CHAPTER 2

Public Finance Systems in Transition Countries

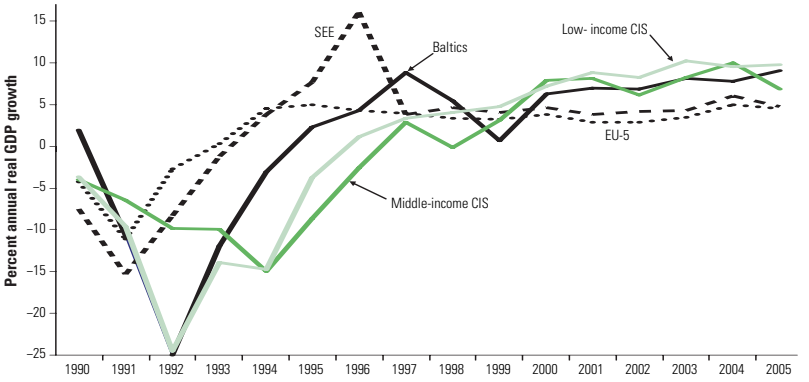
Tracey Lane
with contributions from
Andrzej Rzonca, Emilia Skrok, and Olga Vybornaia

The Europe and Central Asia (ECA) region comprises a diverse group of countries that have all undergone dramatic changes since the early 1990s, as they have moved from socialism toward market economies. The region suffered a major economic downturn in the early 1990s but has rebounded over the past 15 years (figure 2.1). Growth resumed in the early 1990s in Central Europe[1] and the Baltics[2]—the countries that became members of the European Union in 2004 (the EU-8)—following rapid structural reforms. Growth rebounded in Southeastern Europe (SEE)[3] following the end to regional hostilities in the mid-1990s, and in the Commonwealth of Independent States (CIS)[4] following the financial crisis in the Russian Federation in the late 1990s. The economic recovery in Russia, the favorable global trading environment, and high commodity prices have sustained high growth rates in the CIS and the Baltics, whereas growth has remained positive but not as strong in Central and Southeastern Europe. Average real GDP growth for the ECA region was 7.1 percent in 2005, which compares favorably with most other developing regions.

Are there links between these patterns of growth and public finance policies in ECA countries? This chapter examines fiscal patterns in the ECA region over the period 1995 to 2005. The analysis is followed in chapter 3 by an empirical examination of the relationship

FIGURE 2.1

ECA Regional Growth Performance, 1990–2005



Sources: National authorities; IMF and World Bank estimates.

between fiscal policy and economic growth. While fiscal policy is not solely concerned with promoting economic growth and there are many other objectives (for example, social improvement, redistribution, and equity concerns), it is interesting to examine how far fiscal adjustment, size and composition of spending, and tax policy have changed during this dynamic period in the region, and to explore (in chapter 3) to what extent these changes were supportive of the economic growth that followed.

The economic downturns in the early years of transition led to major upheavals in intraregional fiscal transfers that contributed to large fiscal imbalances, particularly in the countries of the former Soviet Union (FSU) and former Yugoslavia. Since then, governments have undertaken macroeconomic stabilization and fiscal adjustments, and fiscal balances have been restored through a combination of reductions in public spending and increases in revenues. However, the size of government (the size of general government expenditure in proportion to GDP) and the composition of spending vary markedly across ECA countries, and significant cross-country differences in fiscal balances and the level of public debt also remain. In Central and Eastern Europe, the size and composition of public spending now approximate that of Western European members of the EU (the EU-15[5]). In the CIS, however, the economic recovery has led to increased public spending, but the size of government is much closer to that in fast-growing Asian comparators.

