}^{4}\mu_{t-s} growth\ in\ credit_{n,t-s} + P_{n,t-4}$$

where *real wage* is total real unit labor cost relative to the EU-25, *reer* is the real effective exchange rate relative to the EU-25, *growth in consumption*^{government} is the 12-month log difference in government consumption in percent relative to the EU-25, *growth in credit* is the 12-month log difference in private sector credit in percent relative to the euro area, and $P_{n,t-4}$ is the relative price level to the EU-25 lagged by four quarters. While four lags are originally included for all independent variables, these are later trimmed to include only statistically significant lags.

31.   **Quarterly data are available for most of the EU-25 countries for the period 2002:Q1−2005:Q3.** The data are from Eurostat, the AMECO database, and the WEO database. Data on credit growth are not available for the full time series for Greece, Malta, and Sweden, while data on manufacturing wages are also not available for Malta. Government consumption growth is also not available for Luxembourg. Hence, these four countries were excluded from the regression. Poland is removed from the sample because the real effective exchange rate data provided by Eurostat show large jumps that cannot be explained in the regressions here.

32.   **Inflation persistence and inflation expectations explain the largest part of inflation.** The Arellano-Bond tests cannot reject the hypothesis that there is autocorrelation, that is, inflation persistence, of order 1, but allow us to reject any higher-order autocorrelation (Table 1). The estimated coefficients for lagged and future expectation are somewhat smaller than what Leigh (2005) finds for overall inflation in Hungary. The persistence of inflation differentials has also been noted by Angeloni and Ehrmann (2004), Honohan and Lane (2003), and European Central Bank (2003). The negative coefficient on the lagged relative price level that is more than ten times greater than that found by Honohan and Lane (2003), however, suggests that there is some price convergence and that it might be faster than in the earlier samples included in these studies.

33.   **Among the exogenous variables, the real wage gap is the most important determinant for inflation differentials, especially among the CEE-8 countries.** In the short run, a 1 percentage point increase in the real wage gap is associated with an 0.02 percentage point increase in country-specific inflation among the old EU members and with an 0.54 percentage point increase in country-specific inflation among the CEE-8 countries. In the long run, a 1 percentage point increase in the real wage gap is associated

with an 0.95 percentage point increase in country-specific inflation in the CEE-8.[9] The real effective exchange rate is not a significant determinant of the country-specific inflation in nontradables. Strong real credit growth, however, may raise country-specific nontradables inflation with longer lags of about three quarters, although the coefficient estimate is small. The effect of real general government consumption growth on nontradables inflation is unclear, with varying significance at various lags. This weak correlation between measures of fiscal impact and inflation

Text Figure 12. EU-25: Country-Specific Inflation in Tradables and Nontradables, 2002:Q1-2005:Q3
(Year-on-year percent change)

has also been found by Honohan and Lane (2003). Because there is a clear correlation between country-specific inflation rates for tradables and nontradables (Text Figure 12), it is possible that domestic demand factors also spill over into tradables inflation.
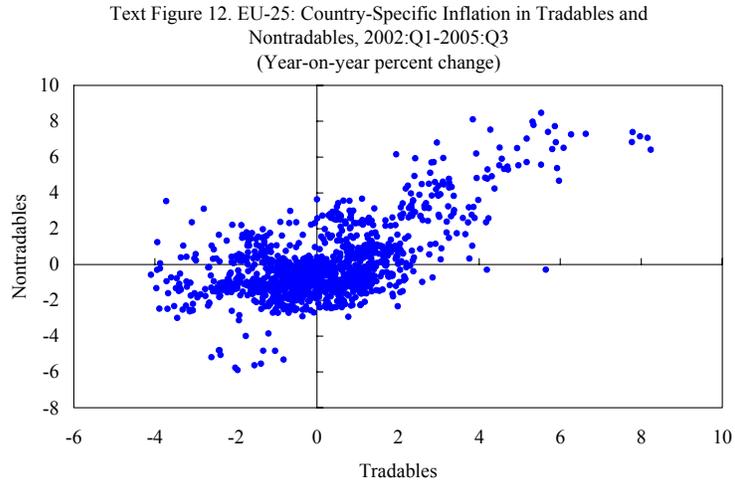
34.   **When the same panel regression is run for tradables, domestic real wage pressures turn out to be important in the CEE-8 countries, as does the real effective exchange rate.** While still significant, the coefficient on the real wage gap in the CEE-8 is somewhat smaller than in the regression for nontradables, especially in the long run (Table 2). In the old EU members and Cyprus, real wages can no longer account for inflation differentials. In addition, the real effective exchange rate is now strongly significant with the expected sign: a 1 percent real effective appreciation reduces country-specific inflation by 0.05 percentage point in the short run and by 0.07 percentage point in the long run. Country-specific inflation persistence is weaker than for nontradables, suggesting that competition with the rest of the world provides some link with international prices. Expectations, however, affect tradables and nontradables similarly. Compared with the regression for nontradables, the one for tradables appears to have a better fit (Text Figure 13).

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[9] The long-term coefficients are calculated as $\beta(t\text{-}3)/(1\text{-}\rho)$ and $\beta(t\text{-}4)/(1\text{-}\rho)$.

Text Figure 13. Lithuania: Actual and Predicted Country-Specific Inflation for Tradables and Nontradables
(Year-on-year percent change)
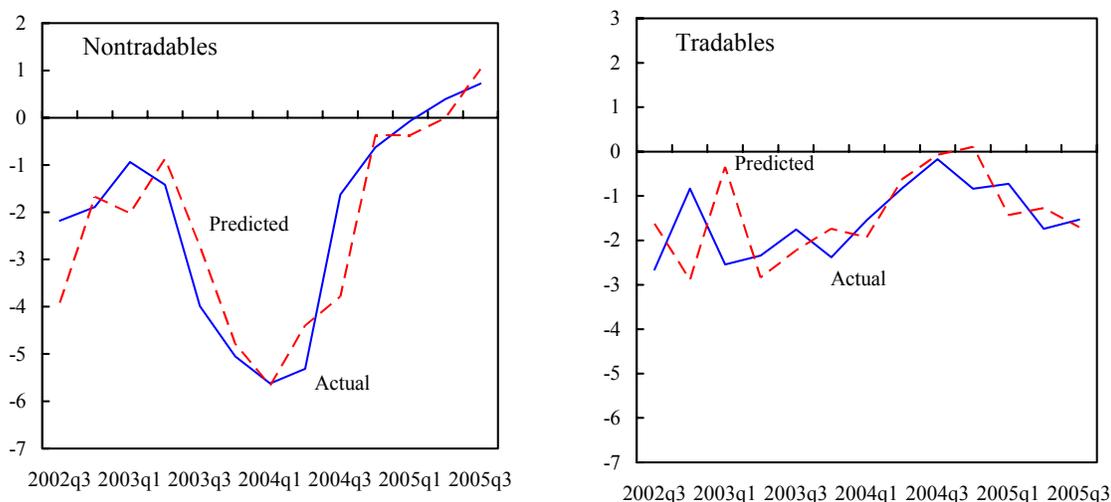
Source: IMF staff estimates.

F.   Conclusions and Outlook

35.   **The convergence of Lithuania's average inflation to EU-average inflation reflects EU accession-related effects, regulated price increases, and underlying demand pressures.** An inflationary spike around the time of EU accession has, for now, plateaued. An important contributor to the price spike was the rise in food prices as demand for Lithuanian food products increased, while external supplies were curtailed. Rising energy prices further contributed to inflation. Additional inflationary pressures, unrelated to EU accession and energy prices, are evident in regulated and unregulated nontradables' inflation. These price developments suggest a role for domestic demand pressures. Therefore, a panel regression is used to analyze the respective roles of wage pressures, real exchange rate appreciation, credit growth, and fiscal pressures in determining inflation.

36.   **The evidence of inflation persistence and the importance of inflation expectations raises concerns that inflation from domestic demand factors could become entrenched.** The strong persistence of inflation, especially for nontradables, suggests that, should wage pressures feed further into inflation, inflation may be permanently higher. Inflation expectations are also important: an increase in inflation expectations of 1 percent can raise inflation by about ¼ percentage point. The real wage gap consistently correlates strongly with inflation, especially in the CEE-8 countries, in both tradables and nontradables. Real effective exchange rates have the expected effects on tradables inflation. Other macroeconomic variables also contribute to inflation, but with less robust and weaker effects.

37.   **Looking ahead, Lithuania's short-term inflationary risks are on the upside:**

- **Tradables and food prices will continue to rise with convergence to EU price levels.** Most tradable and food prices are still 50−70 percent of EU-15 average prices (Text Figure 14), leaving substantial room for catch-up.

Text Figure 14. Lithuania: Relative Price Level Compared to EU-15, 2005
(EU-15=100)
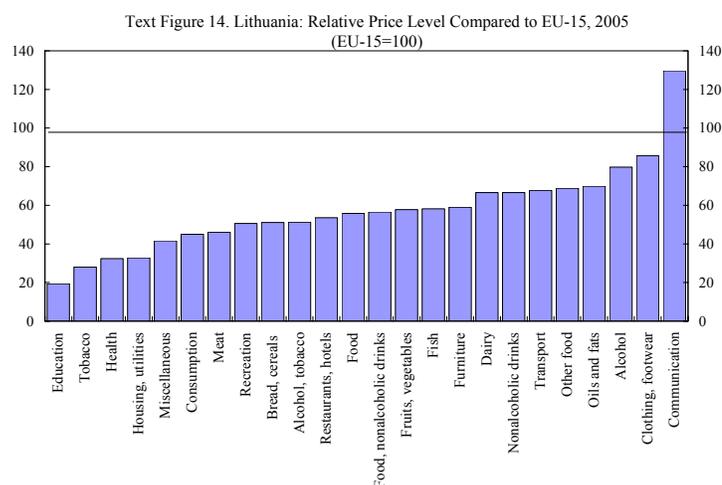
- **Energy price increases have yet to feed fully into inflation.** Further oil price increases projected by the WEO 2006 and the still-incomplete pass-through of past energy price increases into inflation will put further pressures on tradables prices, as will Gazprom's decision to raise its import prices by 40 percent.

- **Wage pressures, including from minimum wage increases, will continue to be inflationary for labor-intensive goods.** About one-quarter of all employees in the private sector are employed at the minimum wage. The 10 percent increase in the minimum wage effective July 1, 2005 and the further 9 percent increase on July 1, 2006 will feed through into wage cost and inflation.

- **Tax harmonization with EU regulations will contribute to price increases once Lithuania's current derogations have run out.** Excise taxes on cigarettes will need to be almost doubled, those on diesel fuel raised by 35 percent and those on petrol by 25 percent.

38.   **The regression results do not suggest any immediate and easily identifiable effect of domestic policy on inflation.** Variables that could be influenced by policy, such as credit growth and general government consumption, have only a weak direct influence on inflation. It is likely that these variables are reflected in real wage pressures and the real effective appreciation. Given these uncertainties, domestic efforts to contain inflation will need to rely on the principal available instrument, a conservative fiscal stance, as a measure of precaution and a signal of commitment to containing demand pressures. Such a stance should help restrain wage growth and real exchange rate appreciation.

Figure 1. EU-15 and CEE-8: Actual and Virtual Inflation
(Year-on-year percent change)
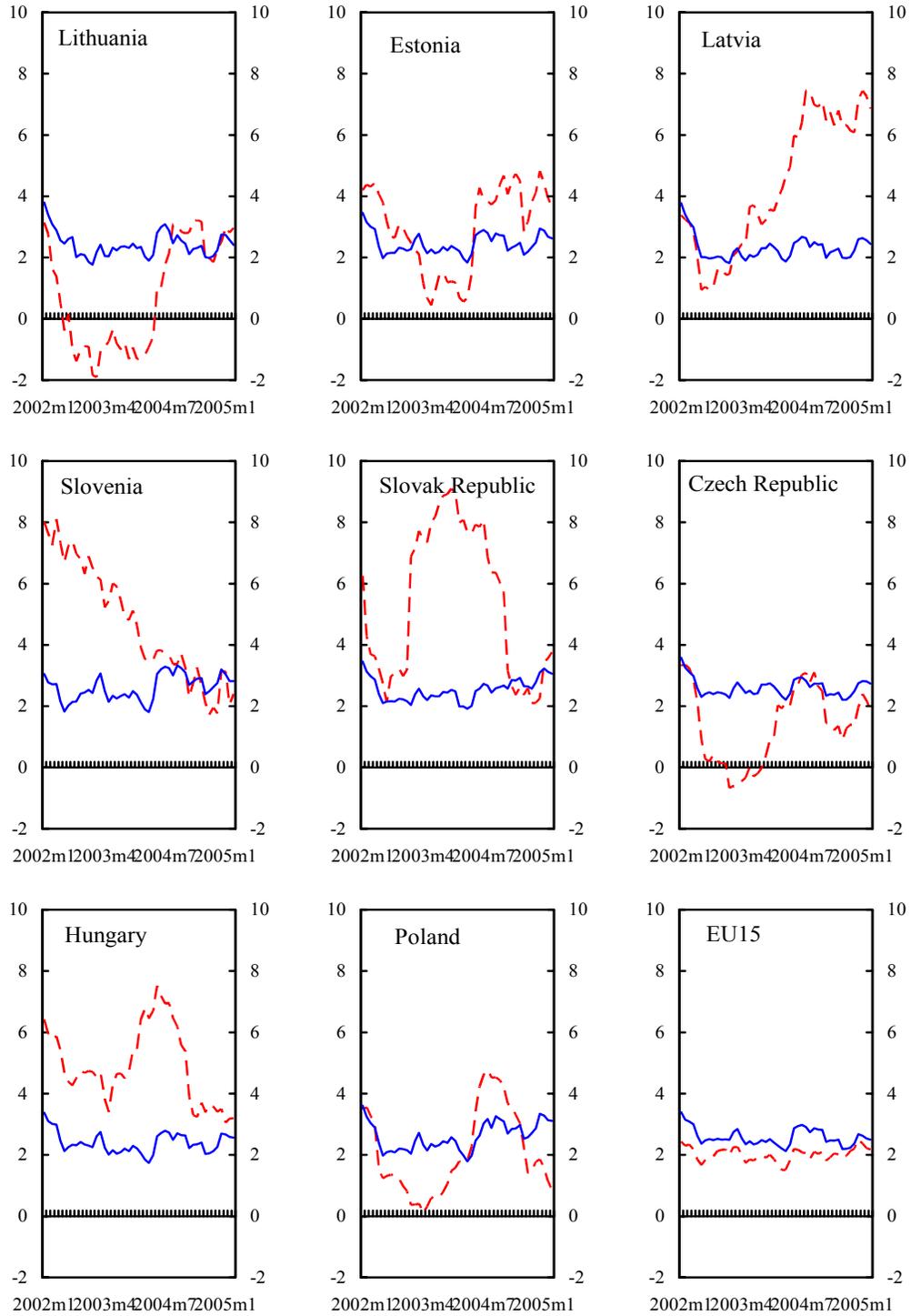
Sources: Eurostat; and IMF staff estimates.

- - - - Actual ——— Virtual

Figure 2. EU-15 and CEE-8: Actual and Virtual Food Inflation
(Year-on-year percent change)
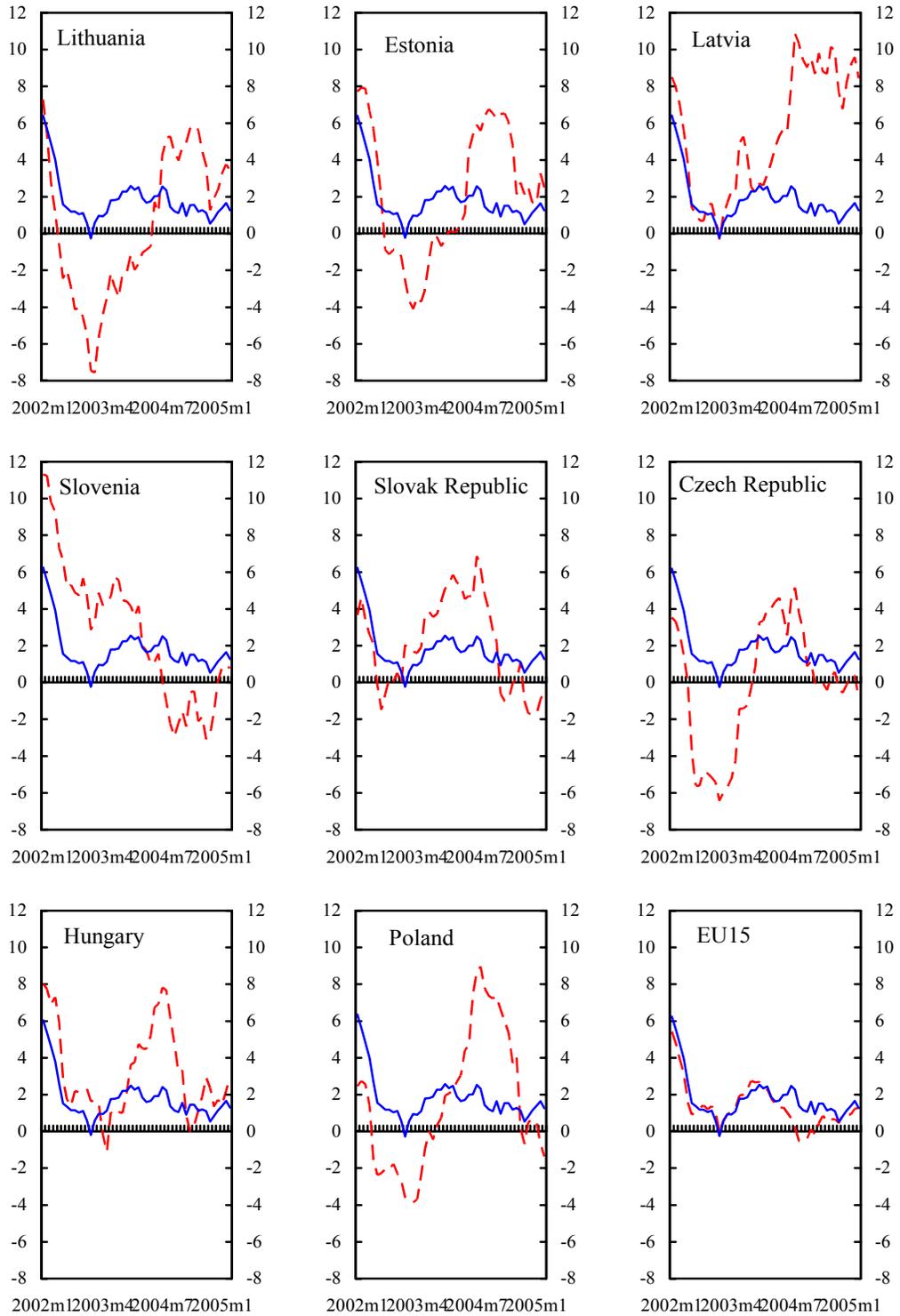
Sources: Eurostat; and IMF staff estimates.

- - - - - Actual ———— Virtual

Figure 3. EU-15 and CEE-8: Actual and Virtual Tradables Inflation
(Year-on-year percent change)
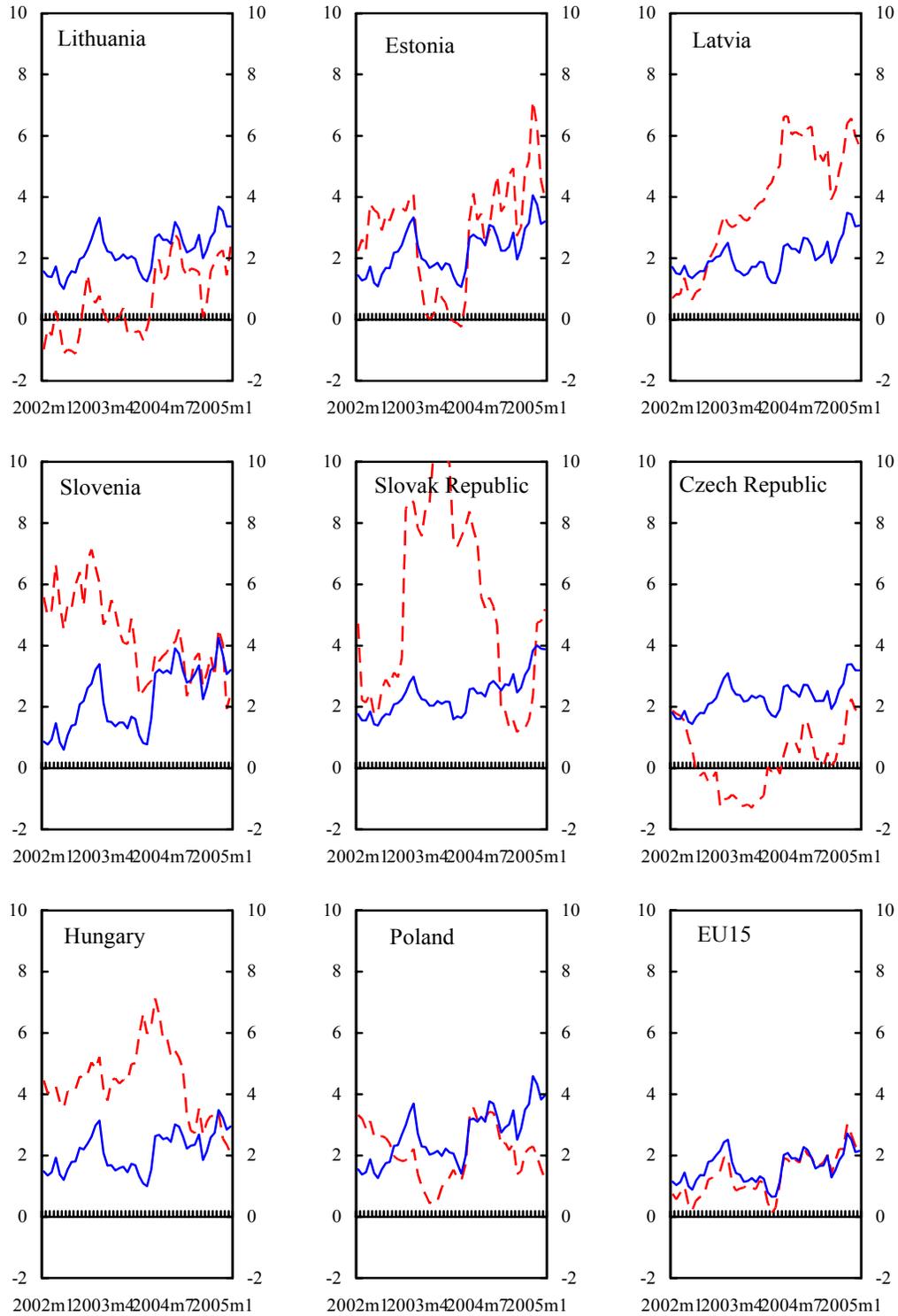
Sources: Eurostat; and IMF staff estimates.

- - - - - Actual   ———— Virtual

Figure 4. EU-15 and CEE-8: Actual and Virtual Inflation of Energy
Tradables
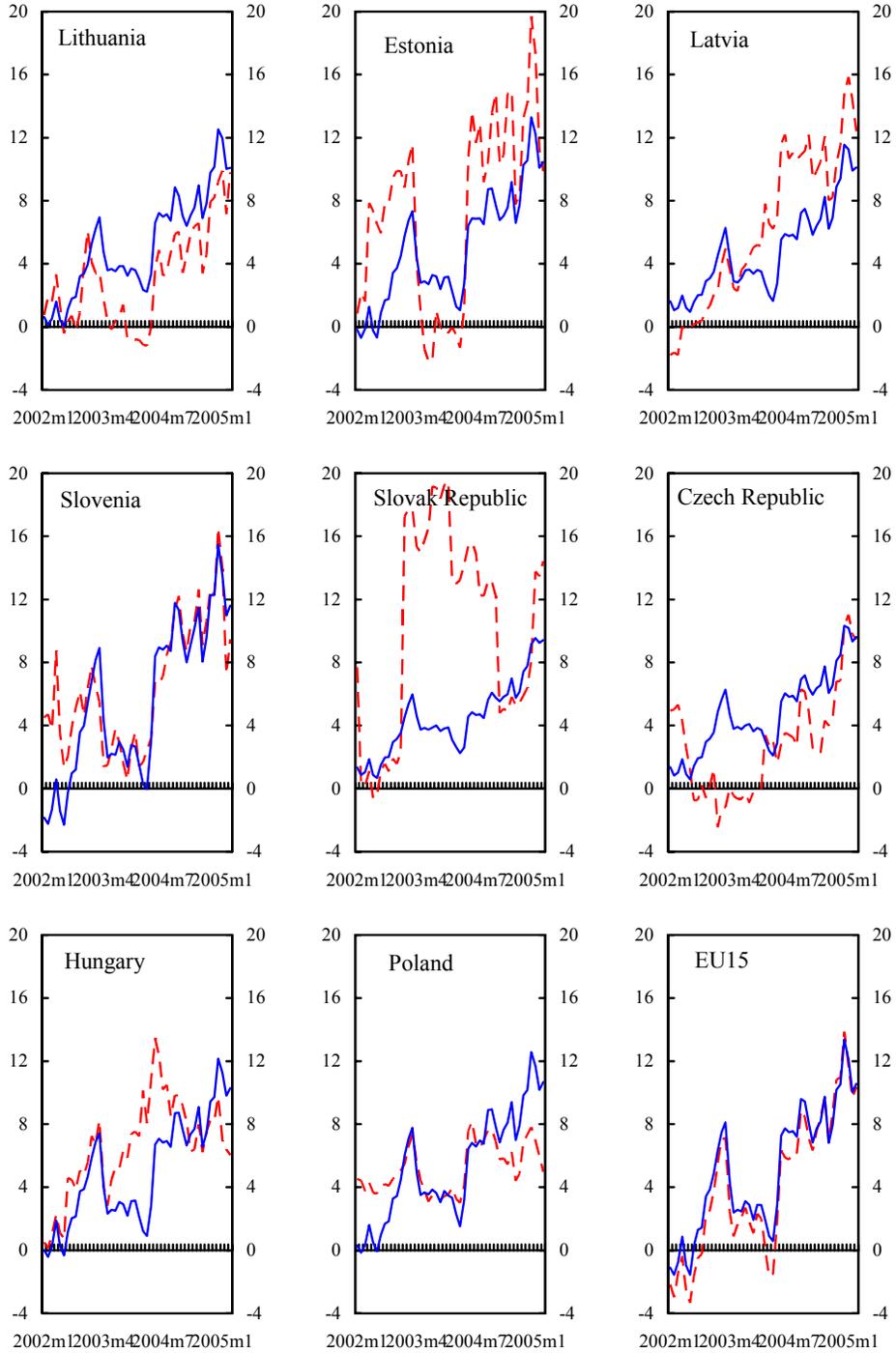
Sources: Eurostat; and IMF staff estimates.

- - - - - Actual ——— Virtual

Figure 5. EU-15 and CEE-8: Actual and Virtual Inflation of Tradables
Excluding Energy

Sources: Eurostat; and IMF staff estimates.
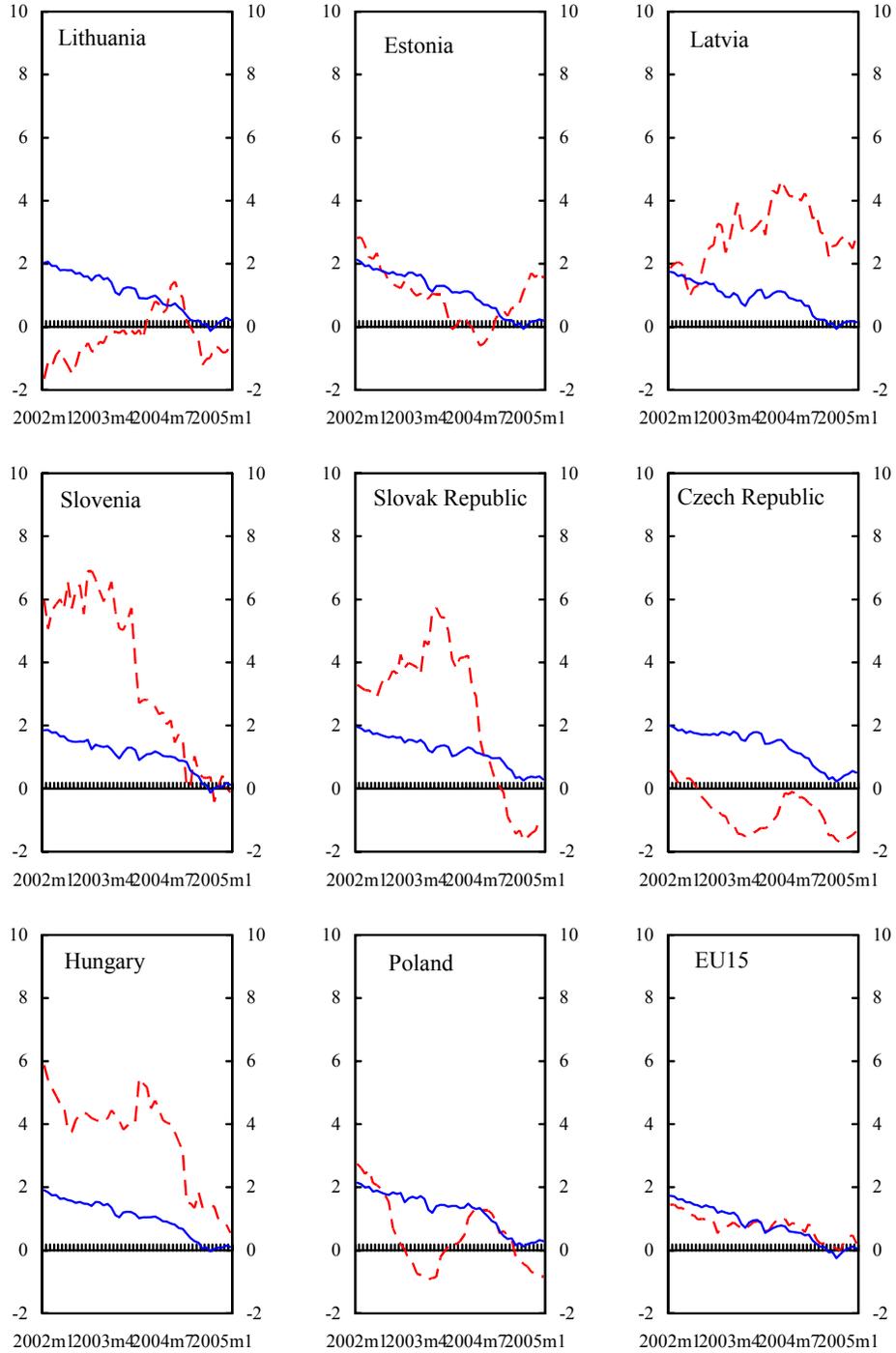
- - - - - - Actual ———— Virtual

Figure 6. EU-15 and CEE-8: Actual and Virtual Nontradables Inflation
(Year-on-year percent change)
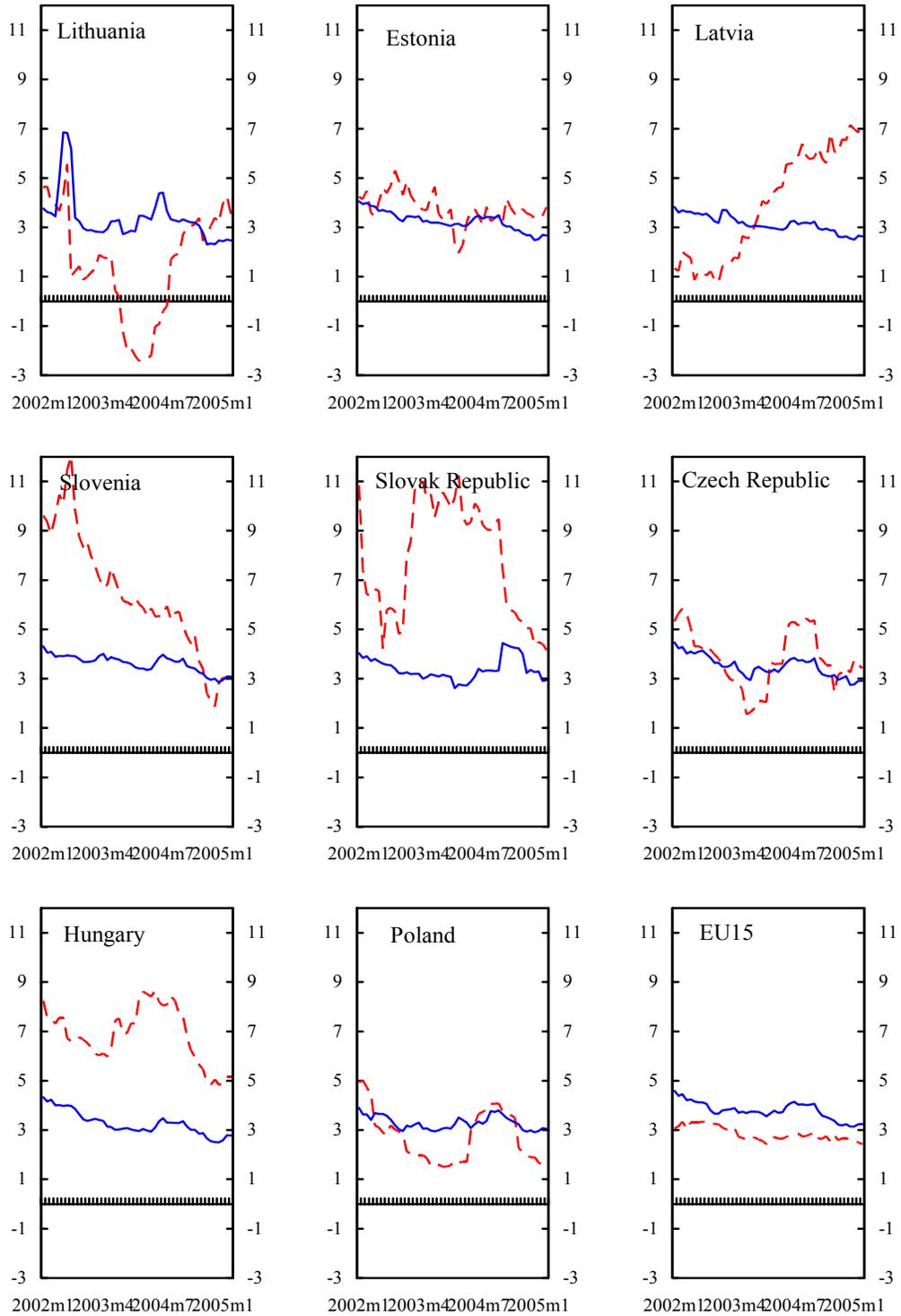
Sources: Eurostat; and IMF staff estimates.

- - - - - Actual   ———— Virtual

Figure 7. EU-15 and CEE-8: Actual and Virtual Inflation of Nontradables
Excluding Regulated

Sources: Eurostat; and IMF staff estimates.

- - - - - Actual   ——— Virtual
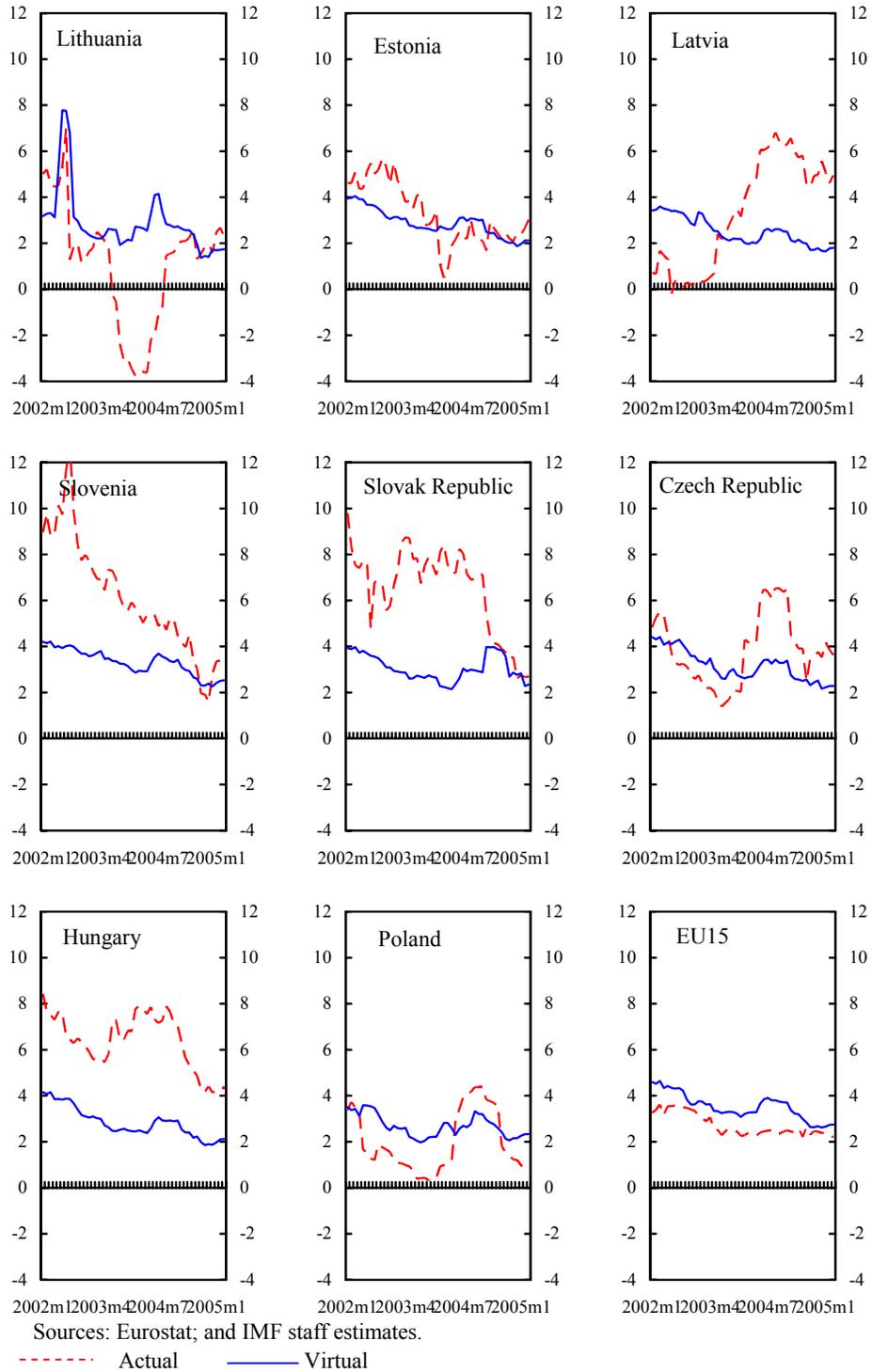
Table 1. Lithuania: Regression for Country-Specific Nontradables Inflation

Arellano-Bond dynamic panel-data estimation				Number of obs	=	259
Group variable (i): cy_id				Number of groups	=	20
				Wald chi2 (14)	=	528.17
Time variable (t): dateq				Obs per group min	=	12
					avg =	12.95
					max =	13

One-step results

D.gap_NT	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
gap_NT (t-1)						
Δ	0.43	0.06	7.05	0.00	0.31	0.55
gap_NT (t+1)						
Δ	0.26	0.05	4.88	0.00	0.16	0.37
Real manufacturing wage						
Δ	0.02	0.01	1.68	0.09	0.00	0.05
Real manufacturing wage in CEE-8						
Δ	0.54	0.09	5.74	0.00	0.36	0.73
Real effective exchange rate (ULC-based)						
Δ	-0.01	0.02	-0.44	0.66	-0.04	0.03
Real credit growth						
Δ	-0.01	0.01	-0.99	0.32	-0.03	0.01
Δ_{t-1}	-0.01	0.01	-0.80	0.42	-0.03	0.01
Δ_{t-2}	0.03	0.01	2.40	0.02	0.00	0.05
Δ_{t-3}	-0.01	0.01	-1.01	0.31	-0.02	0.01
Real government consumption growth						
Δ	0.05	0.02	2.10	0.04	0.00	0.09
Δ_{t-1}	-0.03	0.02	-1.28	0.20	-0.06	0.01
Δ_{t-2}	0.00	0.02	0.22	0.83	-0.03	0.04
Δ_{t-3}	-0.05	0.02	-2.29	0.02	-0.09	-0.01
Relative price level (EU25=100)						
Δ_{t-4}	-0.46	0.07	-6.61	0.00	-0.60	-0.33
constant	-0.02	0.02	-0.88	0.38	-0.06	0.02

Sargan test of over-identifying restrictions:
chi2 (90) = 116.27 Prob> chi2 0.0327

Arellano-Bond test that average autocovariance in residuals of order 1 is 0:
H0: no autocorrelation z = -7.35 Pr > z = 0
Arellano-Bond test that average autocovariance in residuals of order 2 is 0:
H0: no autocorrelation z = 0.99 Pr > z = 0.3225

Table 2. Lithuania: Regression for Country-Specific Tradables Inflation

Arellano-Bond dynamic panel-data estimation				Number of obs =		259
Group variable (i): cy_id				Number of groups =		20
				Wald chi2 (14) =		539.29
Time variable (t): dateq				Obs per group min =		12
				avg =		12.95
				max =		13

One-step results

D.gap_T	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
gap_T (t-1)						
Δ	0.32	0.06	5.15	0.00	0.20	0.44
gap_T (t+1)						
Δ	0.26	0.05	4.94	0.00	0.15	0.36
Real manufacturing wage						
Δ	0.02	0.01	1.16	0.25	-0.01	0.04
Real manufacturing wage in CEE-8						
Δ	0.46	0.10	4.77	0.00	0.27	0.65
Real effective exchange rate (ULC-based)						
Δ	-0.05	0.02	-2.56	0.01	-0.09	-0.01
Real credit growth						
Δ	-0.02	0.01	-1.75	0.08	-0.04	0.00
Δ_{t-1}	0.01	0.01	1.02	0.31	-0.01	0.03
Δ_{t-2}	0.00	0.01	-0.07	0.94	-0.02	0.02
Δ_{t-3}	0.01	0.01	1.41	0.16	0.00	0.03
Real government consumption growth						
Δ	0.00	0.02	-0.10	0.92	-0.04	0.04
Δ_{t-1}	0.01	0.02	0.77	0.44	-0.02	0.05
Δ_{t-2}	-0.04	0.02	-2.17	0.03	-0.08	0.00
Δ_{t-3}	-0.02	0.02	-0.85	0.40	-0.06	0.02
Relative price level (EU25=100)						
Δ_{t-4}	-0.48	0.08	-6.42	0.00	-0.63	-0.34
constant	-0.03	0.02	-1.45	0.15	-0.07	0.01

Sargan test of over-identifying restrictions:
chi2   (90) =   144.3 Prob> chi2   0

Arellano-Bond test that average autocovariance in residuals of order 1 is 0:
H0:   no autocorrelation z =   -7.92   Pr > z =   0
Arellano-Bond test that average autocovariance in residuals of order 2 is 0:
H0:   no autocorrelation z =   2.35   Pr > z =   0.0188

	Classification of Commodities			
Four-digit ID	**Commodity Description**	**Tradable/ Nontradable**	**Regulated/ Unregulated**	**Energy/ Nonenergy**
01	Food and nonalcoholic beverages	T	NR	NE
011	Food	T	NR	NE
0111	Bread and cereals	T	NR	NE
0112	Meat	T	NR	NE
0113	Fish and seafood	T	NR	NE
0114	Milk, cheese, and eggs	T	NR	NE
0115	Oils and fats	T	NR	NE
0116	Fruit	T	NR	NE
0117	Vegetables	T	NR	NE
0118	Sugar, jam, honey, chocolate, and confectionery	T	NR	NE
0119	Food products n.e.c.	T	NR	NE
012	Nonalcoholic beverages	T	NR	NE
0121	Coffee, tea and cocoa	T	NR	NE
0122	Mineral waters, soft drinks, and fruit and vegetable juices	T	NR	NE
02	Alcoholic beverages, tobacco, and narcotics	T	NR	NE
021	Alcoholic beverages	T	NR	NE
0211	Spirits	T	NR	NE
0212	Wine	T	NR	NE
0213	Beer	T	NR	NE
022	Tobacco	T	NR	NE
03	Clothing and footwear	T	NR	NE
031	Clothing	T	NR	NE
0311	Clothing materials	T	NR	NE
0312	Garments	T	NR	NE
0313	Other articles of clothing and clothing accessories	T	NR	NE
0314	Cleaning, repair, and hire of clothing	NT	NR	NE
032	Footwear including repair	T	NR	NE
04	Housing, water, electricity, gas, and other fuels	T/NT	NR	NE
041	Actual rentals for housing	NT	R	NE
043	Maintenance and repair of the dwelling	NT	NR	NE
0431	Materials for the maintenance and repair of the dwelling	NT	NR	NE
0432	Services for the maintenance and repair of the dwelling	NT	NR	NE
044	Water supply and miscellaneous services relating to the dwelling	NT	R/NR	NE
0441	Water supply	NT	R	NE
0442	Refuse collection	NT	R	NE
0443	Sewerage collection	NT	R	NE
0444	Other services relating to the dwelling n.e.c.	NT	NR	NE
045	Electricity, gas, and other fuels	T	R/NR	E
0451	Electricity	T	R	E
0452	Gas	T	R	E
0453	Liquid fuels	T	NR	E
0454	Solid fuels	T	NR	E
0455	Heat energy	T	R	E

	Classification of Commodities (continued)			
Four-digit ID	Commodity Description	Tradable/ Nontradable	Regulated/ Unregulated	Energy/ Nonenergy
05	Furnishings, household equipment, and routine maintenance of the house	T/NT	NR	NE
051	Furniture and furnishings, carpets, and other floor coverings	T/NT	NR	NE
0511	Furniture and furnishings	T	NR	NE
0512	Carpets and other floor coverings	T	NR	NE
0513	Repair of furniture, furnishings, and floor coverings	NT	NR	NE
052	Household textiles	T	NR	NE
053	Household appliances	T/NT	NR	NE
0531_532	Major household appliances, whether electric or not, and small electric household appliances	T	NR	NE
0533	Repair of household appliances	NT	NR	NE
054	Glassware, tableware, and household utensils	T	NR	NE
055	Tools and equipment for house and garden	T	NR	NE
056	Goods and services for routine household maintenance	T/NT	NR	NE
0561	Nondurable household goods	T	NR	NE
0562	Domestic services and household services	NT	NR	NE
06	Health	T/NT	NR	NE
061	Medical products, appliances, and equipment	T	R	NE
0611	Pharmaceutical products	T	R	NE
0612_613	Other medical products; therapeutic appliances, and equipment	T	R	NE
062	Outpatient services	NT	NR	NE
0621_623	Medical and paramedical services	NT	R	NE
0622	Dental services	NT	NR	NE
063	Hospital services	NT	R	NE
07	Transport	T/NT	NR	NE
071	Purchase of vehicles	T	NR	NE
071_not_711	Motor cycles, bicycles, and animal-drawn vehicles	T	NR	NE
0711	Motor cars	T	NR	NE
072	Operation of personal transport equipment	T/NT	NR	NE
0721	Spares parts and accessories for personal transport equipment	T	NR	NE
0722	Fuels and lubricants for personal transport equipment	T	NR	E
0723	Maintenance and repair of personal transport equipment	NT	NR	NE
0724	Other services in respect of personal transport equipment	NT	NR	NE
073	Transport services	NT	NR	NE
0731	Passenger transport by railway	NT	R	NE
0732	Passenger transport by road	NT	R	NE
0733	Passenger transport by air	NT	NR	NE
0734	Passenger transport by sea and inland waterway	NT	NR	NE
0735	Combined passenger transport	NT	NR	NE
0736	Other purchased transport services	NT	NR	NE
08	Communications	T/NT	NR	NE
081	Postal services	NT	R	NE
082	Telephone and telefax equipment	T	NR	NE

		Tradable/ Nontradable	Regulated/ Unregulated	Energy/ Nonenergy
Four-digit ID	**Commodity Description**			
082_83	Telephone and telefax equipment and services	NT	NR	NE
083	Telephone and telefax services	NT	NR	NE
09	Recreation and culture	T/NT	NR	NE
091	Audio-visual, photographic, and information-processing equipment	T/NT	NR	NE
0911	Equipment for the reception, recording, and reproduction of sound and pictures	T	NR	NE
0912	Photographic and cinematographic equipment and optical instruments	T	NR	NE
0913	Information-processing equipment	T	NR	NE
0914	Recording media	T	NR	NE
0915	Repair of audio-visual, photographic, and information-processing equipment	NT	NR	NE
092	Other major durables for recreation and culture	T/NT	NR	NE
0921_922	Major durables for indoor and outdoor recreation, including musical instruments	T	NR	NE
0923	Maintenance and repair of other major durables for recreation and culture	NT	NR	NE
093	Other recreational items and equipment, gardens and pets	T	NR	NE
0931	Games, toys, and hobbies	T	NR	NE
0932	Equipment for sport, camping, and open-air recreation	T	NR	NE
0933	Gardens, plants, and flowers	T	NR	NE
0934_935	Pets and related products; veterinary and other services for pets	T	NR	NE
094	Recreational and cultural services	NT	NR	NE
0941	Recreational and sporting services	NT	NR	NE
0942	Cultural services	NT	NR	NE
095	Newspapers, books and stationery	T	NR	NE
0951	Books	T	NR	NE
0952	Newspapers and periodicals	T	NR	NE
0953_954	Miscellaneous printed matter; stationery and drawing materials	T	NR	NE
096	Package holidays	NT	NR	NE
10	Education	NT	R	NE
11	Restaurants and hotels	NT	NR	NE
111	Catering services	NT	NR	NE
1111	Restaurants, cafés, and the like	NT	NR	NE
1112	Canteens	NT	NR	NE
112	Accommodation services	NT	NR	NE
12	Miscellaneous goods and services	T/NT	NR	NE
121	Personal care	T/NT	NR	NE
1211	Hairdressing salons and personal grooming establishments	NT	NR	NE
1212_1213	Electrical appliances for personal care; other appliances, articles and products for personal care	T	NR	NE
123	Personal effects n.e.c.	T	NR	NE
1231	Jewelry, clocks, and watches	T	NR	NE

Classification of Commodities (continued)

Four-digit ID	Commodity Description	Tradable/ Nontradable	Regulated/ Unregulated	Energy/ Nonenergy
1232	Other personal effects	T	NR	NE
124	Social protection	NT	R	NE
125	Insurance	NT	NR	NE
1252	Insurance connected with the dwelling	NT	NR	NE
1253	Insurance connected with health	NT	NR	NE
1254	Insurance connected with transport	NT	NR	NE
1255	Other insurance	NT	NR	NE
126	Financial services n.e.c.	NT	NR	NE
127	Other services n.e.c.	NT	NR	NE

Classification of Commodities (concluded)

Source: IMF staff.

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III. ISSUES IN HEALTH CARE AND SOCIAL ASSISTANCE[10]

A. Introduction

39.   **The Lithuanian authorities have made progress in modernizing and improving the efficiency of the health care and social assistance system.** Measures have been taken to limit excessive demand for secondary and tertiary health care in favour of primary care; health care institutions have been consolidated and the number of hospital beds per inhabitants reduced; investment costs have been partially internalized into contractual pricing; doctors' salaries have been increased substantially in order to check emigration; social insurance benefits entitlements have been made stricter and are now clearly conditional on a minimum duration of insurance; some benefits have been terminated (e.g., retirement benefits); and some assistance has been decentralized to local governments.

40.   **However, recent revenue buoyancy has increased the risks of halting, or even reversing, these positive trends.** A new system of child benefits, additional to already existing tax exemptions, has been introduced and is being gradually phased in. This is estimated to cost an additional LTL 100 million per year. Some of the benefits (e.g., unemployment benefit) have been made more generous. There are also plans to increase the scope of unemployment benefits and employment subsidies.

41.   **Present revenue buoyancy should not obscure the need to improve the efficiency of public resources.** Revenue buoyancy may be temporary, and conditions may revert in the future making it difficult to sustain present commitments. Moreover, tax reform measures introduced in 2005 are likely to result in revenue losses from 2008 onward. Expenditure pressures are also likely to continue to increase in the near future. Lithuania will need to increase investment in physical and human capital to raise the economy's long-run growth potential while a rapidly aging population will raise social security costs. Thus meeting the authorities' stated objective of reducing the fiscal deficit to 1 percent of GDP by 2008 will require concerted efforts to generate additional revenues while controlling the growth of expenditures.

42.   **In light of this background, this chapter attempts to identify policy measures to rationalize public expenditures in two areas—health care and social assistance.** The rest of the chapter is organized as follows: Section B reviews the main issues in the health care sector and lays out a menu of reform options for the short and medium term. Section C discusses the main social assistance benefits and illustrates with the help of an example the disincentives to work that are inherent in the system. A proposal for consolidating these benefits so as to reduce these disincentives is then illustrated. Finally, Section D presents conclusions.

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[10] Prepared by Sergio Lugaresi (FAD expert).

B. Health Care

Main issues

43. **Public health expenditures are broadly in line with those in other European Union (EU) countries.** Comparable data show that, at the beginning of the decade, Lithuania had a level of public expenditure (4.3 percent of GDP) lower than the major EU countries (more than 6 percent of GDP), but higher than neighboring countries, and in particular the other two Baltic states (see Text Figure 1). In 2005, public expenditure for health care was LTL 2.7 billion, or 3.8 percent of GDP. However, most of the public resources are absorbed by current spending, leaving little for essential maintenance of medical equipment. Consequently, the quality of medical equipment is deteriorating, and innovation is lagging.

Text Figure 1. Selected Countries: Public Spending on Health in Selected Countries, 1998–2002
(In percent of GDP)
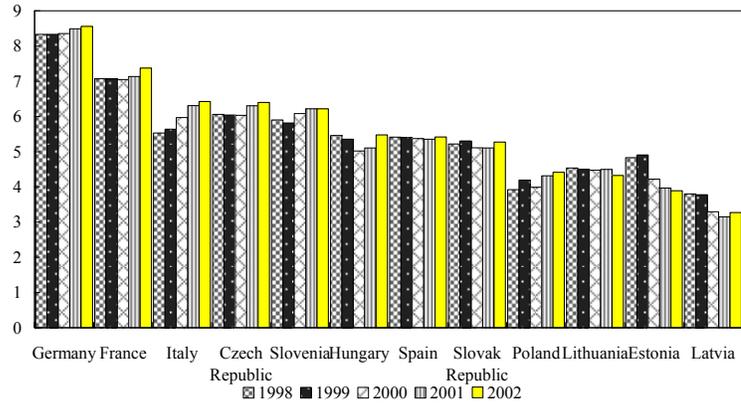
Source: World Bank (2006), World Development Indicators.

44. **However, there is overcapacity in the health sector.** The number of hospital beds and physicians per 1,000 inhabitants is among the highest in the EU (Text Figure 2). The oversupply of hospital infrastructure is partly a legacy of the past and generates an enormous fixed cost for the system. It is also a huge drain on scarce public resources. The authorities have made some progress in reducing the oversupply. However, much more needs to be done if health care costs are to be contained at manageable levels.

Text Figure 2. Selected EU Countries: Health Care Indicators, 1998–2001
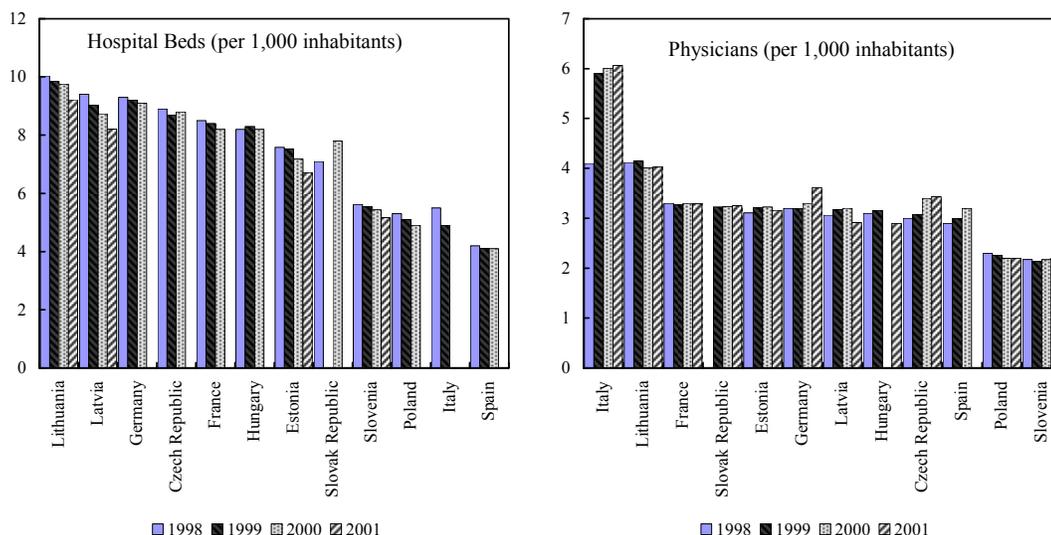
Source: World Bank (2006). World Development Indicators Database.

45.   **Notwithstanding the overcapacity, services are often rationed and of poor quality.** The provision of free health care, as mandated by the constitution, generates a very strong sense of entitlement and, consequently, heavy demand for these services. The result is that the resources that can be allocated to health care are insufficient to cope with such high demand. Consequently, services are effectively being rationed through quotas and/or long waiting list. These rationing methods reduce the transparency and efficiency of the health care system. Moreover, the quality of services is low and informal charges are widespread (see below).

46.   **At the same time, the salary of specialized physicians is too low, and some of them are emigrating abroad.** The propensity to emigrate is higher among younger physicians and those with knowledge of English. According to a recent study (Lovkyte, Reamy, and Padaiga, 2003), 61 percent of medical residents and 27 percent of physicians intend to leave the country. The authorities have taken a number of steps to reverse this trend. Salaries of physicians have been increased substantially in the last three years (20–30 percent in 2005). Moreover, the government has agreed to raise the wages of specialized physicians by 20 percent per year, subject to the availability of funds.

47.   **The level of satisfaction with health care services is among the lowest in the EU.**
Text Figure 3 provides information on the level of satisfaction with health care and social

services in a number of European
countries. The combined index of
satisfaction (on a scale of 1 to 10
with 10 being the highest) is only
3.9 for Lithuania, compared with
5.6 for the EU-15 countries. It is
even lower than in the other two
Baltic states. Only three countries
in the table have lower satisfaction
indices. According to a survey
carried out by Bankauskaite and
Saalerma (2003), the four top
reasons for dissatisfaction with
health care are: (1) doctors' attitude;

Text Figure 3. Europe: Index of Satisfaction with Health Care and Social Services
(On a scale from 1 (low) to 10 (high))
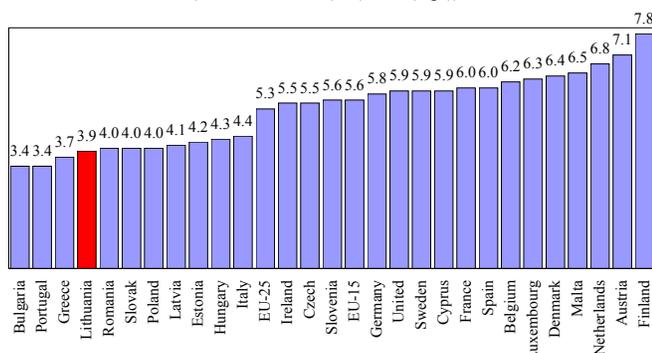
Source: European Foundation for the Improvement of Living and Working Conditions, 2004.

(2) lack of competence; (3) no money, no service; and (4) long queues. While the last reason
has clearly to do with service rationing, the first three may be attributed to low salaries for
physicians.

48.   **Informal payments for health care services are widespread.[11]** Informal payments

are one way by which health
care services are being
rationed in the face of heavy
demand. A survey carried out
in 2001–03 found that about
80 percent of patients had
been paying some sort of
informal charges (in cash and
in kind) for access to health
care services (Text Figure 4).
Unofficial fees paid for these
services ranged from LTL
164 to LTL 177 during
2002-03 (see Text Table 1).

Text Figure 4. Lithuania: Informal Payments for Health Care, 2001–03
(In percent of patients who paid unofficial fees)
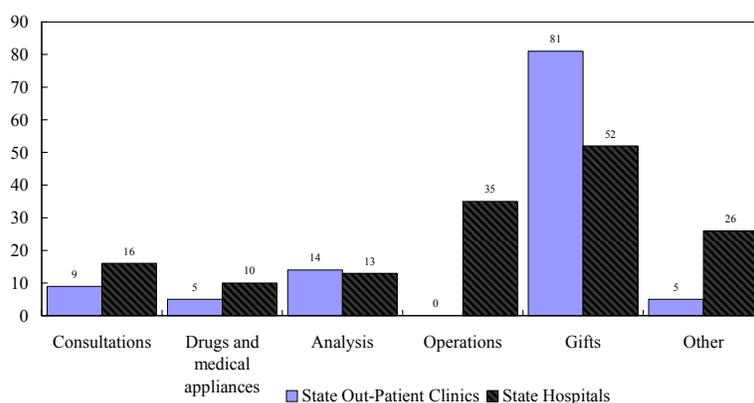
Source: Statistics Lithuania.

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[11] Informal payments are defined as payments in cash or in kind by patients to health care providers that the
latter are not authorized to receive, either under the terms of their contract or under the rules governing their
organizations.

Text Table 1. Lithuania: Average Informal Payments
(In litai, unless otherwise specified)

	Unofficial Fees	Gifts to Health Care Staff
CIET 2002	164	34
In percent of 2005 average annual wage	0.9	0.2
Questionnaire 2003	177	164
In percent of 2005 average annual wage	1.0	0.9

Sources: Statistics Lithuania; and Community Information, Empowerment and Transparency, *"The Baltic States: Regional Survey on System Leakages in the Health and Licencing Sectors,"* 2002.

49.   **Competition in the provision of health care services is lacking.** More than half of non-hospital health care providers are private, but more than 93 percent of hospitals are publicly owned (Text Figure 5). Public hospitals are centralized and poorly managed. A draft Law on Health Care envisages more decentralization in investment decisions and the introduction of competitive recruitment of managers in public hospitals. This is a move in the right direction. However, property rights of buildings and lands will remain in the hands of the original owners (state and local governments, and universities), thereby relieving public hospitals the responsibility and costs of their maintenance and improvement.

Text Figure 5. Lithuania: The Role of Private Health Care Institutions, 2003–05
(In percent of total)
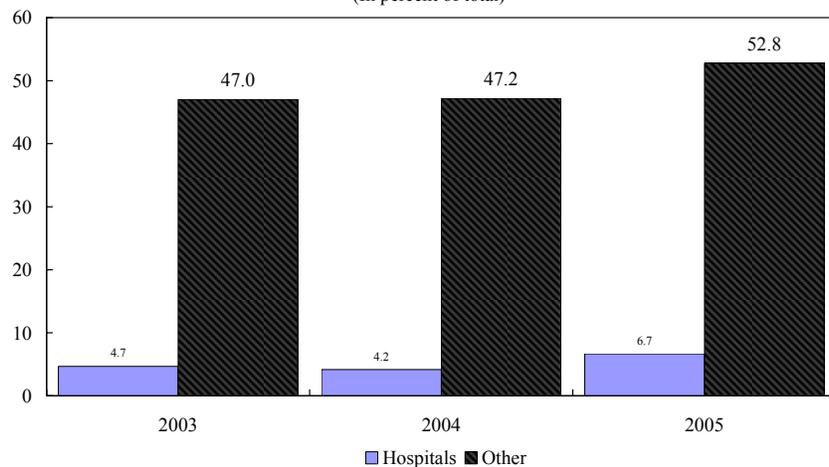
Source: State Patient Fund.

50.   **Health care financing is complex and potentially inefficient.** The State Patient Fund (VLK) is financed by a broad array of taxes and budget transfers:

•   Half of the VLK revenue comes from the allocation of 30 percent of income taxes collected by the State Tax Inspectorate.

•   Another 24 percent of VLK revenues are transfers from the budget (LTL 264.4 a year per person) for the "state-insured," which include pensioners, full-time students, registered unemployed, disabled, and women on maternity leave.

- A 3 percent levy on wages earned under a labor contract; these contributions are collected by Social Insurance Fund (SoDra) (20 percent of VLK revenue).

- Contributions from farm workers and self-employed workers paid directly to the VLK. The contributions vary from LTL 8.25 per month for small farmers (1.5 percent of the minimum wage) to LTL 126 in 2005 for the self-employed (about 10 percent of average wage).

This financing system requires collection by three agencies (SoDra, the VLK, and the State Tax Inspectorate). It is not only complex, but also leads to widely different levies on different types of participants. As a result, there is no relationship between contributions and benefits; the system relies in fact on the principle of solidarity.

51.   **Co-payment is limited.** Formal co-payments exists only for drugs, some medical aid for ambulatory treatment, and spa services. Patients pay the providers the subsidized price of medicines and then providers claim reimbursement from the VLK. The reimbursement is based on the reference price of the medicine which is the average price of the medicine in six comparable countries (Estonia, Latvia, Poland, the Slovak Republic, Czech Republic, and Hungary) less 5 percent. The criteria for listing reimbursable pharmaceuticals are not always transparent. Out of 5,000 registered drugs, reimbursements apply to only about 1,400 (less than one-third). Reimbursements range from 100 percent to 50 percent (depending on the disease treated). Moreover, some social groups are eligible for higher reimbursement than others.

Reform options

Short-term options

52.   **At least four options could be considered over the short term. First, the authorities could introduce co-payments for medical services to ease pressures on State Patient Fund resources and help in managing the demand for health services.** Increasing co-payment reduces government spending directly by redirecting some costs to individuals and away from taxpayers. It also reduces demand for services, saving additional resources. Although modest co-payments would not force consumers to bear the full cost of their usage of the health care system, they would cause consumers to consider more carefully how best to use the system. In most OECD countries, co-payment for health care services is a normal practice.[12] The danger of co-payments is that they could curtail access to the system for lower-income families. However, a number of steps could be taken to ensure that these families continue to have access to health care. For example, co-payments should not be applied to clearly cost-effective preventive services; a limit should be set on any family's out-of-pocket expenses; and the lowest-income families should be exempted. Co-payments

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[12] This is the case in the other Baltic countries, the new EU members, Germany, Italy, and France. The few exceptions are Canada, Spain, and the United Kingdom (Esmail and Walker, 2005).

that average 10 percent of the cost of services would raise about LTL 190 million, or 0.3 percent of GDP. This would be roughly equivalent to LTL 45 (about 3 percent of the average monthly wage) per service unit, which is well below the average informal payment for health care (between LTL 164 and LTL 177).

53.   **Second, consideration could be given to increasing the contribution levels to the VLK for small farmers and, if necessary, creating an explicit subsidy.** Currently, small farmers contribute only LTL 8.25 per month, as compared with LTL 264.4 per month paid by the state for the uninsured. The contribution rate for both groups could be equalized, and explicit subsidies instituted for those who cannot afford to pay the full contribution. This would increase both equity and transparency.

54.   **Third, administrative costs could be reduced.** The authorities should look for ways to improve efficiency in both the collection of contributions and the distribution of benefits. One possibility would be to give the State Tax Inspectorate responsibility for collection, as is the case in many countries. This would enable SoDra to concentrate on more efficient delivery of benefits.

55.   **Fourth, the financing structure of the VLK could be revamped.** The current structure for financing the VLK is overly complicated. Moreover, there is no connection between the taxes paid into, and benefits derived from the system. The authorities should consider one of the following two options:

- **One would be to institute a premium-based system.** The VLK could calculate the cost of providing coverage, and participants could be charged according to this cost. Practice could likely deviate from this paradigm in two ways. First, premiums would probably not be perfectly risk adjusted. In other words, society is unlikely to want people who are sure to have higher costs—for instance, diabetics—to bear the full cost of a condition that was beyond their control. Second, premiums for lower-income households would have to be subsidized. With these caveats, it should still be possible to establish a premium-based system in which costs were (approximately) internalized.

- **Alternatively, health care could be organized on a pure tax-and-transfer basis, as it is now, but without earmarking revenues.** Earmarking existing revenues does not provide the efficiency gain of a premium-based system; instead, it imposes unnecessary costs. The public sector provides a wide range of critical services—from national security, to education, to health care. All are critical to the nation, but each should compete for resources so that public funds are allocated to their most productive use. The government should be free to reallocate resources to best meet the needs of the citizens. Moreover, the existing wage tax adds to the already heavy tax burden on workers, creating counterproductive labor market incentives.

Medium-term options

56.   **In the longer run, allowing more private participation in the provision of health care services can promote efficiency and reduce health care costs.** Currently, less than 5 percent of hospitals (about 6 percent of total hospital capacity in 2005) are privately owned. However, various charity organizations provide social and health care services worth several hundred million litai annually (or 0.3 percent of GDP). To allow more private initiatives (profit and nonprofit), a level playing field, in terms of regulations and accounting rules, should be provided to ensure fair competition between public and private institutions. For example, the ownership (and the costs of maintenance) of public hospital buildings (presently in the hands of the government) could be assigned to the hospitals, or, alternatively, sold or leased to the private sector.

57.   **Also, a role for private insurance companies could be considered.** Participation by private insurers could follow two possible tracks. First, to the extent that the health funds mimic traditional insurers, it would be possible to allow private insurers to compete directly in the health market. Alternatively, private insurers could be allowed to provide supplemental insurance to cover services that are not covered by the public health funds. Whichever option is selected, it is important that the insurance regulatory system in general—and the health insurance regulatory system in particular—be in place before private participation is introduced.

C. Social Assistance

58.   **This section discusses the main issues in social assistance and possible areas for reform.** The discussion focuses on unemployment benefits, family benefits, and social benefits. These are administered by the SoDra, the Labor Exchange, the central government, and local governments.

Main issues

59.   **Social benefits are fragmented and costly to administer.** There are several family and child benefits as well as a number of other social assistance benefits (including consumer subsidies for utilities), and unemployment benefits. Table 2 provides information on the main social assistance benefits in Lithuania. The budgetary cost of providing these benefits is about 2 percent of GDP. However, the large number of benefits impose substantial administrative costs on the system (about 0.1 percent of GDP). In particular, the administrative costs of the Labor Exchange, which administers the unemployment benefits, are too high: in 2005, out of LTL 230 million of total expenditures of the Labor Exchange, LTL 59 million (26 percent) were for administrative costs.

60.   **While each single benefit is small, cumulatively they create work disincentives.** A low-income family, with one spouse unemployed and three children, is entitled to social assistance benefits, child benefits, unemployment benefits, housing support, and other benefits (Text Table 2). If both spouses worked, the family would lose the social assistance benefit while other subsidies would be reduced. At the same time, the family would incur

additional costs related to employment (such as cost of transportation to work, out-of-house meals, etc.). Therefore, there would be an incentive to work only if the second spouse's wage was higher than the sum of forgone subsidy and additional costs.

Text Table 2. Lithuania: Social Benefits, 2005

	Formula			Monthly Amount (in litai)
Family benefit for family with one or two children below age of three	0.75	x	MLS	93.75
Family benefit for family with three or more children	1.1	x	MLS	137.50
Child benefit (3-7 years old, third child 3-18)	0.4	x	MLS	50.00
Maternity grant 1/	2	x	MLS	250.00
Birth grant 1/	8	x	MLS	1,000.00
Child benefit for conscript	1.5	x	MLS	187.50
Guardianship benefit	4	x	MLS	500.00
Settlement grant 1/	50	x	MLS	6,250.00
Means-tested social assistance benefit 2/	0.9	x	N x SSI − FI	121.50
Heating subsidy	Heating Cost - 0.25(FI - 121.50 N)			
Cold-water subsidy	Water cost - 0.02 FI			
Hot-water subsidy	Water cost - 0.05 FI			
Unemployment benefit				
Minimum	1	x	SSI	135.00
Average				328.00
Maximum				693.00
Training subsidy for the unemployed	1.5	x	MLS	187.50
Notes				
MLS = minimum living standard				125.00
SSI = state-supported Income				135.00
FI = family income				
N = number of family members				

Source: Ministry of Social Security and Labor.
1/ Lump sum.
2/ The eligibility requirement is that FI < N x SSI.

61.   **Text Table 3 illustrates the argument by considering the case of a family with three children.** Only one of the spouses works and one of the children is under three years old. Three cases are considered. Under the current benefit system, when the earning member of the family is long-term unemployed,[13] the only sources of cash income for the family are the family benefit and the child benefits. Since the family income is well below the poverty line, the family will also receive the social assistance benefit and heating and water subsidies (estimated at their average). When the earning member of the family is unemployed and entitled to the unemployment benefit, the family receives the (minimum) unemployment benefit, but the social assistance benefit as well as water and heating subsidies are smaller than in the previous case. If one of the spouses is employed at the minimum wage, the family income exceeds the poverty line. Consequently, the family is no longer entitled to the social assistance benefit. Furthermore, water and heating subsidies, which are negatively correlated to the family income, are also smaller than in the two previous cases. As the figures in Text Table 3 show, under the current benefit system, the total family income is higher when the earning member of the family is unemployed rather than working at the minimum wage, illustrating the negative work incentive of the system.

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[13] A long-term unemployed is defined as a worker who has been seeking a job for six months or more and is no longer entitled to unemployment benefits (either because he is not insured or because the benefit has already expired).

Text Table 3. Lithuania: Monthly Income of a Couple With 3 Children (aged 7, 5, and 2)
(In litai)

	Current Benefit System			Raise and Redistribute State-Supported Income and Abolish Utility Subsidy		
	Long-term unemployed	Short-term unemployed	Minimum-wage employed	Long-term unemployed	Short-term unemployed	Minimum-wage employed
Labor income	0	0	550	0	0	550
Unemployment benefit	0	135	0	0	135	0
Family benefit	138	138	138	138	138	138
Child benefits (2)	100	100	100	100	100	100
Family income	238	373	788	238	373	788
Poverty line	675	675	675	1,000	1,000	1,000
Social assistance benefit	394	272	0	686	565	191
Heating benefit	150	116	13	0	0	0
Water subsidy	30	25	8	0	0	0
Total income	811	786	808	924	937	979

Memorandum items:

Minimum subjective sufficient income (decile I)	1,055	
Minimum subjective sufficient income (housing with children)	1,700	

Sources: Ministry of Social Security and Labor; and IMF staff
estimates.

Reform options

62.   **One option would be to consolidate social benefits to reduce work disincentives and contain administrative costs.** For example, consumer subsidies to utilities could be phased out while the state-supported income could be increased, so that the social assistance benefits, which are means-tested, would increase. The centralized data base for benefits of the SoDra and the local governments (to be soon joined by the Labor Exchange) will facilitate such consolidation. Consolidation of benefits should be based on considerations such as poverty alleviation and social insurance.

63.   **Text Table 3 (second panel) illustrates this argument using the three cases discussed above.** Here it is assumed that the water and heating subsidies have been phased out, while the poverty line (state supported income) has been increased by 48 percent, on the assumption that resources allocated in 2006 to consumer subsidies are instead allocated to the social assistance benefit. As the poverty line is now higher than in Text Table 1, the social assistance benefit to which the three families are entitled to is also higher, and more than compensate for the loss of income from subsidies. As can be seen from the figures in Text Table 3, the family income is now highest when the spouse is working and lowest in the case

of long-term unemployment. With improved design and better targeting of the subsidies, there are no longer disincentives to work.

64.   **Another option would be the provision of efficient social services, both public and private, as an alternative to cash benefits.** Cash benefits, particularly if fragmented as in Lithuania, have high administrative costs and do not necessarily make the beneficiaries responsible toward the society: cash benefits may be spent not only on necessities but also on cigarettes or alcohol. Furthermore, social vulnerability arises not only from lack of cash income or life cycle events (childbirth, unemployment, sickness, and death), but also from the lack of access to certain goods and services or unpredictable contingencies of life (separation, overtime work, moonlighting, and working on weekends). Social services (child care, old-age care, transportation, etc.) provided at the local level may better address some of these problems and encourage private participation through charitable nonprofit organizations and volunteer work.

D. Conclusions

65.   **Public resources allocated to health care and social assistance in Lithuania are broadly in line with other European countries.** However, there is scope for improving the efficiency of these expenditures. Some steps taken by the authorities have improved efficiency; nevertheless, many challenges lay ahead. On the one hand, access to health care services is being rationed through quotas, long queues, and/or informal payments even though there is overcapacity in hospital infrastructure. On the other hand, the current system of social assistance benefits is fragmented, costly to administer, and creates work disincentives.

66.   **Several options can be considered for enhancing the efficiency of the health care system.** Expanding the scope of co-payments can generate some revenue while helping to manage demand for health care services. Increased private participation in the sector can facilitate greater price and quality competition thereby contributing to improved efficiency. This would require appropriate changes in the legal and regulatory framework to provide an enabling environment for private participation. Leasing or selling public facilities to private enterprises and providing a larger role for private insurance services are actions that could be considered in this regard.

67.   **Social assistance can be made more effective through consolidation and improved targeting.** The centralized database for the benefits by the Social Insurance Fund and the local governments (to be joined soon by the Labor Exchange) would be useful in this regard by providing a unified view of benefits. Moreover, phasing out utility subsidies while raising the state-supported income can help mitigate disincentives to work that are inherent in the current system. Provision of efficient social services at the local level, in lieu of cash benefits, can also help in this regard while simultaneously encouraging private participation.

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IV. EMIGRATION FROM LITHUANIA: DETERMINANTS AND IMPLICATIONS[14]

A. Introduction and Overview

68.   **Emigration has contributed importantly to the steady decline of Lithuania's population.** In 1996, Lithuania's population was just over 3.6 million people; by 2005, the population was close to 3.4 million (Figure 1). The decline in population reflects some of the same forces, such as natural demographic changes, that have caused populations to stagnate or diminish throughout Europe; in Lithuania, the natural population growth rate turned negative in 1994. But, in addition, international migration has contributed to the decline. There appears to be some correlation between population growth rate and migration in Europe (Figure 2). Thus, Ireland's population has increased along with the inflow of immigrants. In contrast, Lithuania (and some of its neighbors) have experienced falling populations along with emigration.

Figure 1. Lithuania: Total Population and Population Growth Rate, 1996-2005
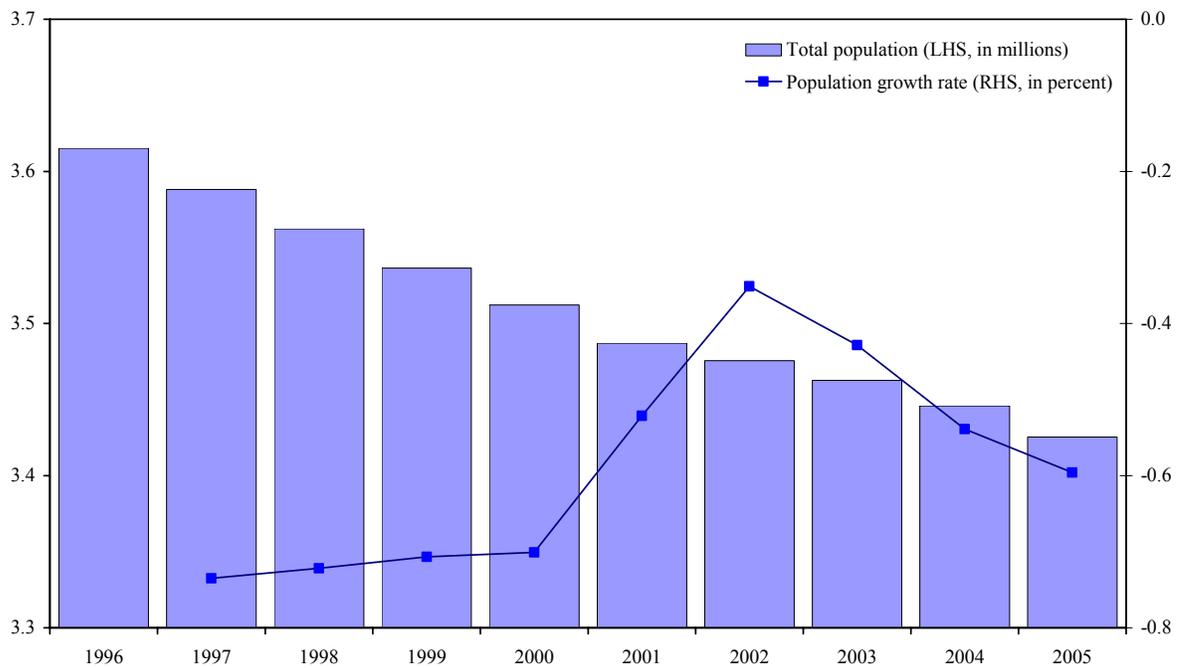
Source: Lithuania Statistics Department.

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[14] Prepared by Deniz Igan.

Figure 2. Selected European Countries: Population Growth and Migration, 1990-2000
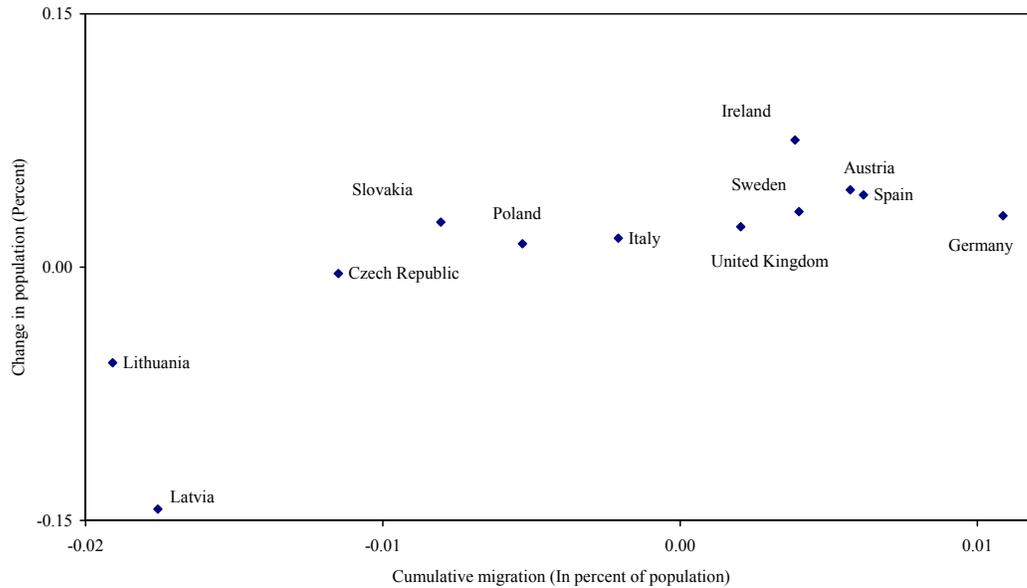
Sources: IMF; and Eurostat.

69. **Following an initial emigration wave of Russian-speaking people, the current emigration is taking place despite improving economic prospects.** The massive migration flows in the 1990s accounted for much of the decrease in population, dwarfing the effect of natural population growth rate (Figure 3). In the early 1990s, the Russian-speaking population returned to the Russian Federation and Ukraine. This movement continued, although at a decreasing rate, until the end of the decade. In the first few years of the new millennium, the net outflow seemed to be stabilizing. However, a surge in emigration in 2003 was followed by a further increase in 2004. Interestingly, both years correspond to stronger GDP per capita growth than in the past. Preliminary numbers for 2005 also point to large outflows despite continuing robust growth. In the past two years, migration accounted for over 40 percent of the annual decline in population.

70. **The recent increase in emigration seems to be related to Lithuania's accession to the European Union (EU).** The signing of the *acquis communautaire* in December 2002 coincides with the migration outflows starting in 2003. Expectations of imminent accession, confirmed at the Athens Summit in April 2003, appear to have boosted migration even before Lithuania joined the EU in May 2004. Initially, of the EU-15 countries, only Ireland, Sweden, and the United Kingdom allowed relatively free access to the new EU members, while the others applied transitional provisions limiting access to their labor markets.[15] Recently, Finland, Portugal, and Spain announced that they would lift restrictions by May 2006, and the

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[15] These restrictions apply to the so-called A-8 countries, the eight new member states from Central and Eastern Europe. Citizens of Cyprus and Malta are exempt from any restrictions.

Figure 3. Lithuania: Contribution of Migration to Population Decline, 1997-2004
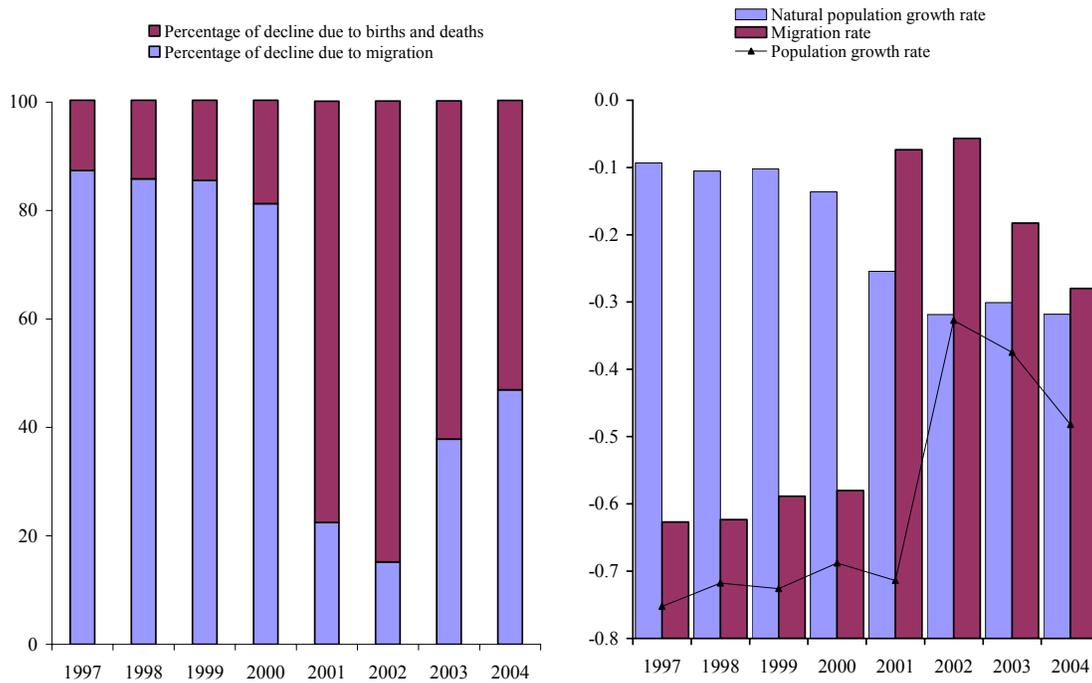
Source: Lithuania Statistics Department.

Notes: Natural population growth rate calculated by subtracting number of deaths from number of births and dividing by annual average population. Migration rate is calculated as number of immigrants minus number of emigrants divided by annual average population.

Accession Treaty requires all such measures to be abandoned by May 2011.[16] The removal of legal barriers to the free movement of persons will, undoubtedly, have an additional impact on migration.

71.   **This chapter estimates the potential for, and implications of, future emigration.** Section B presents the findings of a survey on the incentives for leaving Lithuania. Also, drawing on econometric estimates of the determinants of emigration, the emigration potential over the next few decades is estimated. Section C considers the implications for the labor market and public finances. While the repercussions are manifold, including potential benefits from the inflow of remittances and the return of well-trained and experienced

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[16] The meeting of the European Council in Tampere in October 1999 marked the beginning of efforts to develop a common EU migration policy. A change in the traditional European attitude toward migration was deemed necessary, reflecting the labor and skill shortages already visible in a number of sectors and regions, as well as the rapid aging of the population. The recent positive Irish and U.K. experiences with respect to immigration from the new member states, along with the empirical evidence of small or no ill effects of immigration on host-country native employment and wages, have stimulated calls for voluntarily abandoning transitional measures sooner rather than later. The European Commission's "Report on the Functioning of the Transitional Arrangements" (February 8, 2006) urged the EU-15 to carefully consider whether restrictions are necessary, in the light of the modest and stable labor flows and their help in easing skills bottlenecks. Following this call, Finland, Portugal, and Spain chose not to extend the restrictions, which are to expire in May 2006, and France announced its intention to gradually lift the restrictions.

professionals, this section focuses on two specific costs of migration: those to the pension and the health care system.

B. Driving Forces and Potential of Migration

72.   **A recent survey investigates the principal reasons for emigration in the various segments of the Lithuanian population.** The survey was carried out by the market analysis and research company Rinkos Analizės ir Tyrimų (RAIT) in August 2005. It covered 1,054 participants, representing the distribution of Lithuanian residents aged between 16 and 74 according to place of residence, income, education level, age, and gender. The respondents were asked to rank the potential reasons for migration. For each of the possible reasons, respondents were asked if they agreed, partially agreed, or did not agree.

73.   **The strongest reason reported for emigration was dissatisfaction with wages, followed by employment prospects.** Over 90 percent of the respondents agreed that low wages were a reason for wanting to migrate, with a mere 0.6 percent disagreeing with the proposition (the others "partially agreed"). Employment prospects came in as the second most important factor for emigration, with almost three-fourths of the respondents agreeing that "unemployment" was a reason for migrating and more than half of the rest partially agreeing with this statement (Table 1).

Table 1. Lithuania: Main Reasons for Emigration, 2005

Which of the Following Do You Agree Is One of the Main Reasons for Emigration?		
(Percent of respondents)		
Unemployment	Don't agree	7.3
	Partially agree	20.2
	Agree	72.2
Dissatisfactory salaries	Don't agree	0.6
	Partially agree	8.0
	Agree	90.7
Security issues	Don't agree	45.2
	Partially agree	33.2
	Agree	20.3
Dissatisfaction with the government	Don't agree	19.6
	Partially agree	36.4
	Agree	42.8
Lure of the "other" lifestyle	Don't agree	17.5
	Partially agree	38.5
	Agree	42.8

Source: RAIT survey.

Totals do not add up to 100 percent due to rounding and no response cases.

74.   **Several potential drivers of emigration are investigated.** The goal is to distinguish whether the intensity of the goal of emigrating to secure employment varies across population groups. Thus, in the top half of Table 2, an ordered probit is used to distinguish among those who agree, partially agree, and disagree:

$$Pr(\text{Agreement with the reason}=k) = \alpha + \beta_0 age + \beta_1 education + \beta_2 employment\ status +$$
$$\gamma_1 income + \gamma_2 place\ of\ residency + \gamma_3 marital\ status +$$
$$\gamma_4 occupation + \gamma_5 nationality + \gamma_6 gender + \varepsilon,$$

where k takes on values 1, 2, or 3, corresponding to "agree," "partially agree," and "disagree."

In the presentation of the results, *age* is measured in years; *education* is the level of schooling on a scale of 1 to 5, where the highest level (5) corresponds to university or college diploma; *employment status* is 0 for those who are employed and 1 for those who are unemployed; *income* takes the value 0 if the average income per family member is less than or equal to 500 LTL per month and 1 otherwise; *place of residency* is a dummy with value 1 if the respondent resides in Vilnius and 0 for all other districts; and *marital status* is 0 for single (never married, divorced, or widowed) and 1 for those with a partner (either married or living together). *Occupation* is another dummy variable with value 0 for executives, specialists, and white collar employees, and 1 for others. Finally, nationality and gender are also dummy variables that become 0 for Lithuanians and males, respectively.

Table 2. Lithuania: Ordered-Probit Regression Results

Reason for Emigration: Unemployment

Variable	Specification			
	1	2	3	4
Age	0.0044* (0.0025)	0.0046* (0.0026)	0.0049* (0.0026)	0.0043 (0.0028)
Education	-0.0695* (0.0394)	-0.0666* (0.0392)	-0.0519 (0.0427)	-0.0628 (0.0470)
Employment status (Unemployed = 1)	0.2095** (0.0910)	0.1949** (0.0921)	0.1009 (0.1079)	0.1703 (0.1155)
Income (Above average = 1)				0.0117 (0.0188)
Place of residency (Vilnius = 1)		-0.0887 (0.0990)	-0.0867 (0.0993)	-0.0393 (0.0370)
Marital status (Married/Partner = 1)		-0.0756 (0.0881)	-0.0879 (0.0887)	-0.0675 (0.0952)
Occupation (Blue collar = 1)			0.1476 (0.1170)	0.1277 (0.1234)
Nationality (Non-Lithuanian = 1)		0.4962*** (0.1438)	0.4788*** (0.1441)	0.4968*** (0.1469)
Gender (Female = 1)	0.2514*** (0.0814)	0.2430*** (0.0818)	0.2541*** (0.0831)	0.2616*** (0.0877)

Table 2. Lithuania: Ordered-Probit Regression Results (concluded)

	Reason for Emigration: Dissatisfaction with Salaries			
	Specification			
Variable	1	2	3	4
Age	-0.0040	-0.0051	-0.0050	-0.0047
	(0.0034)	(0.0034)	(0.0035)	(0.0036)
Education	-0.0253	-0.0301	-0.0291	-0.0483
	(0.0537)	(0.0538)	(0.0568)	(0.0609)
Employment status	-0.0366	-0.0207	-0.0769	-0.0793
(Unemployed = 1)	(0.1216)	(0.1244)	(0.1513)	(0.1581)
Income				-0.0182
(Above average = 1)				(0.0262)
Place of residency		-0.0657	-0.0657	0.0578
(Vilnius = 1)		(0.1305)	(0.1312)	(0.0499)
Marital status		0.1181	0.1030	0.1343
(Married/Partner = 1)		(0.1170)	(0.1173)	(0.1247)
Occupation			0.0719	0.0639
(Blue collar = 1)			(0.1633)	(0.1751)
Nationality		0.0752	0.0627	0.0038
(Non-Lithuanian = 1)		(0.1655)	(0.1664)	(0.1722)
Gender	0.0371	0.0474	0.0461	0.0624
(Female = 1)	(0.1105)	(0.1114)	(0.1108)	(0.1157)

*, **, and *** denote significance levels at 1 percent, 5 percent, and 10 percent, respectively.
Standard errors are displayed in parentheses.

75.   **The older, the less educated, and the unemployed see emigration as a valuable means of securing employment opportunities.** The coefficient suggests that older respondents were more likely to agree with the proposition that the risk of unemployment in Lithuania was an important consideration in the decision to emigrate. This may reflect the difficulty faced by older workers in finding jobs due to shifts in labor demand toward younger workers better equipped with state-of-the-art skills. There is some indication that the relationship with age may be nonlinear, with incentives to migrate rising before they eventually begin to fall again; however, these findings are not robust. As may be expected, the more educated/skilled view unemployment as less of a problem. Not surprisingly, the unemployed express more agreement with unemployment being the main reason for emigration. Since being educated and employed is correlated with a person's income and occupation, the introduction of these additional categories does not add to the distinctions between those seeking or not seeking to migrate. Being non-Lithuanian and being female also appear to be effective in determining the extent people feel about unemployment as a reason to emigrate. Nationality and gender are actually the most significant factors shaping

the response to unemployment.[17] The results reported in Table 2 remain robust to different constructions of the independent variables, such as defining cohorts based on age and clustering according to income intervals.

76.   **Low salary levels as a cause of emigration, meanwhile, seem to be widespread across segments of the population.** No single variable turns out to be statistically significant: in other words, no particular group feels more strongly than another about low salary levels. The mean and median responses are extremely close across groups, pointing to a consensus about dissatisfaction with salaries as the foremost cause of emigration. Examination of wage levels relative to other European countries reveals that this perception is well-founded (Figure 4). Lithuanian wages are about one-third of the EU-25 average.

Figure 4. Selected European Countries: Average Monthly Wages in PPP by Education Level, 2002
(In euros)
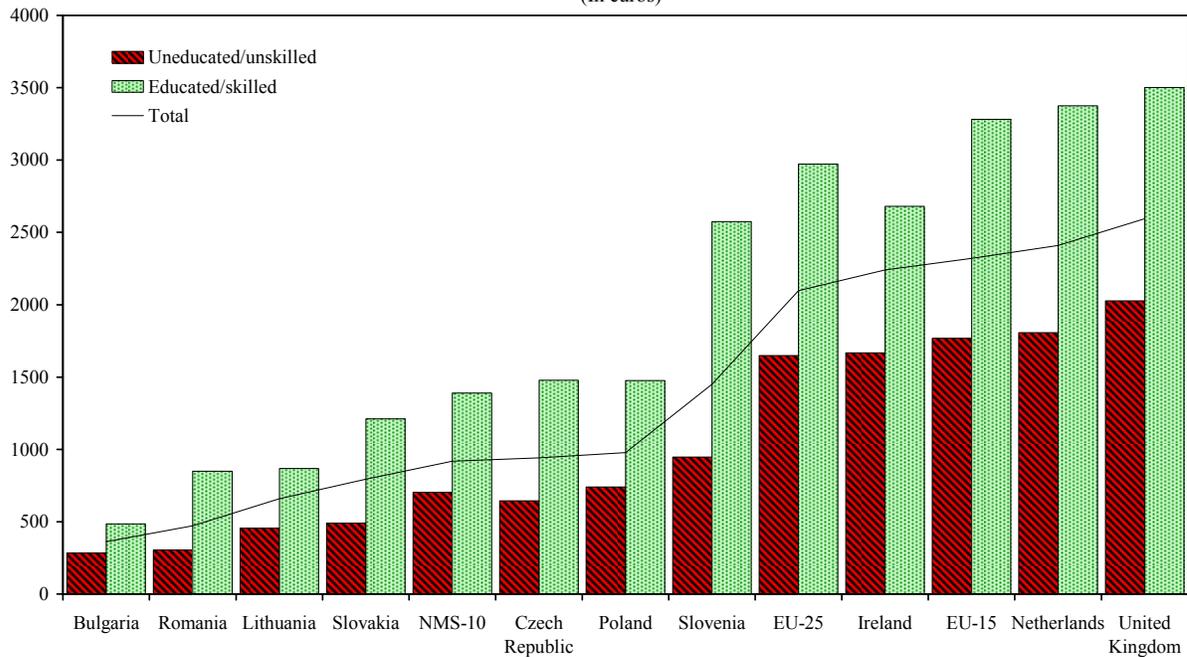
Source: Eurostat.
Note: NMS-10 refers to the ten new member states of the EU.

77.   **What is the potential migration from Lithuania?** Given that the two leading causes of emigration are the low level of salaries and the fear of unemployment, forecasts can be obtained based on the projections of GDP per capita and the unemployment rate. Several studies have analyzed the relationship between migration flows and economic and social

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[17] This could be a reflection of less favorable employment statistics for these groups. For instance, the unemployment rate among women was 11.8 percent in 2004, compared to 11 percent among men. The rate decreased for both in 2005 but still stayed slightly higher for women at 8.3 percent, over the year, compared to 8.2 percent for men.

factors in order to come up with estimates of future migration flows. These studies also generally identify the income and unemployment gap between the origin and host countries as the main economic factors; in addition, the stock of migrants, as proxy for social network effects, and physical and cultural proximity of the two countries are revealed to be important in the determination of bilateral migration flows. For example, Kielyte (2002) uses the following logarithmic specification:

$$M_t = a_0 + a_1 log(1-y^o/y^d)_{t-1} + a_2 log(U^d/U^o)_{t-1} + a_3 log(MS)_{t-1} + a_4 log(D) + u_t,$$

where the migration rate, M_t, calculated as the number of migrants divided by population, depends on $1-y^o/y^d$, the income gap between the origin and destination countries; U^d/U^o, the unemployment differential; MS, the stock of migrants from the origin country living in the destination country; and D, the distance between the capitals of the origin countries and the destination countries. She uses data on the migration flows from the Baltic countries to the EU during the 1990–2000 period. Table 3 summarizes her results. To obtain estimates of Lithuania's migration potential, the coefficients reported in Table 3 are applied to projections of income convergence from Eurostat and the World Economic Outlook (WEO) database. Eurostat projections are for the years 2005–07. The WEO database provides projections until 2010. For the years after the projection period, a simple trend is assumed, as implied by the available forecasts. The underlying assumptions assert that the income gap would be somewhere between 48.8 percent and 50.7 percent in 2005, but convergence would be achieved pretty quickly (by 2028, according to the WEO database, and by 2032, according to Eurostat). The stock of migrants is assumed to be 100,000 at the start of the forecasting period[18] and is recalculated each year, taking into account the forecast flow from the previous year. The distance D is the average distance from Vilnius to the capitals of the EU-15 countries. In these calculations, the unemployment gap assumptions do not play a major quantitative role.

Table 3. Lithuania: Quantifying the Determinants of Migration

Dependent Variable: Migration Rate		
Independent variable	Coefficient	t-statistic
Intercept	-1.34	-2.79
Income gap	0.21	4.83
Unemployment differential	-0.098	-1.25
Stock of migrants	0.067	4.40
Distance	-0.057	-1.81

Source: Kielyte (2002).

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[18] Estimates for the Lithuanian population living abroad range from 195,000 to 250,000. The Lithuanian community in Ireland, Spain, and the United Kingdom alone is estimated to total some 70,000 people.

78.   **The emigration incentives, stemming from the discrepancy in earnings, would peter out in 23 to 27 years as the income gap disappears.** About 10,000 people, corresponding to 0.33 percent of the population, are forecast to migrate from Lithuania during 2006. This is somewhat smaller than the actual number (15,571) that migrated in 2005. Figure 5 shows the evolution of the migration rate, assuming that, once income convergence has been achieved, there will be no migration.

Figure 5. Lithuania: Projected Income Gap and Emigration, 2006-32
(In percent)
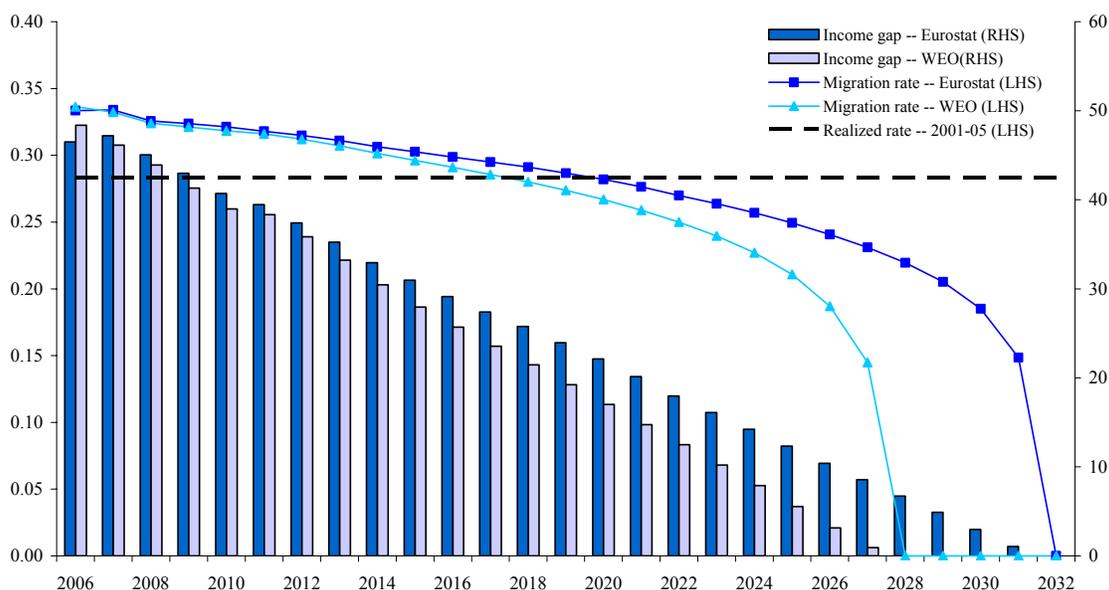
Source: IMF staff calculations.
Notes: Migration rate is expressed as a percent of population. Income gap is the ratio of Lithuanian GDP per capita to the EU-15 average in percent.

79.   **These projections are sensitive on several counts.** First, the projection error relative to the annual average observed rate from 2001 to 2005 turns out to be quite high, most probably reflecting the inaccuracy inherent in the data and the estimation procedure. This may suggest a general upward bias in the estimates. Note, though, that the 2005 migration numbers were quite close to the forecasts here. Nevertheless, since the initial projection has a significant bearing on the overall migration potential, it is important to assess this sensitivity. One source of an upward bias may be that the coefficients were obtained through regressions on data covering the period 1990–2000, which witnessed unusually large outflows of the Russian-speaking population. Although Kielyte (2002) reports that only bilateral flows between the Baltic countries and EU-15 were considered, a high degree of uncertainty governs the quality of the data.[19]

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[19] There is no easy way to assess whether the recent increase in outflows signals a renewal of migration incentives in light of the gradual opening-up of the European labor markets before the 2011 deadline for removal of all legal barriers to free movement of persons. If these recent trends continue, it could be argued that

(continued)

80.   **A simple realignment of migration projections eliminates the projection error by normalizing the projected rates according to the annual average realized rate from 2001 to 2005.** Figure 6 shows the results of this adjustment. The discrepancy between the unadjusted and adjusted migration numbers amounts to around 1.2 percentage points of the working-age population. According to the unadjusted estimates, as many as 227,000 Lithuanians, making up a hefty 9.7 percent of the working-age population in 2005, can be expected to leave the country between 2006 and 2032, based on Eurostat convergence projections. The adjustment brings this number down to 197,200, or 8.4 percent of the working-age population in 2005. With WEO projections, the corresponding figures are 192,700 (8.2 percent of the working-age population) and 166,300 (7.1 percent of the working-age population).[20]

Figure 6. Lithuania: Adjusted Projection for Emigration, 2006-2032
(In percent)
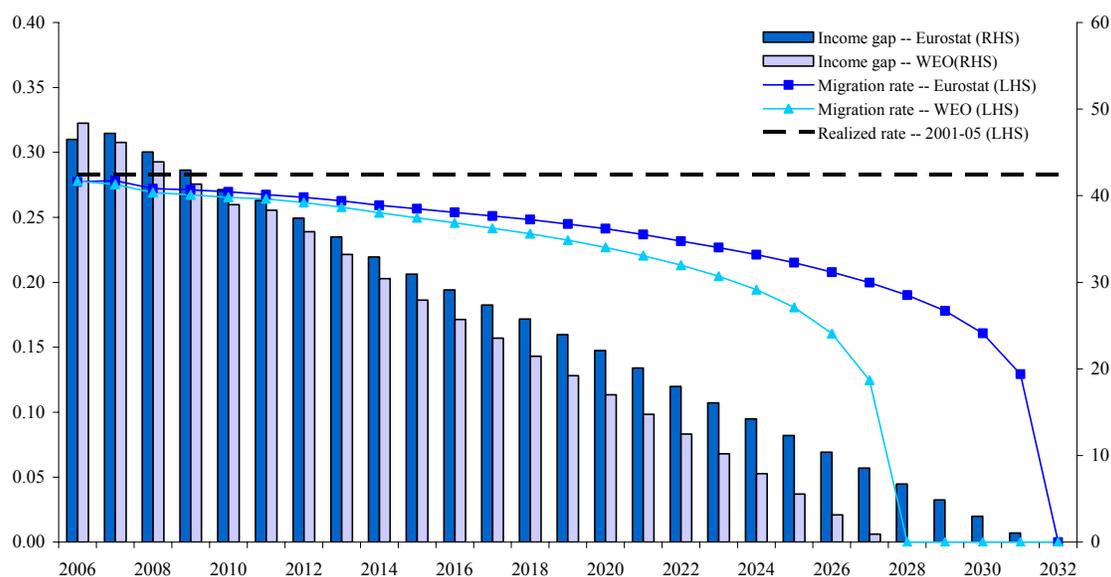
Source: IMF staff calculations.
Notes: Migration rate is expressed as a percent of population. Income gap is the ratio of Lithuanian GDP per capita to the EU-15 average in percent.

81.   **Another source of elusiveness regarding migration numbers is the sensitivity to underlying macroeconomic forecasts.** The impact of a shock to the GDP growth or unemployment rate might be substantial. To assess how sensitive migration flows can be to the assumptions regarding the convergence process, the total number of migrants is recalculated under several simple scenarios. Table 4 presents the results of this exercise. Sensitivity to GDP growth assumptions appear to be stronger than sensitivity to

the estimated coefficients are downward biased because they are based on data prior to increased mobility with the EU and the future flows could be higher as legal, as well as cultural and linguistic, impediments disappear.

[20] The Ministry of Social Security and Labor projects that net migration could reach 219,959 by 2030.

unemployment. This result is not surprising, given that the discrepancy between unemployment rates is small, so, numerically, differences in per capita income are the main driving force of emigration.

Table 4. Lithuania: Scenarios

	Convergence Achieved in 2032 1/ (Based on Eurostat) 2/			Convergence Achieved in 2028 1/ (Based on WEO) 2/		
	Zero net migration in year	Total number of emigrants	Change from original scenario (in percent)	Zero net migration in year	Total number of emigrants	Change from original scenario (in percent)
Original	2032	197,180	-	2028	166,324	-
A	2032	197,357	0.09	2028	166,500	0.11
B	2034	213,746	8.40	2032	198,498	19.34
A+B	2034	213,924	8.49	2032	198,675	19.45
C	2035	218,954	11.04	2029	175,772	5.68

Notes: Scenario A. A 1 percentage point increase in the unemployment rate in 2005–07. Scenario B. A 1 percentage point decrease in GDP per capita growth rate in 2005–07 (trend growth is assumed from 2008 onward for both Eurostat and WEO). Scenario C. A 3 percentage point decrease in GDP per capita growth rate in the last year of projections (2007 for Eurostat, and 2010 for WEO).

1/ Lithuania is assumed to catch up with the EU-25 average GDP per capita by 2032 in Eurostat projections and by 2028 in WEO projections.
2/ The rate of income convergence is roughly in line with the European Commission's Economic Policy Committee–Working Group on Aging Population (EPC-AWG) projections, which forecast net migration to continue until sometime between 2020 and 2030.

82.   **Because of the great uncertainty surrounding migration projections, these projections should be treated with caution.** The main issues affecting the accuracy of predictions include (i) quality of available data; (ii) assumption of invariance in the relation of migration factors and migration decisions across countries and through time; (iii) assumption of stability in political and institutional conditions; (iv) indifference between temporary and permanent migration; and (v) econometric problems. Table 5 summarizes the predictions from several studies on the potential magnitude of east-to-west migration in Europe. The numbers are quoted for the next ten years, in order to preserve comparability

without imposing further assumptions on the studies with shorter time coverage. Forecasts display wide differences, driven by the variation in methodology and assumptions. Note that the Eurostat estimate is less than half of our estimate. The key reason is that Eurostat reports net migration; hence, migration *into* Lithuania from third countries is incorporated in the Eurostat forecast.[21]

Table 5. Lithuania: Comparison to Previous Studies

	To	From	Between 2005 and 2015 1/	
This study	EU-15	Lithuania	Low (WEO)	96,272
			High (Eurostat)	113,439
Kielyte (2002)	EU-15	Lithuania	Low income difference	76,313
			High income difference	122,100
Eurostat	World	Lithuania		47,500
Lundborg (1998)	EU-15	Baltic countries and Poland	High convergence	414,480
			Low convergence	1,244,100
Fertig (2001)	EU-15	CEE-10	Medium convergence	1,036,000
			No convergence	1,096,000
Boeri and Brücker (2000)	EU-15	CEE-10	High convergence	1,044,000
			Low convergence	1,732,000
Bauer and Zimmermann (1999)	EU-15	CEE-10	Restricted mobility	691,527
			Free mobility	2,614,544

Note: CEE–10 refers to the group of ten Central and Eastern European countries (Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia).

1/ This period is chosen to make estimates from various studies comparable.

83.   **The migration potential estimate for Lithuania obtained from this analysis is consistent with the estimates of migration potential from all CEE-10 countries.** Juxtaposed to the migration projections from other studies, the numbers obtained here suggest that about 10 percent of intra-European east-to-west migration would originate from Lithuania. This would imply a higher migration rate for Lithuanians than the average of this subgroup, because the Lithuanian population is only 5 percent of the CEE-10 population. The relatively large share of Lithuanians in intra-European migration is corroborated by the available evidence. According to Irish, Swedish, and U.K. accounts, Polish workers make up one half to two-thirds of new immigrants, followed by Lithuanians and Latvians. For instance, Irish authorities report that 11,410 social insurance numbers were issued for Lithuanians from May 2004 to December 2004, making up more than one-fifth of the total

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[21] Eurostat estimates are based on "extrapolation of the trends observed over the period 1994 to 2002, or shorter, depending on data availability." In addition, "minimum values [are] assumed for 2012 and 2013 and "target values for 2050 are bridged using an approximation of a logistic curve," details of which were not available at the time of this writing (European Commission 2005, p. 32).

number of 53,582.[22] Similarly, U.K. government statistics show that about 13 percent of job seekers who have come to the country since the enlargement are from Lithuania.[23] The latest International Labor Organization (ILO) data also show higher proportion of Lithuanians emigrating (Table 6).

Table 6. Selected Countries: Emigration-to-Population Ratio, 2001

	Population (Millions)	Emigration	Emigration to Population Ratio (In percent)
Latvia	2.36	6,602	0.28
Lithuania	3.48	7,253	0.21
Poland	38.63	23,368	0.06
Romania	22.03	9,921	0.05
Slovakia	5.4	1,011	0.02
Slovenia	1.97	1,442	0.07

Source: ILO.

84.   **In sum, despite the uncertainties in projecting the numbers of migrants, these numbers are large enough to warrant an assessment of the possible impact on the economy.** Even the most conservative analysts foresee a considerable number of people leaving Lithuania until 2030. Our analysis suggests 7 to almost 10 percent of the current working-age population leaving Lithuania in the next few decades. The next section discusses the policy implications of potential migration movements for labor markets and public finances.

C. Policy Implications and Conclusions

85.   **While potential benefits of migration should not be ignored, the pressures on the labor market and the social security system deserve immediate attention.** Policy choices are critical for achieving a flexible labor market and fiscal sustainability. Emigration reduces the economically-active population, and, hence, the base that supports public finances. To the extent that emigrants are drawn from the working-age population, migration will tend to exacerbate the impact of aging.[24] To assess the full potential impact on labor markets and the social security system, in the rest of this section, it is assumed that all emigrants are economically active and that emigration will not be offset by increased labor force

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[22] Issuance for Polish workers was the highest (25,222 social insurance numbers), but Poland has a population ten times greater than Lithuania.

[23] Once again, Polish immigrants rank first, constituting almost 60 percent of the newcomers, and Slovakia follows Lithuania with 10.5 percent.

[24] Irish records show that almost 70 percent of immigrants are between the ages of 20 and 34, whereas U.K. statistics suggest that more than 80 percent of their immigrants are aged 18 to 34.

participation. The section starts with a brief discussion of labor markets and then explores the magnitude of the burden that could be imposed upon the pension and health insurance funds.

86.   **The recent tightening of labor markets might partly be a consequence of the decline in the economically-active population.** The migration of some of the unemployed has apparently contributed to the declining unemployment rate, which had fallen sharply to 7.1 percent by the fourth quarter of 2005. The sharp decrease in the unemployment rate has coincided with the increase in the number of emigrants; meanwhile, the labor force has declined despite the increase in the working-age population (Figure 7). Wage pressure has been evident in the aggregate, and particularly in select sectors, such as construction, wholesale and retail trade (where nominal wages increased almost 12 percent), and health care (with about 20 percent increase in salaries). The rise in reported vacancies, especially for specialists in construction, retail and transportation services, pharmacists, and doctors, has been further evidence of the labor crunch.[25, 26]

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[25] Associated Press quoted a spokesman for Lithuania's second-largest supermarket chain saying that about 10 percent of its workforce had left in 2005 (Jacobs, 2005). Real estate reviews mention similar problems in the construction industry.

[26] In response, the Lithuanian parliament unanimously adopted a resolution urging the government to set up a long-term strategy to decelerate youth emigration and create incentives for those already abroad to come back. The Lithuanian Foreign Ministry hosted a roundtable discussion on emigration on March 8, 2006, aiming to obtain a better assessment of the situation and to share insights with countries such as Ireland, Spain, and the United Kingdom, which have past experience with mass emigration.

Figure 7. Lithuania: Emigration and Labor Market, 1998-2004
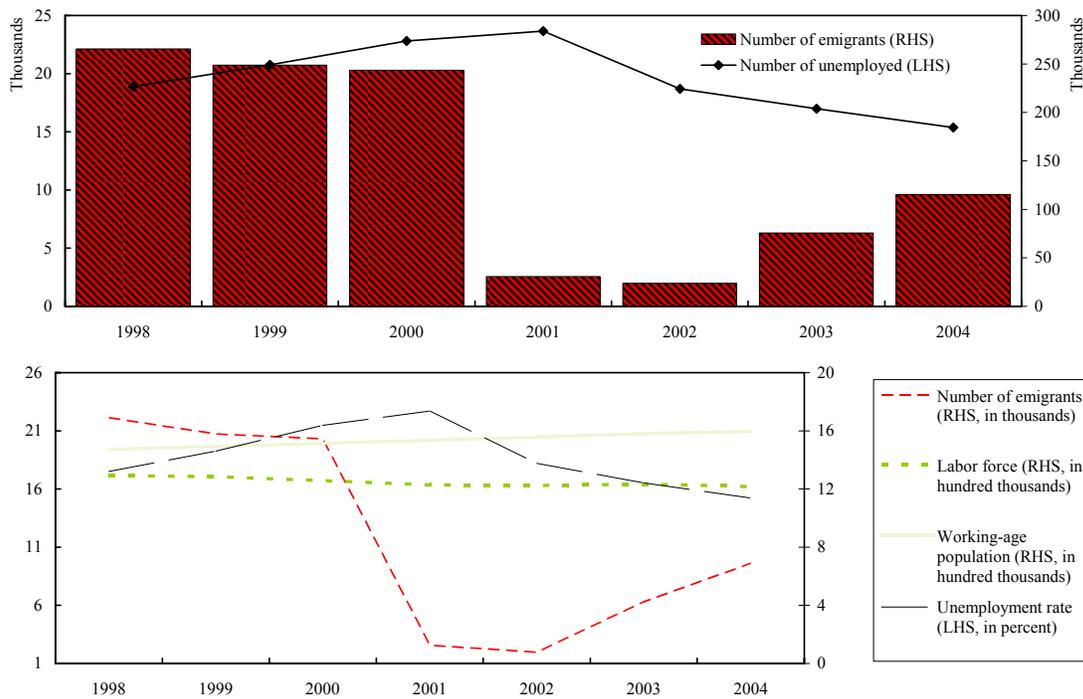
Source: Lithuania Statistics Department.

87.   **Measures to retain older workers in the labor market would help to mitigate the decrease in the labor force.** These measures could include raising standard retirement ages, eliminating early retirement schemes, making old-age pension schemes actuarially neutral so that pensions fully reflect the time spent at work, enhancing the role of part-time work, and expanding education and training opportunities to foster skill development in mid-career. A comparison of the average exit age, legal retirement age, and extent of continuing training of the workforce in Lithuania with other European countries reveals that there might be room for such policies to be effective. Lithuanian workers opt out of the labor force earlier than their European counterparts and do less to maintain or improve their skills (Figure 8).[27]

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[27] Aptly, the Lithuanian government has recently taken steps to implement a program aiming to encourage on-the-job training.

Figure 8. Selected European Countries: Age and Training in Labor Markets, 2004

Average Exit Age from Labor Force

1/ Latest data available in 2003.

Legal Retirement Age

2/ Recent legislation.

Percentage of Employees in Training
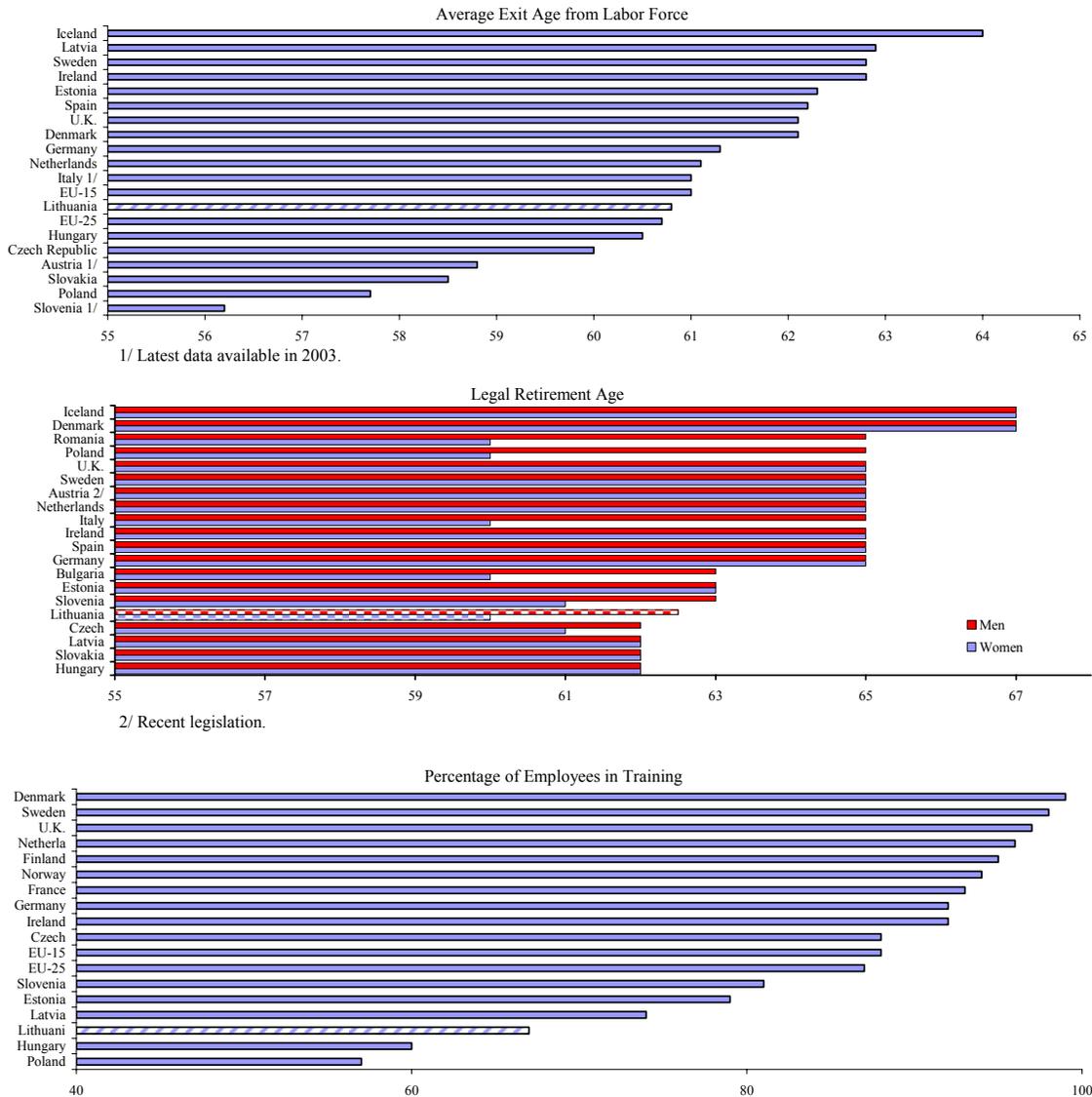
Source: Eurostat.

88.   **Since emigrants are mostly young and drawn from the pool of potential contributors to the social security system, migration will cause a deterioration in the pensioner-to-contributor ratio.** Due to demographic factors, dependency ratio is expected to worsen from 46.7 percent in 2005 to 56.8 percent in 2030, which would be reflected as an increase in the pensioner-to-contributor ratio from 73.9 percent to 101.7 percent, assuming no changes to the current retirement ages of 60 for women and 62.5 for men. When emigration is accounted for, the pensioner-to-contributor ratio may rise to 125.3 percent. If current policies were left unchanged, revenues net of expenditures in the first pillar would amount to 0.6 percent of GDP in 2010 in such an emigration scenario, down from 0.9 percent of GDP if migration effects were excluded. By 2030, the pension fund budget would score a deficit equal to 2.7 percent of GDP, of which 1.3 percentage points would be attributable to

emigration. In other words, the deficit would be 1.4 percent of GDP if there were no migration (Figure 9).[28]

89.   **Measures to increase the economically active population would help alleviate the pressure on the pension fund.** Implementation of a three-pillar pension system has been recently completed. Although the introduction of voluntary contributions to be managed by private pension funds is an important step, further changes are necessary to guarantee a system that can face the challenges imposed by aging and emigration of the active population. Gradually increasing the retirement age to 65 for both men and women by 2020 could bring the deficit down to 0.9 percent of GDP in 2030 (as opposed to 2.7 percent of GDP), even if the highest estimate of emigration were realized. It is critical to remember that these figures depend on (i) the proportion of emigrants that are of working age; (ii) the extent to which the emigrants choose to contribute to the national pension system, as opposed to claiming welfare benefits in the host country; (iii) the share of permanent relative to temporary migration; (iv) the changes in the labor force participation rate; and (v) the specification of the retirement system. These factors will determine the severity of the final impact on the pension system budget balance.

Figure 9. Lithuania: Social Insurance Pension System Budget Balance, 2005-30
(In percent of GDP)
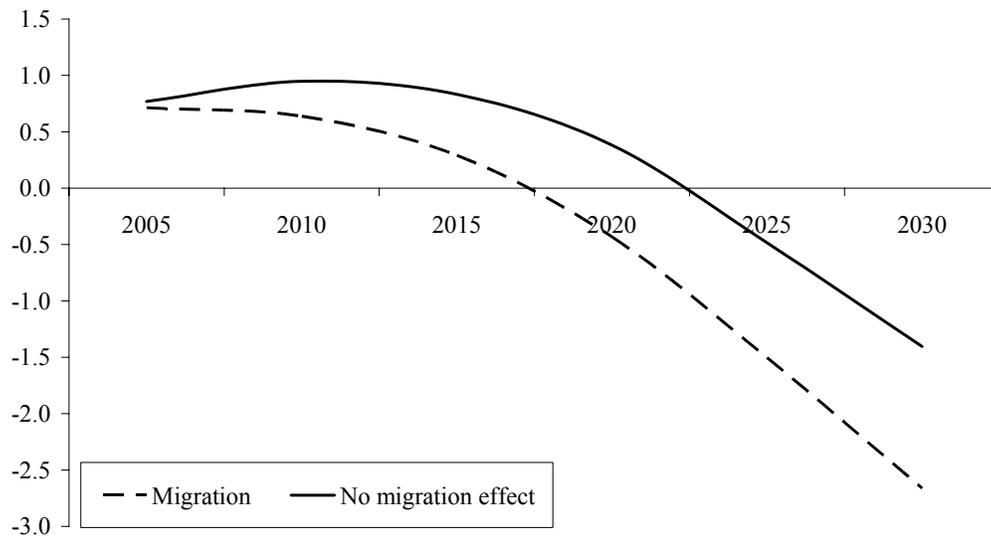
Source: IMF staff calculations.

90.   **The Health Insurance Fund faces an additional challenge stemming from migration, due to the possibility of "brain drain."** According to a study done by the

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[28] These figures are based on staff calculations and information about the pension system obtained from the authorities.

Kaunas University of Medicine, migration is seriously depleting health care human resources—and this tendency will continue. The study reports that 26.8 percent of physicians and 60.7 percent of medical residents interviewed have expressed their intention to migrate, while 3.8 percent and 2.5 percent, respectively, have made a definite decision to do so. Since 1995, the number of physicians per 100,000 population has fallen from 408 to 391.[29] These factors could push up health care costs per capita, while the aging of the population is likely to induce a second spike to the total health care bill. Measures to avoid potential shortages, while maintaining fiscal soundness, will be needed. The Kaunas University of Medicine study recommends an increase of salaries, until they have tripled, or even, quintupled in size, by 2015. This implies a growth in nominal wages of between 14 and 17 percent a year. While such a policy might be necessary, it is likely to induce a deficit of about 1 percent of GDP in the Health Insurance Fund budget by 2010 (Figure 10). The Lithuanian government has approved a plan to increase the salaries of health staff by 20 percent a year in the coming few years. Such an increase would create even greater pressure on the health fund resources.

Figure 10. Lithuania: Health Insurance Fund Budget Balance, 2004-10
(In percent of GDP)
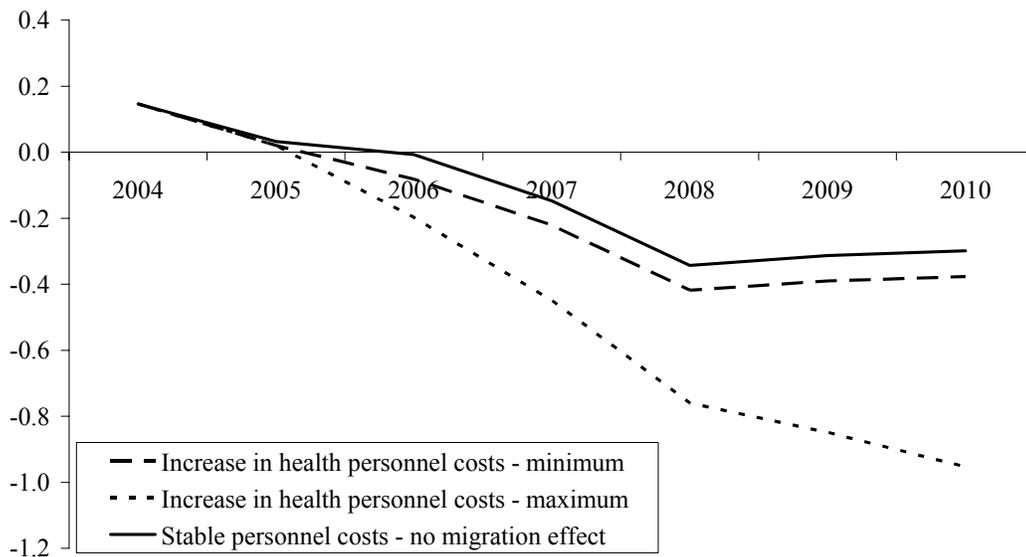
Source: IMF staff calculations.

91. **In conclusion, while migration poses an important economic and social challenge, it also presents opportunities.** Recognizing the pressures on the labor market

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[29] Starkiene and others (2005) report that 36 family physicians left Lithuania in 2005 and calculate the annual migration rate among family physicians to be equal to 2.2 percent.

and on public finances, through the pension and health care systems, requires structural reforms in labor markets, the social security system, and the health care system to face the emerging challenges.[30] At the same time, migration creates a unique opportunity. The skills that migrant workers gain through networking, their experiences in the destination countries, and remittances they send are important for needed human and financial capital. Such spillovers could turn the brain drain to a "brain circulation" and contribute to productivity gains. Policies encouraging the continuous interaction of the emigrants with the Lithuanian economy would help utilize these spillovers in the long run. Figure 11 suggests remittances are growing and could be an important potential of financial capital.

Figure 11. Lithuania: Emigration and Remittances, 1998-2005
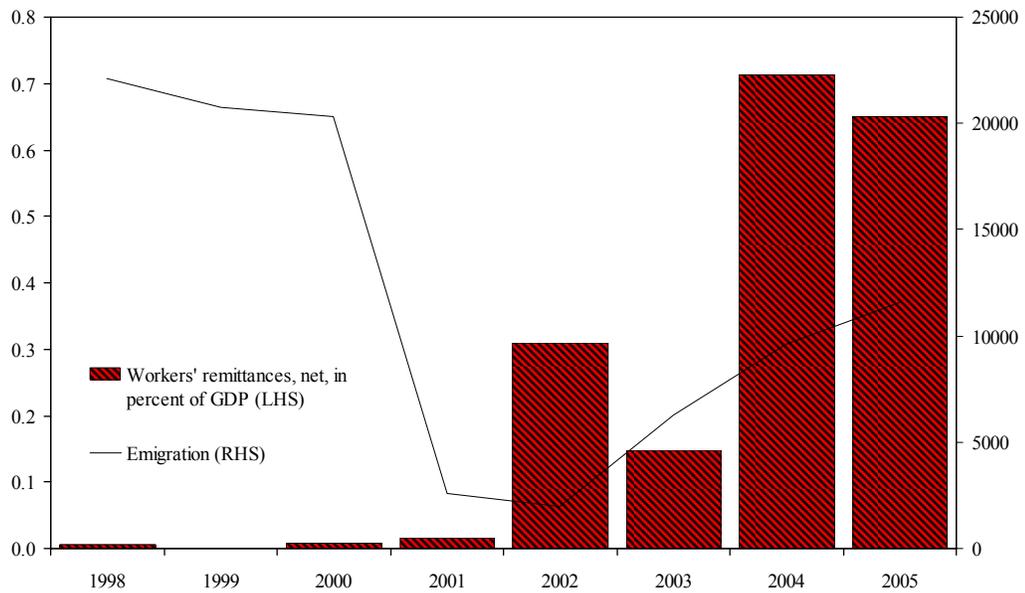
Sources: Bank of Lithuania; and Lithuania Statistics Department.

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[30] For a discussion of possible measures for the health care system, see Chapter III.

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V.   THE SHADOW ECONOMY[31]

A.   Introduction

92.   **A large shadow economy can undermine the tax revenue base and, hence, growth.** Lower revenues can limit the provision of public services and—to the extent these services are required for production—reduce growth. Loayza (1996) find that an increase in the size of the shadow economy in Latin American countries of 1 percent of GDP can reduce official real per capita GDP growth by 1.2 percentage points. Similarly, Johnson and others (1997) find that a 1 percent increase in the share of the shadow economy reduces real GDP by about 1 percentage point in a sample of transition economies in the mid-1990s.

93.   **Does the size of the shadow economy depend on policy measures?** In their influential contribution, Friedman and others (2000) conclude that the shadow economy mainly reflects bureaucracy and corruption. In particular, they find no evidence that higher tax rates drove firms into operations outside of the tax net. These results potentially reflect two features of their study. First, they focused on a sample of countries with a heavy weight on members of the OECD. Second, they used aggregate measures of the shadow economy (Box 1). More recently, the focus on developing economies, using firm-level data, has revealed a stronger role for policy measures in influencing the size of the shadow economy. The shadow economy is measured based on responses to a question about the share of sales reported to tax authorities. Using the World Bank's *World Business Environment Survey* (*WBES*) of firms in mostly developing countries, Dabla-Norris, Gradstein, and Inchauste (2005) find that firms that consider higher tax regulation a constraint are more engaged in informal sector activity than other firms.

94.   **Apart from tax policy, the general business climate has an important effect on informal sector activity.** Many studies emphasize the importance of a strong rule of law for minimizing the size of the shadow economy (Johnson and others, 1997, for transition economies in the 1990s; Johnson and Kaufmann, 2000, for firm-level data from five Eastern European countries; and Dabla-Norris, Gradstein, and Inchauste, 2005, for firm-level data from *WBES*). There is some evidence that the effect of a weak rule of law on informal sector activity is compounded by a heavy regulatory burden (Dabla-Norris, Gradstein, and Inchauste, 2005). Most studies (including Friedman and others, 2000) also find that a heavy regulatory burden independently increases the size of the shadow economy. Labor market regulation, in particular, has been found to make the shadow economy larger (Botero and others, 2003) The corruption that often accompanies heavy regulation further increases the size of the shadow economy (e.g., Alexeev and Pyle, 2003).

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[31] Prepared by Franziska Ohnsorge (EUR).

Box 1. Estimating the Size of the Shadow Economy

Much of the debate has centered around the definition of the shadow economy, and several measures have been used to estimate its size. Four approaches have been the most popular in the recent academic literature: electricity consumption, latent variable estimation, the currency demand approach and firm-level survey data.

a. **The electricity consumption approach.** Since the short-run elasticity between GDP growth and electricity consumption is usually one, the gap between electricity consumption and GDP growth has been used as an indicator of the size of the informal economy. Studies using this measure include Johnson and others (1997), Johnson, Kaufmann, and Zoido-Lobatan (1998), Friedman and others (2000), Lackó (1998 and 1999), and Alexeev and Pyle (2003).

b. **The latent variable (MIMIC) approach.** Informality is defined by a latent variable, and the size of the shadow economy is estimated in a multiple indicators-multiple causes factor analysis. Estimations using this approach can be found in Schneider (2005) and Kanniainen, Pääkkönen, and Schneider (2004). Chaudhuri, Schneider, and Chattopadhyay (2006) and Schneider, Chaudhuri, and Chatterjee (2003) use this method for Indian states.

c. **The currency demand approach.** Estimates for the tax variable in a currency demand equation are used to calculate the size of the shadow economy caused by tax evasion. This method is also used by Schneider (2005).

d. **Firm-level data from survey responses.** The World Bank's *World Business Environment Survey* (2000) includes a question about the share of sales not reported to tax authorities. Several studies have used this variable as an indicator of informal sector activity (e.g., Straub, 2005; Dabla-Norris, Gradstein, and Inchauste, 2005).

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95.   **Finally, informal sector activity is associated with certain firm characteristics.** Firm-level studies generally find that small, private, domestically owned firms are more likely to be engaged in informal sector activity (Dabla-Norris, Gradstein, and Inchauste, 2005; Batra, Kaufmann, and Stone, 2003; and Straub, 2005). Dabla-Norris, Gradstein and Inchauste (2005) also find that nonexporters tend to be more likely to be engaged in informal sector activity.

96.   **To disentangle the importance of the firm-level and economy-wide determinants of informal sector activity and to point to possible policy recommendations, this paper uses a new firm-level data set for emerging markets.** While the question of the exact measurement of the size of the shadow economy is an important research topic, it is not the purpose of this paper. Instead, this paper focuses on using one consistent definition of the shadow economy over time and across countries to assess the determinants of the shadow economy. Formal sector activity is defined as the share of sales reported to tax authorities in the World Bank's *Investment Climate Survey* (*ICS*), and informal sector activity as 100 minus formal sector activity. The firm-level data used in the previous literature were based on *WBES* data for 2000. Since then, these surveys have been updated substantially and repeatedly in *ICS*, such that data are available for most Central and Eastern European countries for 2002 and 2005, and data for many developing countries are available for 2003.

The next Section B reviews the data for the Lithuanian shadow economy. Section C shows the results of a panel estimation. Section D concludes, with a summary of the findings and implications for Lithuania.

97.   **Our results show that tax policy is an important policy tool for reducing the size of the shadow economy.** In all the estimations presented here, high tax rates and a heavy fiscal burden consistently increase the size of the shadow economy, and this result is robust. Our preferred regressions suggest that the planned cut in the personal income tax (PIT) rate may reduce underreporting of sales to tax authorities, as would a cut in social security contributions to reduce hiring cost. However, both these measures will likely still lead to net revenue losses, as the effect of the increased tax base is more than offset by the decline in tax rates. More effective at reducing underreporting of sales for tax purposes—and with a net revenue gain—is regulatory easing, such as a reduction in administrative barriers to entry and in the effective minimum wage.

B. Lithuania's Shadow Economy

98.   **The Lithuanian Department of Statistics estimates the size of the shadow economy at 18 percent of GDP.** However, there are a variety of indicators of the size of the shadow economy (Text Table 1), and these show quite different estimates. Our analysis in the rest of this paper relies on survey estimates of the share of unreported revenues as the measure of informal sector activity, which for 2005 was 10.5 percent for Lithuania.

Text Table 1. Lithuania: Estimates of the Shadow Economy
(In percent)

Unreported employment to total employment, 2005 (Labor Inspectorate)	20.0
Of which:	
Wood processing	7.0
Construction	39.0
Machinery repair	7.0
Size of shadow economy to GDP, 2005 (Department of Statistics)	18.0
Size of shadow economy to GDP, 2002/03 (Schneider, 2005)	32.6
Undeclared wages to declared wages, 2005 (Free Market Institute)	30.0
Unreported revenues to total revenues, 2005 (*ICS*, 2005)	10.4

Sources: Labor Inspectorate; Department of Statistics; Schneider (2005); Free Market Institute; and World Bank, *Investment Climate Survey*, 2005.

99.   **Lithuania's shadow economy is not particularly large by the standards of new EU member countries and may have been shrinking.** Although the difference is not statistically significant, Lithuania's shadow economy—as measured by the share of sales not reported for tax purposes—fell by about 4½ percentage points between 2002 and 2005, from about 15 to about 10½ percent (Text Table 2). In 2005, the only Central and Eastern European countries (CEE-8) with a significantly smaller shadow economy were the Slovak Republic, which had made substantial regulatory improvements, and Estonia, whose shadow economy has always been the smallest among the CEE-8.

Text Table 2. Average Share of Sales Reported for Tax Purposes Among
Private Firms, 2001-2005
(In percent)

	2001	2002	2004	2005
Turkey		82.8		70.7 *
Macedonia		62.7 *		74.9 *
Albania		75.2 *		74.9 *
Russian Federation		80.3		83.5 *
Azerbaijan		84.7		85.2 *
Bulgaria		81.7	88.8	85.5 *
Czech Republic		89.0 *		86.0 *
Bosnia and Herzegovina		64.6		87.3
Hungary		88.1 *		88.6
Serbia and Montenegro	72.7 *			88.7
Ukraine		84.0		88.8
Moldova		76.1 *		89.0
Poland		89.0 *		89.5
Lithuania		**83.9**		**89.6**
Slovenia		81.5		92.4
Croatia		87.3		92.5
Latvia		85.8		92.7
Kazakhstan		82.6		93.0 *
Romania		85.4		93.5 *
Madagascar				93.7 *
Slovak Republic		86.0		95.1 *
Armenia		90.3		95.5 *
Estonia		92.3 *		96.8 *
Egypt			83.3 *	
Sri Lanka			92.1	
Algeria		72.7 *		
China		60.4 *		
Eritrea		80.7		
Georgia		60.8 *		
Mozambique	66.0 *			
Peru		70.7 *		
Yugoslavia		73.1 *		
Zambia		84.6		

Note: * indicates that the average in 2001-03 is significantly different from
that for Lithuania in 2002, and the average in 2004-05 is significantly
different from that for Lithuania in 2005.

100.   **Large firms tend to be operating less in the shadow economy than do small and medium-sized firms.** In the full sample, domestically owned and younger private firms also report significantly less sales to tax authorities (Text Table 3).[32] Firms operating in the services or construction sectors do not report significantly less sales than those operating in the manufacturing industry, but firms in other nonmanufacturing sectors (mostly energy and mining) report more.

101.   **Lithuania's business climate is generally supportive of entrepreneurship, albeit somewhat less so than, for example, Estonia's.** For this analysis, measures of fiscal burden, regulation (in particular, pertaining to labor markets), law and order, and corruption are drawn from five sources: the World Bank's *Doing Business* database, the Heritage Foundation's *Index of Economic Freedom*, the Fraser Institute's index of *Economic Freedom (Gwartney, 2005)*, the World Bank's *Governance Indicators*, and Transparency International (see Data Appendix). Figure 1 shows that, at 33 percent, Lithuania's personal income tax is average among emerging countries, while its corporate tax rate of 15 percent is low and tax administration not very burdensome. Lithuania's regulatory environment is benign, with business start-ups being easy, licenses fairly easily obtained, and the regulatory burden generally light (Figures 2 and 3). The legal system is reasonably well-functioning, with contract enforcement relatively easy (Figure 4). Corruption is low among emerging markets (Figure 5). Labor market regulations, including hiring-and-firing practices, are at about the average of emerging markets economies (Figure 6 and 7), with the exception of temporary and overtime contracts.

Text Table 3. Characteristics of Firms Reporting a Larger Share of Sales to Tax Authorities

	Lithuania, 2002, 2005	Full sample, 2001, 2002, 2004, 2005
Constant	**90.635****	**85.125*****
Small	-1.000	**-3.224*****
Large	**3.808****	0.423
Private	-3.335	**-2.411***
Nonexport	-3.101	-1.321
Domestically owned	0.449	**-3.486*****
Age	0.061	**0.048*****
Services	0.815	0.103
Agrobusiness	0.000	-1.566
Construction	4.024	-0.174
Other non-manufacturing sectors	0.297	**3.202****
Observations	348	16831
R-squared	0.02	0.12

Notes: Robust t-statistics in brackets.
* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

C. Results from Panel Estimation

102.   **A panel regression is run to find the determinants of the share of sales reported to tax authorities, that is, the degree of formality of a firm.** The dependent variable is the share of sales reported to tax authorities by firms in 24 emerging markets during 2002, 2004, and 2005 in the World Bank's *Investment Climate Survey*. Data for 2003—mostly a sample of poor and developing countries—are excluded since the processes driving their shadow economies appear to be fundamentally different from those driving the remainder of the sample. For most of the remaining countries, data are available for 2002 and 2005. For

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[32] The regression also includes country dummies.

Bulgaria, Egypt, and Sri Lanka, data are available for 2004 and included here. The survey data include the question "Recognizing the difficulties many firms face in fully complying with taxes and regulations, what percentage of total sales would you estimate the typical firm in your area of activity reports to the tax authorities?" The following regression is estimated, with robust standard errors that correct for country-year clusters:

$$share\ of\ sales = \alpha + \gamma\ firm\ characteristics + \beta_0 GDP\ per\ capita + \beta_1 fiscal\ burden$$
$$+ \beta_2\ regulation + \beta_3\ law\ and\ order + \beta_4 corruption$$
$$+ country\ dummies + sector\ dummies + \varepsilon.$$

Firm characteristics include dummies for small and large firms, exporters, foreign ownership, and audited accounts. There are 8 measures of fiscal burden (of which 2 describe tax administration, 1 expenditure, and 3 tax rates), 15 measures of regulation (of which 6 describe the ease of starting a business, 3 the ease of closing a business, and 3 the ease of obtaining licenses), 12 measures of law and order and respect for property rights, and 4 measures of corruption (see Data Appendix for a list of variables).

103. **Higher tax rates and a heavier overall fiscal burden raise the size of the shadow economy** (Text Table 4). This result holds for a range of measures of taxation and fiscal burden from various sources. The results are robust to changes in sample size and years for the tax variables and the overall indices. The coefficient estimates for government expenditures, however, are less robust across samples. Similarly, the measures of a cumbersome tax administration—as, for example, reflected in the number of taxes to be paid—are not robust (Table 1).

Text Table 4. Panel Regression of Share of Sales Reported to Tax Authorities on Fiscal Measures, 2002, 2004, and 2005

Constant	90.929***	46.997***	77.793***	84.232***	87.135***	72.686***	120.883***
GDP per capita	0	0	0.002***	0.001***	0.001***	0.002***	-0.001***
Small	-3.009***	-3.334***	-2.098***	-2.098***	-2.098***	-3.335***	-2.098***
Large	1.175*	1.189	0.763	0.763	0.763	1.119	0.763
Export	0.959	1.450*	1.27	1.27	1.27	1.408*	1.27
Foreign	2.974***	2.615***	2.975***	2.975***	2.975***	2.573***	2.975***
Audited	1.667**	1.648*	0.744	0.744	0.744	1.673*	0.744
Fiscal burden index (Heritage Foundation)—higher index=greater burden	-5.734***						-2.605***
Size of government (Fraser)—higher index=smaller size		4.435***					
Income tax rate (Heritage Foundation) (in percent)			-0.445***				
Corporate tax rate (Heritage Foundation) (in percent)				-0.520***			
Total tax payable in percent of profit (World Bank, *Doing Business*)					-0.214***		
General govt. consumption as share of total consumption						-0.531***	
Number of payments for taxes (World Bank, *Doing Business)*							-0.641***
Observations	13888	11333	7256	7256	7256	11333	7256
R-squared	0.12	0.11	0.11	0.11	0.11	0.11	0.11

Notes: Robust t-statistics in brackets.
* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

104. **Regulation increases the size of the shadow economy, especially if it impedes new business start-ups and raises the cost of business closure** (Text Table 5)**.** The coefficient estimates on regulation of the start-up of businesses and the cost of business closure are robust to changes in sample size and the inclusion of fiscal variables. The link between licensing requirements and administrative barriers to business closure, however, is less robust (Tables 2a and 2b). This is partly due to collinearity with the measures of the economy's overall fiscal burden.

Text Table 5. Panel Regression of Share of Sales Reported to Tax Authorities on Fiscal and Regulatory Measures, 2002, 2004, and 2005

Constant	77.552***	76.711***	100.484***
GDP per capita	0.001**	0.003***	0.001***
Small	-3.298***	-3.236***	-2.046***
Large	1.142	1.15	0.952
Export	1.519**	1.491**	1.532**
Foreign	2.521***	2.551***	2.794***
Audited	1.570***	1.570***	0.796
Fiscal burden index (Heritage Foundation)—higher index=greater burden	**-2.041****	**-4.587*****	**-5.564*****
Starting a new business (Fraser)—higher index=easier start	**0.827****		
Administrative conditions/entry of new business (Fraser)—higher index=easier entry		**1.532*****	
Cost of closing business (in percent of estate) (World Bank, *Doing Business*)			**-0.350*****
Observations	11159	11159	6990
R-squared	0.11	0.11	0.11

Notes: Robust t-statistics in brackets.
* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

105. **The effect of property rights' protection and corruption on the shadow economy is mostly already captured in the regulatory variables.** Only three measures appear to be significant determinants of the size of the shadow economy: the cost of registering property, the cost of enforcing contracts, and judiciary independence (Text Table 6). The coefficients on these variables are significant, with the expected sign, and are robust to changes in sample size and the inclusion of fiscal variables (Table 3). They are, however, not robust to the inclusion of regulatory measures. Most regulatory measures already include an assessment of the enforcement of regulations, thus overlapping with the measures of law and order and property rights. Corruption measures perform weakly, especially once combined with fiscal and regulatory measures (Table 4).

Text Table 6. Panel Regression of Share of Sales Reported to Tax Authorities on Legal and Fiscal Measures, 2002, 2004, and 2005

Constant	81.522***	166.259**	89.255***
GDP per capita	-0.001***	-0.001***	0
Small	-3.301***	-3.301***	-3.243***
Large	0.172	0.172	1.151
Export	1.165	1.165	1.519*
Foreign	2.580***	2.580***	2.516***
Audited	0.284	0.284	1.584*
Fiscal burden index (Heritage Foundation)—higher index=greater burden	**-3.560*****	**-3.617*****	**-4.000*****
Cost of registering property (in percent of property value) (World Bank, *Doing Business*)	**2.270*****		
Cost of enforcing contracts (in percent of debt) (World Bank, *Doing Business*)		**-2.597*****	
Judiciary independence (Fraser)—higher index=greater independence			**1.149*****
Observations	8783	8783	11159
R-squared	0.1	0.10	0.11

Notes: Robust t-statistics in brackets.
* significant at 10 percent; ** significant at 5 percent; *** significant at 1 pe

106.   **Labor market regulations that affect the shadow economy are those pertaining to the minimum wage, unemployment insurance, and costs of hiring.** Higher effective minimum wages and unemployment insurance tend to increase the size of the shadow economy, as does a larger cost of hiring (Text Table 7). Coefficient estimates for the effective minimum wage and the cost of hiring tend to be more robust than those for unemployment insurance for changes in sample size, especially once measures of the regulatory and fiscal burden have been included (Tables 5a and 5b). Unfortunately, collinearity between the effective minimum wage and hiring cost precludes their joint inclusion in a regression. Coefficient estimates for most other measures of labor market regulation—such as firing cost or rigidity of hours and employment—are either insignificant or not robust to changes in sample size and inclusion of other variables. These are, therefore, not included in the preferred regressions in Text Table 7.

Text Table 7. Results of Panel Regression of Share of Sales Reported to Tax Authorities on Fiscal, Regulatory, and Labor Market Measures, 2002, 2004, and 2005

	1	2	3	4
Constant	76.711***	96.465***	111.063**	110.412***
GDP per capita	0.003***	0.000***	0	0.001***
Small	-3.236***	-2.629***	-2.690***	-2.046***
Large	1.15	0.844	0.531	0.952
Export	1.491*	2.019**	1.862*	1.532*
Foreign	2.551***	3.167***	3.171***	2.794***
Audited	1.570*	0.657	0.557	0.796
Fiscal burden index (Heritage Foundation)—higher index=greater burden	-4.587***	-3.039***	-4.557***	-7.368***
Administrative conditions/entry of new business (Fraser)—higher index=easier entry	1.532**		0.645***	
Cost of closing business (in percent of estate) (World Bank, *Doing Business*)		-0.344***		-0.327***
Impact of minimum wage index (Fraser)—higher index=less impact	2.921***	2.052***		
Hiring cost (in percent of salary) (World Bank, *Doing Business*)			-0.242***	-0.178***
Observations	11159	5430	5522	6990
R-squared	0.11	0.12	0.12	0.11

Notes: Robust t-statistics in brackets.
* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

107.   **The preferred regressions point to three areas of policy measures for reducing the size of the shadow economy in Lithuania.** Policies could include a reduction in its fiscal burden, an easing of labor market restrictions, and reduction in entry cost:

a.   **Reducing the fiscal burden.** This could be achieved by reducing the PIT rate from 30 to 24 percent—as currently planned by the authorities for 2008—since Lithuania's current PIT rate is somewhat higher than that in the other Baltic countries (Figure 1). The fiscal burden could be further reduced by containing increases in government expenditure to, say, 1 percent of GDP. The large savings and property restitution

payments in 2004 placed Lithuania's increase in government expenditures at the top of emerging markets in the sample. There is less scope for reducing the corporate income tax (CIT) further, which, at 15 percent, is already the lowest in the sample, except for Estonia, which has a zero CIT rate (Figure 1).

b. **Easing labor market restrictions.** Although hiring costs in Lithuania are broadly in line with other emerging markets in the sample (Figure 7), they could be lowered by reducing social security contributions from 28 percent of the salary to, say, 22.4 percent of the salary, as in neighboring Latvia. Additionally, Lithuania's relatively high effective minimum wage (due to stricter legislation and/or enforcement) among the CEE-8 countries could be reduced to the average among the CEE-8 countries.

c. **Reducing entry cost.** Administrative cost for the entry of new businesses, although lower than in many emerging markets, could be further reduced to, say, the level of Estonia's.

108. **Though tax reductions help in reducing the size of the shadow economy, regulatory and labor market measures are likely to be more effective.** Based on the preferred regressions in Text Table 7, the fiscal, regulatory, and labor market measures together could increase the share of reported sales by up to 9.7 percentage points, virtually eliminating the shadow economy. A 6 percent cut in the PIT rate and a 5½ percent cut in social security contributions generate the lowest increase in the share of reported sales (Text Table 8). The PIT cut raises the share of reported sales by up to 1.8 percentage points and the cut in social security contributions, that is, the hiring cost, raises it by up to 1.4 percentage points. This compares with an increase in the share of reported sales generated of up to 3.3 percentage points by easing entry barriers or an increase of up to 2.4 percentage points by reducing the effective minimum wage.

Text Table 8. Lithuania: Predicted Values for Lithuania for Five Scenaria, 2005 1/
(Share of sales reported to tax authorities, in percent)

	Reducing the fiscal burden		Reducing labor market restrictions		
	PIT of 24 percent	1 percent of GDP increase in government expenditure	Reducing hiring cost to Latvia's level	Reducing impact of minimum wage to CEE-8 average	Reducing entry barriers to Estonia 's level
Panel regression 1	90.9	93.7	...	96.1	99.4
Panel regression 2	90.5	92.4	...	94.1	...
Panel regression 3	90.9	93.7	95.1	...	96.5
Panel regression 4	91.6	96.2	97.2	...	...
Memorandum items:					
Actual (Lithuania)	89.7				
Actual (Estonia)	96.9				

Source: IMF staff estimates.

1/ Each scenario assumes that the previous scenario has also been implemented.

While the largest increase in the share of reported sales (up to 4.6 percentage points) is generated by containing growth in government expenditures, this policy measure will be difficult to implement should the use of EU funds increase as projected.

109.   **A further downside of relying on taxation measures is that, though the tax base expands, a net revenue loss is projected nevertheless.** The different policy measures have very different implications for revenues and the fiscal deficit. The PIT cut will lead to net revenue shortfalls of 1 percent of GDP since the increase in the revenue base through additional tax reporting is more than offset by the losses in PIT revenues (Text Table 9). Similarly, the revenue losses from the cut in social security contributions—the hiring cost—leads to net revenue shortfalls of 0.9 percent of GDP. In contrast, containing the increase in government expenditures to 1 percent of GDP would not only be more effective at increasing tax reporting, but also allow a fiscal consolidation. Reducing administrative barriers to entry and the effective minimum wage would also be more effective than the assumed tax cuts at increasing tax reporting and would not lead to fiscal deterioration.

Text Table 9. Lithuania: Fiscal Impact of the Five Scenaria, 2006 1/
(In percent of GDP; unless otherwise specified)

	Actual	Reducing the fiscal burden		Reducing labor market restrictions		
		PIT of 24 percent	1 percent of GDP increase in government expenditure	Reducing hiring cost to Latvia's level	Reducing impact of minimum wage to CEE-8 average	Reducing entry barriers to Estonia's level
Revenues	33.7	32.7	33.3	31.6	33.3	33.7
Of which:						
PIT	6.4	5.1	5.1	5.1	5.1	5.1
CIT	2.7	2.7	2.9	2.9	2.9	3.0
VAT	6.9	7.1	7.4	7.5	7.4	7.7
Excises	2.7	2.7	2.8	2.9	2.8	2.9
Social security contributions	9.0	9.0	9.0	7.2	9.0	9.0
Expenditures	35.8	35.8	34.6	34.6	34.6	34.6
Overall balance	-2.1	-3.1	-1.3	-3.0	-1.3	-0.9
Memorandum items:						
Share of reported sales (in percent)	89.7	91.6	96.2	97.2	96.1	99.4
GDP (in millions of litai)	80,617	80,617	80,617	80,617	80,617	80,617
PIT rate (in percent)	30	24.0	24.0	24.0	24.0	24.0
Government expenditure increase	2.2	2.2	1.0	1.0	1.0	1.0
Social security contributions (in percent)	28.0	28.0	28.0	22.4	28.0	28.0

Source: IMF staff estimates.

1/ Each scenario assumes that the previous scenario has also been implemented. Fiscal figures refer to general government.

D. Conclusions

110.   **Lithuania's shadow economy is not out of line with that in other emerging markets.** In most CEE-8 countries, the size of the shadow economy is similar to that in Lithuania. Only Estonia's is and has been over time consistently smaller than Lithuania's. A broader range of firms might be participating in Lithuania's shadow economy, however, than in other countries.

111.   **The tax burden is an important determinant of the informal economy.** In contrast to Friedman and others (2000), the results presented here show a strong and consistently robust effect of several measures of tax and fiscal burden on the size of the shadow economy. Also important are measures of the regulatory burden, in particular those pertaining to closure and start-up of businesses. Among labor market regulations, the level and enforcement of the minimum wage, the labor market disincentives arising from unemployment insurance, and the hiring cost implied by payroll taxes have a relatively robust effect on the size of the shadow economy.

112.   **Regulatory and labor market measures are likely to be more effective than tax measures in reducing the size of the shadow economy.** The planned PIT cut will contribute to increased reporting for tax purposes. However, the lower tax rate will, on balance, reduce

government revenues. Regulatory easing and labor market measures are likely to have a bigger effect without revenue losses. In particular, easing administrative barriers and reducing the effective minimum wage would be more effective at raising tax reporting without triggering revenue shortfalls.

Figure 1. Emerging Markets: Measures of Tax Burden, 2003-05
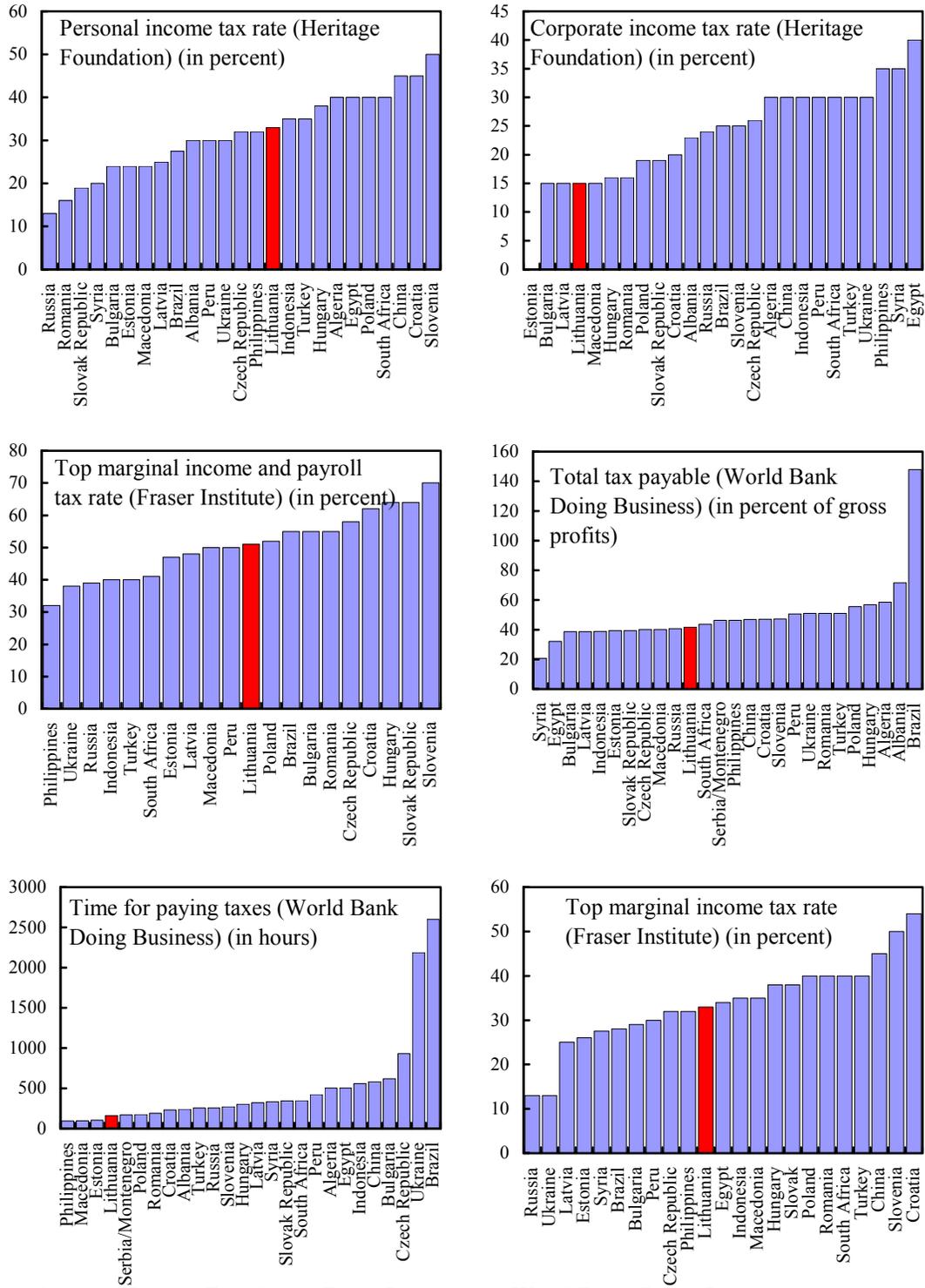
Sources: Heritage Foundation; Fraser Institute; and World Bank, *Doing Business*

Figure 2. Emerging Markets: Starting and Closing a Business, 2005
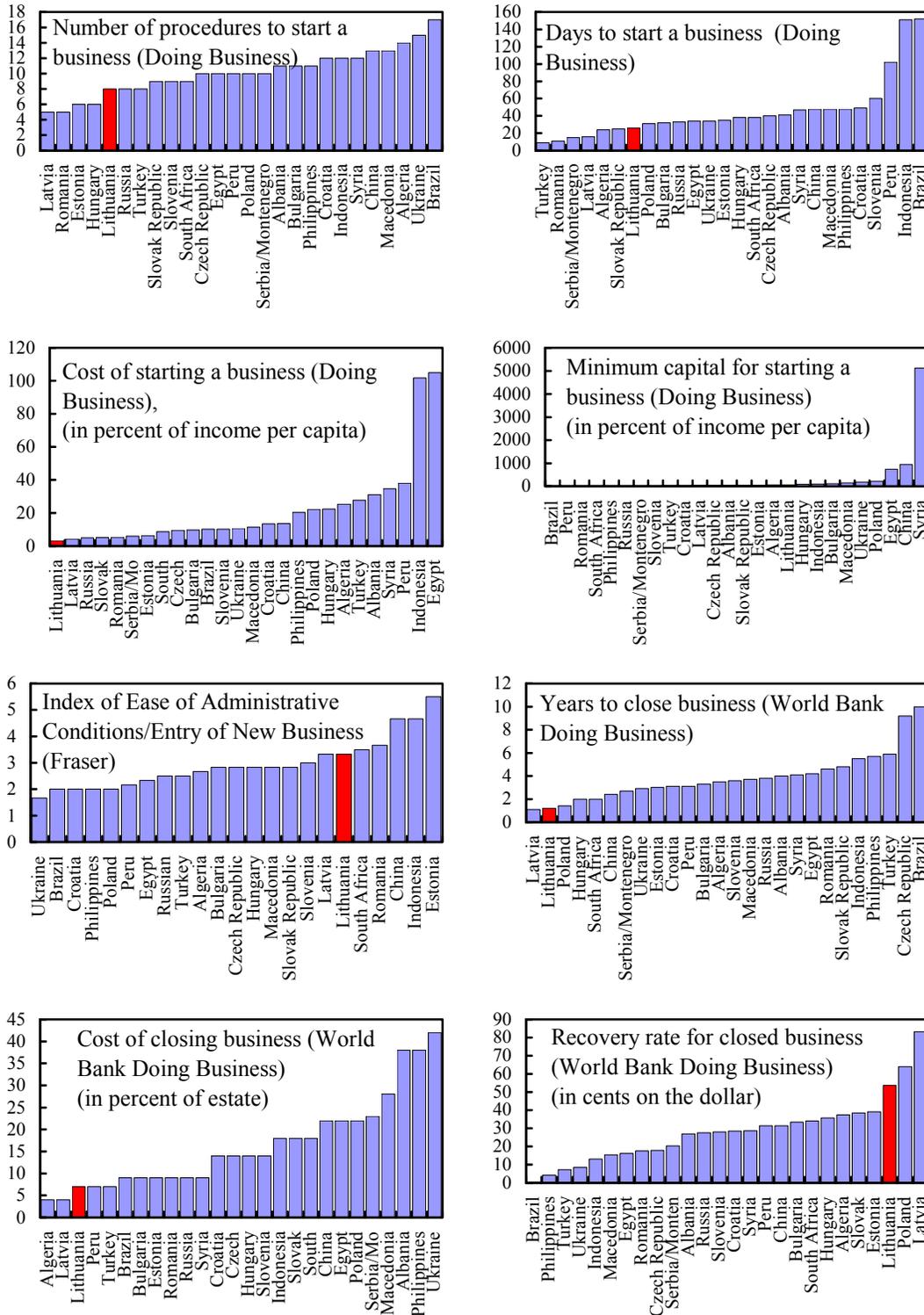
Sources: Heritage Foundation; Fraser Institute; and World Bank, *Doing Business*

Figure 3. Emerging Markets: Regulatory Burden, 2003-05
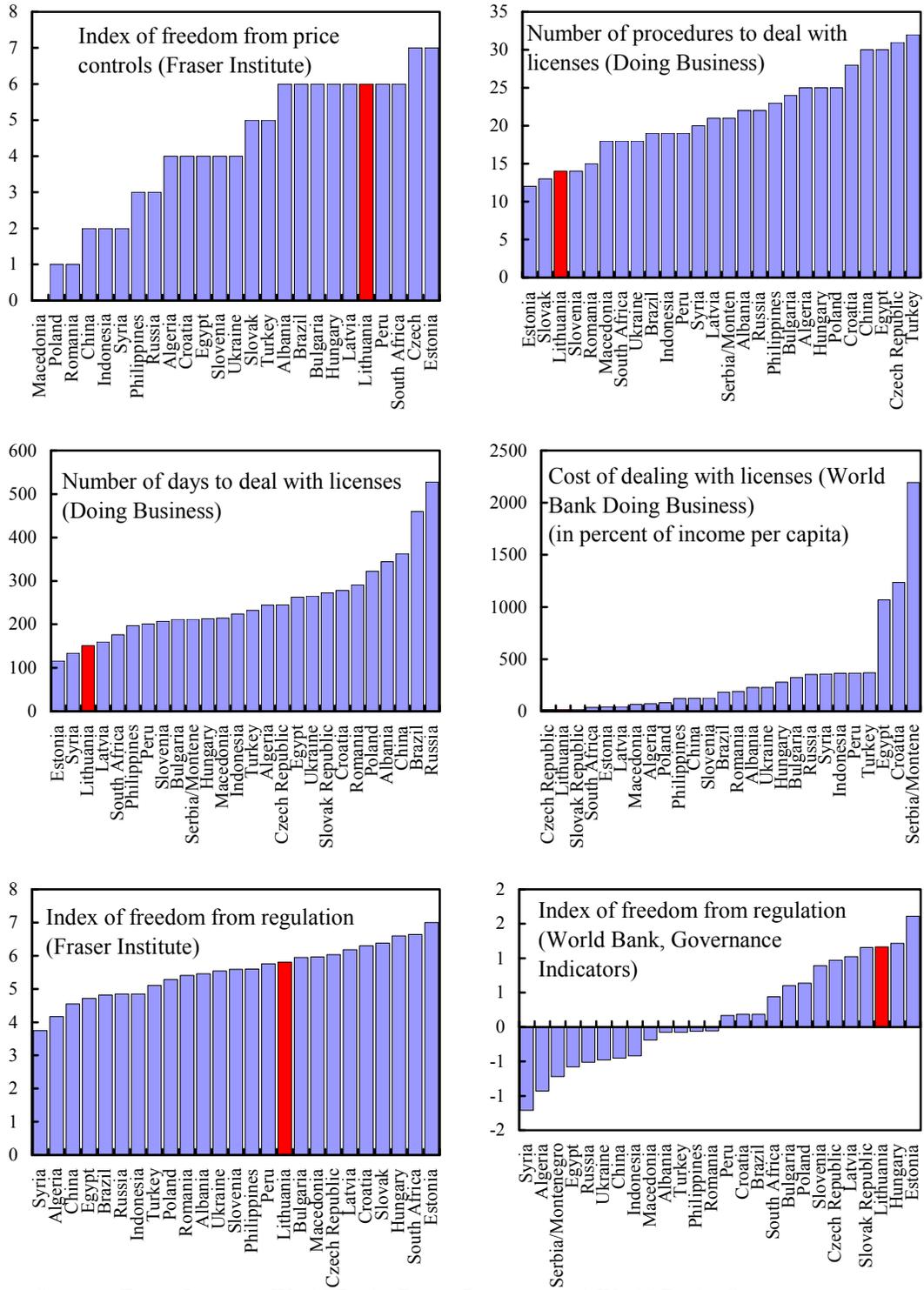
Sources: Fraser Institute; World Bank, *Doing Business;* and World Bank, *Governance Indicators* .

Figure 4. Emerging Markets: Law and Order, 2003-05
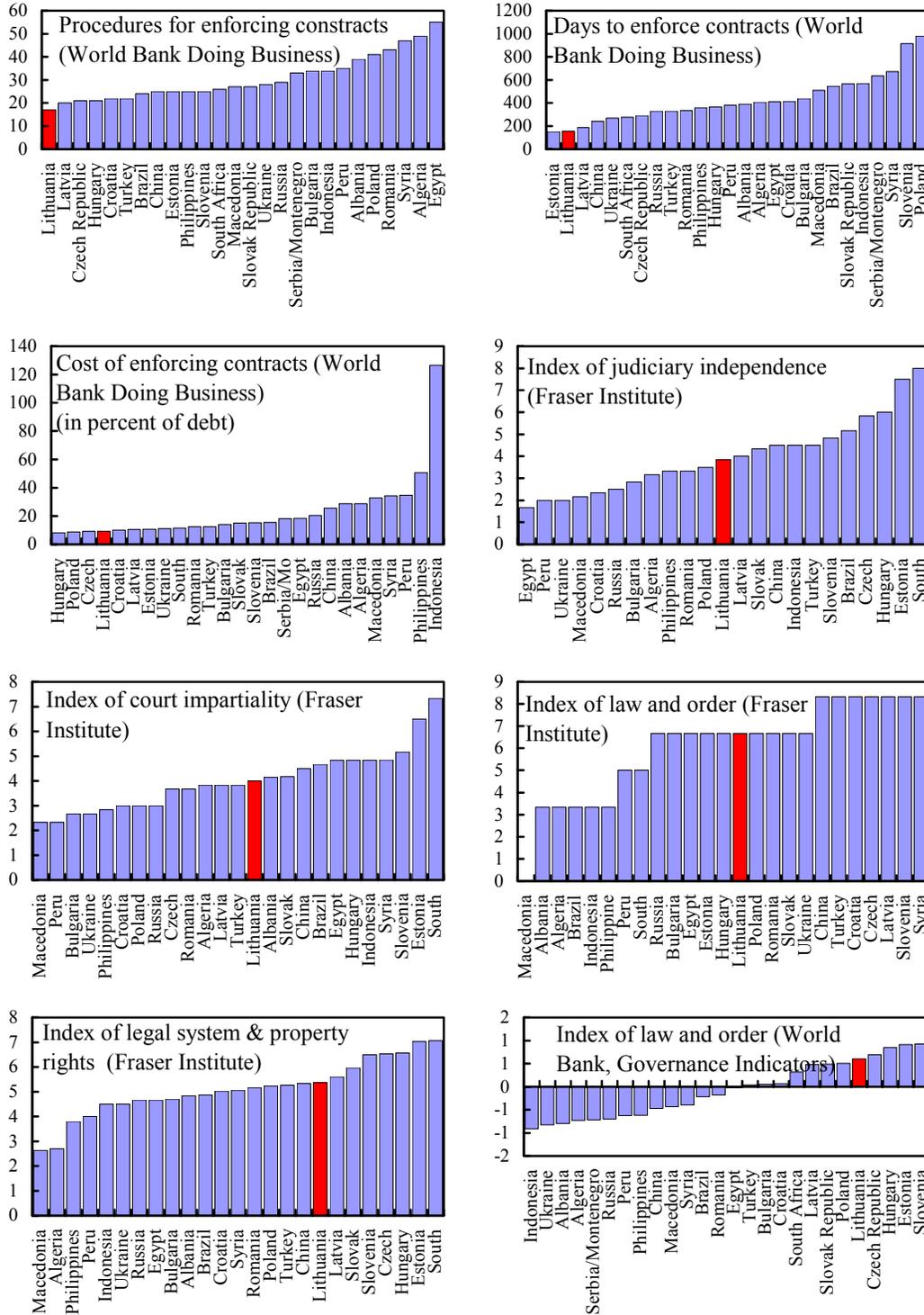
Sources: World Bank, *Doing Business*; World Bank, *Governance Indicators*; and Fraser Institute.

Figure 5. Emerging Markets: Corruption Indices, 2003-05
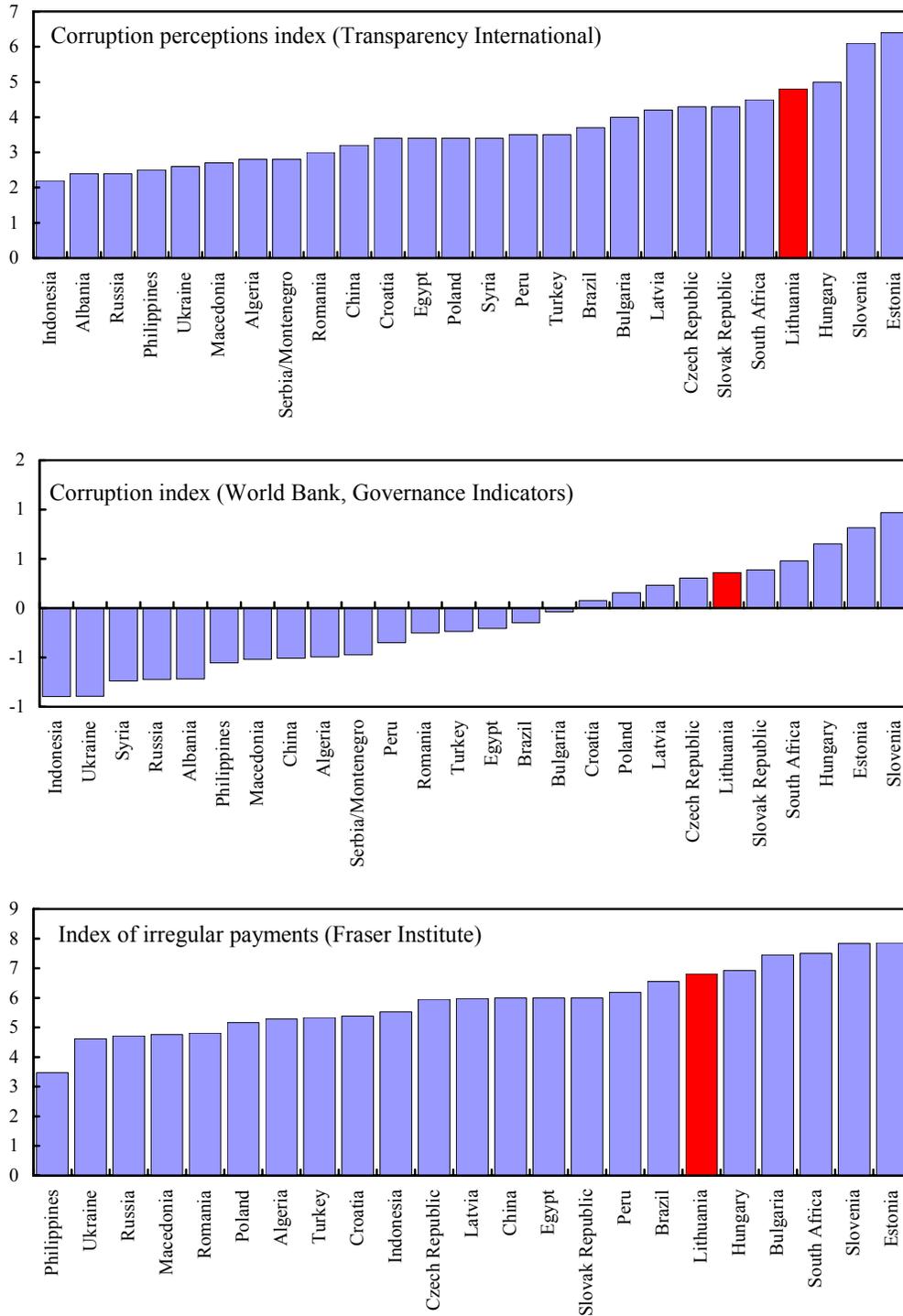
Sources: Transparency International; Fraser Institute; and World Bank, *Governance Indicators*.

Figure 6. Emerging Markets: Labor Market Regulations, 2003-05
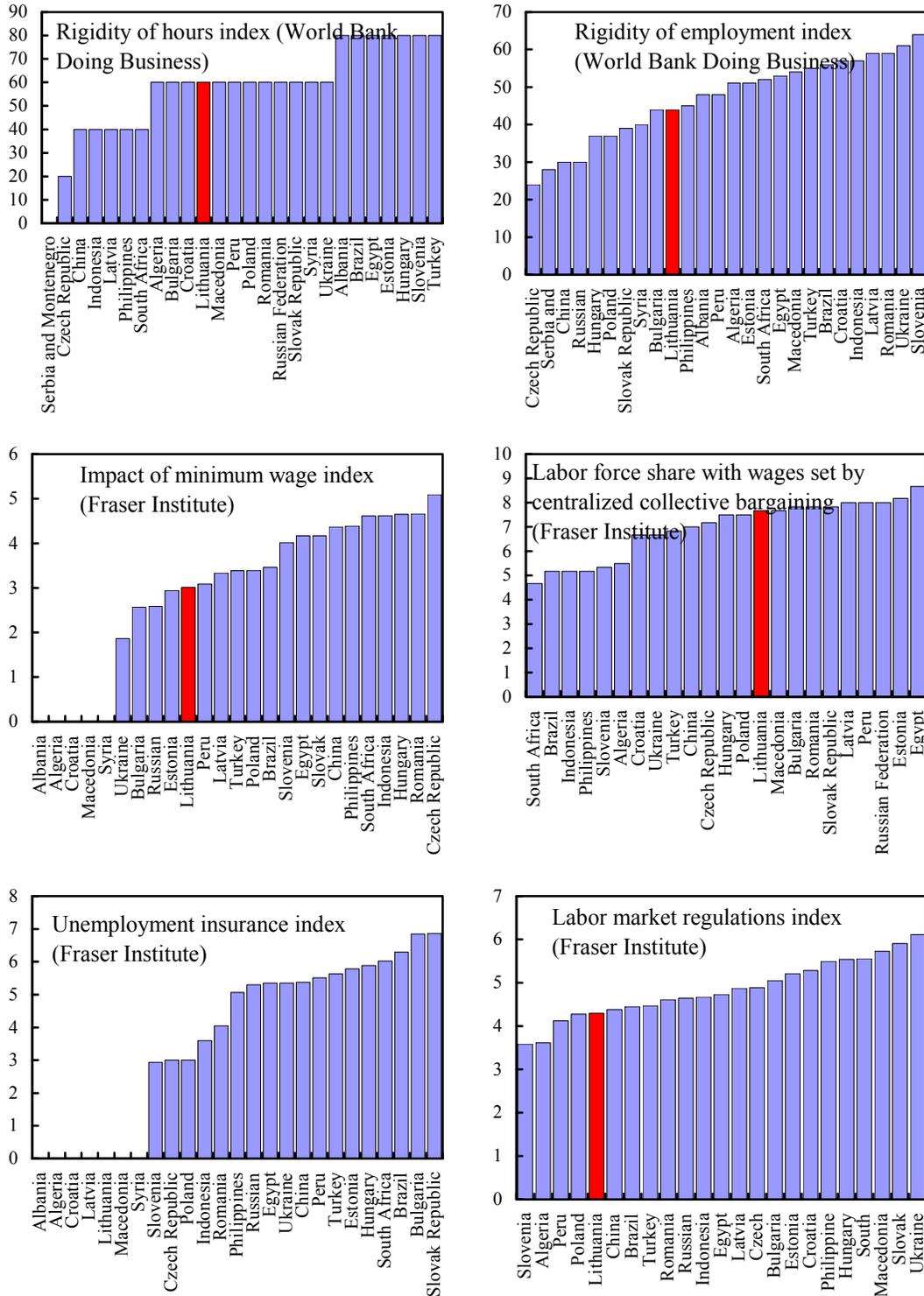
Sources: Fraser Institute; and World Bank, *Doing Business* .

Figure 7. Emerging Markets: Hiring and Firing, 2003 and 2005
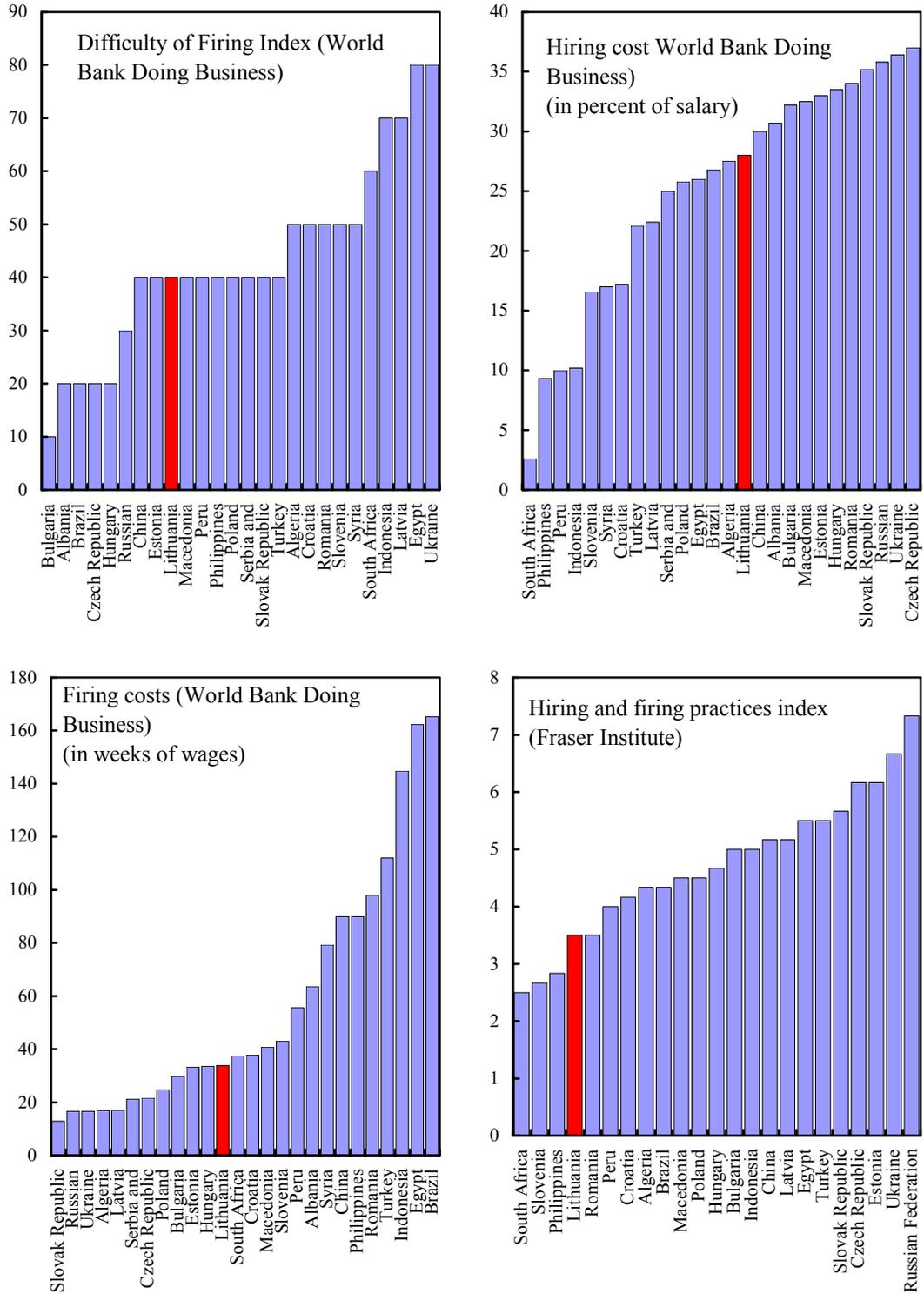
Sources: World Bank, *Doing Business* ; and Fraser Institute.

Table 1. Robustness Test of Panel Regression of Share of Sales Reported to Tax Authorities on Fiscal Variables, 2002, 2005

	2005							2002		
Constant	95.290***	75.845***	90.627***	95.519***	112.742**	85.027***	97.603***	82.888***	68.303***	63.367***
GDP per capita	0.000***	0.001***	0.001***	0.000***	0.000***	-0.000***	0.001***	0.001***	0.001***	0.001***
Small	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-1.985	-1.985	-1.985
Large	0.805	0.805	0.805	0.805	0.805	0.805	0.805	3.080***	3.080***	3.080***
Export	2.234**	2.234**	2.234**	2.234**	2.234**	2.234**	2.234**	1.536	1.536	1.536
Foreign	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***	2.277**	2.277**	2.277**
Audited	0.614	0.614	0.614	0.614	0.614	0.614	0.614	4.556**	4.556**	4.556**
Fiscal burden index (Heritage Foundation)—higher index=greater burden	-3.500***							-11.089***		-4.545***
Size of government (Fraser)—higher index=smaller size		1.207***							0.011	
Income tax rate (Heritage Foundation) (in percent)			-0.212***							
Corporate tax rate (Heritage Foundation) (in percent)				-0.377***						
Total tax payable in percent of profit (World Bank, *Doing Business*)					-0.511***					
General govt. consumption as share of total consumption						0.361***				0.285***
Number of payments for taxes (World Bank, *Doing Business*)							0.148***			
Observations	5256	5256	5256	5256	5256	5256	5256	4110	4110	4110
R-squared	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12

Notes: Robust t-statistics in brackets.

* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Table 2a. Robustness Tests of Panel Regression of Share of Sales Reported to Tax Authorities on Regulatory and Fiscal Measures, 2002, 2004, and 2005

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Constant	48.182***	91.061***	91.261***	117.037***	32.212***	46.669***	32.848***	79.287***	44.592***	40.419***	39.304***
GDP per capita	0.001*	0.001***	0.001***	0.001***	0.001	0.001	0.003***	0.001***	0.002***	0.002***	0.002***
Small	-3.256***	-2.046***	-2.098***	-2.098***	-3.325***	-3.316***	-3.281***	-2.629***	-2.629***	-2.669***	-2.669***
Large	1.154	0.952	0.763	0.763	1.166	1.145	1.161	0.844	0.844	0.573	0.573
Export	1.454**	1.532**	1.270**	1.270**	1.537**	1.508**	1.466**	2.019***	2.019***	1.671**	1.671**
Foreign	2.591***	2.794***	2.975***	2.975***	2.535***	2.534***	2.596***	3.167***	3.167***	3.348***	3.348***
Audited	1.682***	0.796	0.744	0.744	1.605***	1.612***	1.691***	0.657	0.657	0.597	0.597
Fiscal burden index (Heritage Foundation)—higher index=greater burden	-1.493	-7.257***	-6.277***	-7.927***							
Size of government (Fraser)—higher index=smaller size					2.686**	4.181***	5.046***	0.926	5.116***	5.979***	4.605***
Regulation (Fraser)—higher index=less regulation	5.405***				4.686***						
Starting a new business (Fraser)—higher index=easier start						0.602*					
Administrative conditions/entry of new business (Fraser)—higher index=easier entry							1.137***				
Cost of closing business (in percent of estate) (World Bank, Doing Business)		-0.51						-0.333***			
Years to close business (World Bank, Doing Business)											
Procedures to deal with licenses (number) (World Bank, Doing Business)			-0.192						-2.009***		
Days to deal with licenses (World Bank, Doing Business)				-0.067***						-0.287***	0.002
Observations	11333	6990	7256	7256	11333	11159	11159	5430	5430	5696	5696
R-squared	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.12

Notes: Robust t-statistics in brackets.

* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Table 2b. Robustness tests for Panel Regression of Share of Sales Reported to Tax Authorities on Regulatory and Fiscal Measures, 2005

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Constant	173.594**	75.921***	93.254***	94.953***	99.579***	102.151**	94.757***	61.102***	47.367***	73.748***	74.585***	79.447***	88.880****	77.657***
GDP per capita	0.002***	0.002***	0.000***	0.000***	0.001***	0	0.002***	0.001***	0.001***	0.001***	0.001***	0.001***	0.000***	0.001***
Small	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***
Large	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.805
Export	2.234***	2.234***	2.234***	2.234***	2.234***	2.234***	2.234***	2.234***	2.234***	2.234***	2.234***	2.234***	2.234***	2.234***
Foreign	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***
Audited	0.614	0.614	0.614	0.614	0.614	0.614	0.614	0.614	0.614	0.614	0.614	0.614	0.614	0.614
Fiscal burden index (Heritage Foundation)—higher index=greater burden	-19.581***	-7.183***	-3.534**	-3.370**	-4.299***	-0.367	-10.797***							
Size of government (Fraser)—higher index=smaller size								1.810***	3.639***	0.625	1.309*	1.247*	1.384***	1.501**
Regulation (Fraser)—higher index=less regulation	-8.873***							1.861						
Starting a new business (Fraser)—higher index=easier start		1.732***							1.871***					
Administrative conditions/entry of new business (Fraser)—higher index=easier entry			0.81							3.376***				
Cost of closing business (in percent of estate) (World Bank, Doing Business)				0.022							0.124***			
Years to close business (World Bank, Doing Business)					-0.773**							-1.229***		
Procedures to deal with licenses (number) (World Bank, Doing Business)						-0.447***							0.014***	
Days to deal with licenses (World Bank, Doing Business)							-0.469***							-0.016***
Observations	5256	5256	5256	5256	5256	5256	5256	5256	5256	5256	5256	5256	5256	5256
R-squared	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12

Notes: Robust t-statistics in brackets.
* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Table 3. Robustness Test for Panel Regression of Share of Sales Reported to Tax Authorities on Legal and Fiscal Measures, 2002, 2004, and 2005

	2002, 2004, 2005			2005						2002
Constant	110.445***	337.010***	70.277***	87.616***	94.536***	84.407***	93.868***	95.654***	75.229***	69.803***
GDP per capita	-0.006***	-0.006***	0.001**	0.000***	0.000***	0	0.000***	0.002***	0.002***	0.000***
Small	-3.301***	-3.301***	-3.347***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-1.985
Large	0.172	0.172	1.069	0.805	0.805	0.805	0.805	0.805	0.805	3.080***
Export	1.165	1.165	1.489*	2.234**	2.234**	2.234**	2.234**	2.234**	2.234**	1.536
Foreign	2.580***	2.580***	2.451***	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***	2.277**
Audited	0.284	0.284	1.599*	0.614	0.614	0.614	0.614	0.614	0.614	4.556**
Fiscal burden index (Heritage Foundation)—higher index=greater burden							-2.756***	-8.992***	-6.596***	
Cost of registering property (in percent of property value) (World Bank, *Doing Business*)	-1.016***			-0.312***			-0.658***			
Cost of enforcing contracts (in percent of debt) (World Bank, *Doing Business*)		-8.089***			-0.652***			-0.381***		
Judiciary independence (Fraser)—higher index=greater independence			0.852**			1.635***			1.712***	1.944***
Observations	8783	8783	11159	5256	5256	5256	5256	5256	5256	4110
R-squared	0.1	0.1	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12

Notes: Robust t-statistics in brackets.

* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Table 4. Panel Regression of Share of Sales Reported to Tax Authorities on Measures of Corruption

	2002, 2004, 2005			2005			2002		
Constant	61.053***	68.421***	68.248***	81.718***	90.135***	99.333***	74.174***	69.135***	69.192***
GDP per capita	0.002***	0.002***	0.002***	-0.001***	0	0.001***	0.002***	0.000**	0.000**
Small	-3.644***	-3.874***	-3.879***	-2.652***	-2.652***	-2.652***	-1.782	-1.985	-1.985
Large	1.404	1.36	1.358	0.805	0.805	0.805	3.101***	3.080****	3.080***
Export	0.939	1.407**	1.404**	2.234**	2.234**	2.234**	1.456	1.536	1.536
Foreign	2.952***	2.762***	2.749***	2.970***	2.970***	2.970***	2.251**	2.277**	2.277**
Audited	2.372***	2.438***	2.451***	0.614	0.614	0.614	4.508**	4.556**	4.556**
Corruption perceptions index (Transparency International)—higher index=less corruption	2.204			3.552***			-3.831***		
Irregular payments (Fraser)—higher index=less irregular payments		0.654*			-0.479***			0.386	
Time with government bureaucracy (Fraser)—higher index=less time			-0.09			-4.090***			0.35
Observations	19726	17492	17492	5256	5256	5256	3949	4110	4110
R-squared	0.17	0.17	0.17	0.12	0.12	0.12	0.12	0.12	0.12

Notes: Robust t-statistics in brackets.
* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Table 5a. Robustness Tests of Panel Regression of Share of Sales Reported for Tax Purposes on Labor Market and Fiscal Variables, 2002, 2004, and 2005

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Constant	42.926**	-311.950**	141.534***	51.888***	46.997***	46.975***	-12.337***	-344.068**	43.095***	43.658***	99.392***
GDP per capita	0	0.007***	-0.008***	0	0	0.002***	0.000***	0.008***	0	0	-0.006***
Small	-3.144***	-4.006***	-4.006***	-3.286***	-3.334***	-2.669***	-4.006***	-4.006***	-3.350***	-3.351***	-4.006***
Large	1.343	-0.116	-0.116	1.173	1.189	0.573	-0.116	-0.116	1.169	1.182	-0.116
Export	1.696*	1.465*	1.465*	1.470*	1.450*	1.671*	1.465*	1.465*	1.550*	1.550*	1.465*
Foreign	2.565***	2.841***	2.841***	2.599***	2.615***	3.348***	2.841***	2.841***	2.507***	2.521***	2.841***
Audited	1.611*	0.05	0.05	1.602*	1.648*	0.597	0.05	0.05	1.665*	1.628*	0.05
Size of government (Fraser)—higher index=smaller size	5.812**	44.133***	-5.673***	3.603***	4.435***	9.692***	22.956***	50.824***	4.947***	4.746***	0.934**
Labor market regulations (Fraser)— higher index=less regulations	-1.112										
Difficulty of hiring index (World Bank, *Doing Business*)—higher index=more difficult		2.352***									
Difficulty of firing index (World Bank, *Doing Business*)—higher index=more difficult			0.298***								
Unemployment insurance (Fraser)—higher index=less unemployment insurance				1.273***							
Impact of minimum wage index (Fraser)—higher index=less impact					5.381						
Hiring cost (in percent of salary) (World Bank, *Doing Business*)						-1.164***					
Rigidity of hours index (World Bank, *Doing Business*)—higher index=more rigid							-0.560***				
Rigidity of employment index (World Bank, *Doing Business*)—higher index=more rigid								1.829***			
Labor force share with wages set by centralized collective bargaining (Fraser)—higher index=lower share									-0.523		
Hiring and firing practices (Fraser)—higher index=more hiring/firing										-0.377	
Firing cost (weeks of wages) (World Bank, *Doing Business*)											0.013***
Observations	10603	7223	7223	11333	11333	5696	7223	7223	11159	11159	7223
R-squared	0.11	0.1	0.1	0.11	0.11	0.12	0.1	0.1	0.11	0.11	0.1

Notes: Robust t-statistics in brackets.

* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Table 5b. Robustness Tests for Panel Regression of Share of Sales Reported to Tax Authorities on Labor Market and Fiscal Variables, 2002, 2004, and 2005

	2002, 2004, 2005			2005										2002	
Constant	80.098***	79.197***	96.393***	109.861***	92.144***	107.090***	89.487***	92.537***	64.101***	85.919***	92.703***	104.747***	100.858***	71.645***	77.155***
GDP per capita	0.001*	0.001*	0.001***	0.001***	0	0.000***	0	0	0.001***	0.001***	0.000***	0.000***	0.001***	0.001***	0.000***
Small	-3.248***	-3.310***	-2.098***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-2.652***	-1.985	-1.985
Large	1.172	1.177	0.763	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.805	0.805	3.080***	3.080***
Export	1.453*	1.421*	1.27	2.234**	2.234**	2.234**	2.234**	2.234**	2.234**	2.234**	2.234**	2.234**	2.234**	1.536	1.536
Foreign	2.600***	2.608***	2.975***	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***	2.970***	2.277**	2.277**
Audited	1.572*	1.619*	0.744	0.614	0.614	0.614	0.614	0.614	0.614	0.614	0.614	0.614	0.614	4.556**	4.556**
Fiscal burden index (Heritage Foundation)—higher index=greater burden	-2.429*	-2.456*	-8.180***	-10.462***	-1.578***	-5.723***	-1.948***	-1.710***				-5.697***	-11.079***	-1.021***	-1.300***
Size of Government--Fraser--higher index=smaller size									2.452***	0.055	0.561***				
Administrative conditions/entry of new business (Fraser)—higher index=easier entry							1.263***					0.804***			2.698***
Cost of closing business (in percent of estate) (World Bank, *Doing Business*)								-0.031***					0.316***		
Unemployment insurance (Fraser)--higher index=less unemployment insurance	1.460***			-1.783***					0.539***					0.951***	
Impact of minimum wage index (Fraser)—higher index=less impact	4.090***				1.602***		1.338***	1.643***		0.631***					
Hiring cost (in percent of salary) (World Bank, *Doing Business*)			-0.139***			-0.204***			-0.317***			-0.199***	-0.098***		-0.768**
Observations	11333	11333	7256	5256	5256	5256	5256	5256	5256	5256	5256	5256	5256	4110	3968
R-squared	0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12

Notes: Robust t-statistics in brackets.

* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

DATA

Variable and Source	Available years and countries
Share of Sales Reported to Tax Authorities (Investment Climate Assessment)	2001: Serbia and Montenegro, Mozambique. 2002: Albania, Algeria, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, China, Croatia, Czech Republic, Eritrea, Estonia, Georgia, Hungary, Latvia, Lithuania, Macedonia, Moldova, Peru, Poland, Romania, Russian Federation, Slovak Republic, Slovenia, Turkey, Ukraine, Zambia. 2004: Bulgaria, Egypt, Sri Lanka. 2005: Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Latvia, Lithuania, Macedonia, Madagascar, Moldova, Poland, Romania, Russian Federation, Serbia and Montenegro, Slovak Republic, Slovenia, Turkey, Ukraine.
Measures of fiscal burden	
Size of Government (Fraser Institute), higher index=smaller size, lagged by 2 years	All years and countries except Serbia and Montenegro, Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Fiscal burden index (Heritage Foundation), higher index=greater burden	All years and countries except Serbia and Montenegro.
Income Tax Rate (Heritage Foundation)	2005 for all countries except Serbia and Montenegro.
Corporate Tax Rate (Heritage Foundation)	2005 for all countries except Serbia and Montenegro.
Total tax payable in percent of profit (World Bank Doing Business)	2005 for all countries.
General government consumption as share of total consumption (Fraser Institute)	2002–2005 for all countries except Serbia and Montenegro (2002–2005), Macedonia (2002), Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Hours for paying taxes (World Bank Doing Business)	2005 for all countries.
Number of Payments for taxes number (World Bank Doing Business)	2005 for all countries.

Measures of regulatory burden	
Regulation (Fraser Institute), higher index=less regulation	2002–2005 for all countries except Serbia and Montenegro (2002–2005), Macedonia (2002), Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Starting a new business (Fraser Institute), higher index=easier start	2002–2005 for all countries except Serbia and Montenegro (2002–2005), Macedonia (2002), Albania (2005), Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Administrative Conditions/Entry of New Business (Fraser Institute), higher index=easier entry	2002–2005 for all countries except Serbia and Montenegro (2002–2005), Macedonia (2002), Albania (2005), Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Price controls (Fraser Institute), higher index=less controls	2002–2005 for all countries except Serbia and Montenegro (2002–2005) and Macedonia (2002), Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Regulatory quality (World Bank Governance Indicators), higher index=better regulation	2001, 2005 for all countries.
Minimum capital for starting a business (in percent of income per capita) (World Bank Doing Business)	2003–2005 for all countries.
Cost of starting a business (in percent of income per capita) (World Bank Doing Business)	2003–2005 for all countries.
Days to start a business (World Bank Doing Business)	2003–2005 for all countries.
Number of procedures to start a business (World Bank Doing Business)	2003–2005 for all countries.
Cost of dealing with licenses (in percent of income per capita) (World Bank Doing Business)	2005 for all countries.
Days to deal with licenses (World Bank Doing Business)	2005 for all countries.
Number of procedures to deal with licenses (World Bank Doing Business)	2005 for all countries.
Recovery rate for closed business (cents on the dollar) (World Bank Doing Business)	2005 for all countries.

Cost of closing business (in percent of estate) (World Bank Doing Business)	2005 for all countries except Madagascar (2005).
Years to close business (World Bank Doing Business)	2005 for all countries except Madagascar (2005).
Measures of labor market regulation	
Labor Market Regulations (Fraser Institute), higher index=less regulations	2002–2005 for all countries except Serbia and Montenegro (2002–2005), Macedonia (2002), Albania (2002, 2005), Croatia (2002), Algeria (2002), Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Difficulty of Hiring Index (World Bank Doing Business), higher index=more difficult	2004–2005 for all countries.
Difficulty of Firing Index (World Bank Doing Business), higher index=more difficult	2004–2005 for all countries.
Unemployment insurance (Fraser Institute), higher index=less unemployment insurance	2002–2005 for all countries except Serbia and Montenegro (2002–2005) and Macedonia (2002), Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Impact of minimum wage index (Fraser Institute), higher index=less impact	2002–2005 for all countries except Serbia and Montenegro (2002–2005) and Macedonia (2002), Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Hiring and firing practices (Fraser Institute), higher index=more hiring/firing	2002–2005 for all countries except Serbia and Montenegro (2002–2005), Macedonia (2002), Albania (2005), Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Labor force share with wages set by centralized collective bargaining (Fraser Institute), higher index=lower share	2002–2005 for all countries except Serbia and Montenegro (2002–2005), Macedonia (2002), Albania (2005), Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Hiring cost (in percent of salary) (World Bank Doing Business)	2005 for all countries.
Rigidity of hours index (World Bank Doing Business), higher index=more rigid	2004–2005 for all countries.
Rigidity of employment index (World Bank Doing Business), higher index=more rigid	2004–2005 for all countries.
Firing cost (weeks of wages) (World Bank Doing Business)	2004–2005 for all countries.

Measures of law and order and property rights	
Property Rights Score (Heritage Foundation), higher index=worse property rights	2001–2005 except for Serbia and Montenegro (2005).
Number of procedures for registering property (World Bank Doing Business)	2004, 2005 for all countries.
Days to register property (World Bank Doing Business)	2004, 2005 for all countries.
Cost of registering property (in percent of property value) (World Bank Doing Business)	2004, 005 for all countries.
Number of procedures for enforcing contracts (World Bank Doing Business)	2003–2005 for all countries.
Days to enforce contracts (World Bank Doing Business)	2003–2005 for all countries.
Cost of enforcing contracts (in percent of debt) (World Bank Doing Business)	2003–2005 for all countries.
Law and Order (Fraser Institute), higher index=more law and order	2002–2005 for all countries except Serbia and Montenegro (2002–2005) and Macedonia (2002), Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Legal System & Property Rights (Fraser Institute), higher index=better legal system	2002–2005 for all countries except Serbia and Montenegro (2002–2005) and Macedonia (2002), Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Impartial courts (Fraser Institute), higher index=more impartial	2002–2005 for all countries except Serbia and Montenegro (2002–2005) and Macedonia (2002), Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Judiciary independence (Fraser Institute), higher index=greater independence	2002–2005 for all countries except Serbia and Montenegro (2002–2005), Macedonia (2002), Albania (2005) , Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Rule of law (World Bank Governance Indicators), higher index=better rule of law	2001, 2005 for all countries.

Corruption measures	
Corruption perceptions index (Transparency International), higher index=less corruption	2001–2005 for all countries except Serbia and Montenegro (2001) and Macedonia (2002), Armenia (2002), Bosnia and Herzegovina, Mozambique.
Irregular payments (Fraser Institute), higher index=less irregular payments	2002–2005 for all countries except Serbia and Montenegro (2002–2005), Macedonia (2002), Albania (2005), Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Time with government bureaucracy (Fraser Institute), higher index=less time	2002–2005 for all countries except Serbia and Montenegro (2002–2005), Macedonia (2002), Albania (2005), Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia (2002), Kazakhstan, Moldova, Mozambique (2001).
Control of Corruption (World Bank Governance Indicators), higher index=less corruption	2001, 2005 for all countries.

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