With the exception of low-income CIS,[6] the average size of public sector spending in ECA is significantly above international norms at

similar levels of per capita income. Influenced by a history of state-sponsored provision of welfare and social security throughout the life cycle, ECA countries tend to spend more on social protection than do other countries, and this spending has increased in the past five years. Public transfers are important components of household income, especially for the poor, and play a valuable role in reducing poverty. However, high levels of spending can also threaten fiscal sustainability and impose heavy tax burdens on the private sector, which in turn can adversely affect economic growth and poverty reduction. Furthermore, most ECA countries have aging populations, and government policy will need to balance demands on public spending today with economic growth tomorrow. Poverty reduction without growth is rare, and continued growth will be critical for funding social spending in the future.

Fiscal Stabilization and Debt Dynamics

This section looks at the experience of fiscal stabilization and public debt during the transition. The early transition was characterized by a massive upheaval in public finances. Households were hit by multiple shocks, and output and incomes plummeted. With the removal of employment guarantees in state-owned enterprises, open and hidden unemployment increased rapidly, putting pressure on the state to respond with cash transfers and social assistance. At the same time, the fall in output and reforms in public enterprises led to falling government revenues. The combined effect was deterioration in fiscal performance and an increase in public debt.

Reflecting the shock of transition, fiscal deficits in ECA have on average been higher than the average in other regions, as well as higher than the average for the seven fast-growing comparator countries—Chile, Ireland, the Republic of Korea, Spain, Thailand, Uganda, and Vietnam. These countries experienced per capita growth in excess of 4 percent for the last 10 years, and examples from this group's experience are drawn upon throughout the report (table 2.1). Deficits were as high as 20 percent of GDP during the 1990s in some low-income CIS countries, many of which had previously depended on transfers from the Soviet Union. The end to these transfers led to huge declines in government revenue for these countries, with difficulties exacerbated by multiple military conflicts that broke out in the early 1990s. Deficits were lowest in the EU-8 countries, which managed to avoid prolonged fiscal crises because of better diversification and closer trade and investment links with the European Union (EU).

TABLE 2.1

Fiscal Balance in ECA Countries, 1989–2005

	Fiscal balance (% of GDP)				Primary fiscal balance (% of GDP)			
Countries	1989–2005	1989–95	1996–2001	2002–05	1989–2005	1989–95	1996–2001	2002–05
EU-8	-2.7	-2.4	-2.8	-3.1	-0.8	-0.6	-0.5	-1.3
Southeastern Europe	-4.3	-6.1	-4.4	-2.2	-0.8	-0.8	-1.1	-0.3
Middle-income CIS	-3.7	-6.9	-3.0	1.0	-1.3	-6.2	-0.9	1.9
Low-income CIS	-5.5	-9.4	-4.3	-1.1	-3.0	-9.2	-2.7	-0.1
Turkey	-	-	-15.2	-9.9	-	-	3.8	6.3
EU-15	-2.4	-4.3	-0.8	-1.4	0.8	-0.6	2.6	0.7
Non-EU high-income OECD[a]	-0.8	-2.5	0.6	0.2	1.1	-0.3	2.6	1.3
High-income OECD outside Europe[b]	-1.9	-3.0	-0.8	-1.5	0.7	0.3	1.6	-0.1
Fast-growing Asia[c]	0.1	1.5	-0.7	-1.0	2.2	3.7	1.7	1.0
Latin America[d]	-2.3	-1.7	-2.7	-2.6	1.3	1.7	0.7	1.6
Fast-growing comparators[e]	-1.0	-1.5	-0.9	-0.3	0.9	0.9	1.2	0.7

Source: IMF, World Economic Outlook database.

a. Australia, Canada, Iceland, Japan, New Zealand, Norway, Switzerland, and the United States.

b. Australia, Canada, Japan, New Zealand, and the United States.

c. China, Hong Kong (China), Indonesia, Republic of Korea, Malaysia, Singapore, Taiwan, and Thailand. The table does not include data for Korea. Primary fiscal deficit includes data for China, Indonesia, and Singapore only.

d. Argentina, Bolivia, Brazil, Chile, Mexico, Paraguay, Peru, Uruguay, and República Bolivariana de Venezuela.

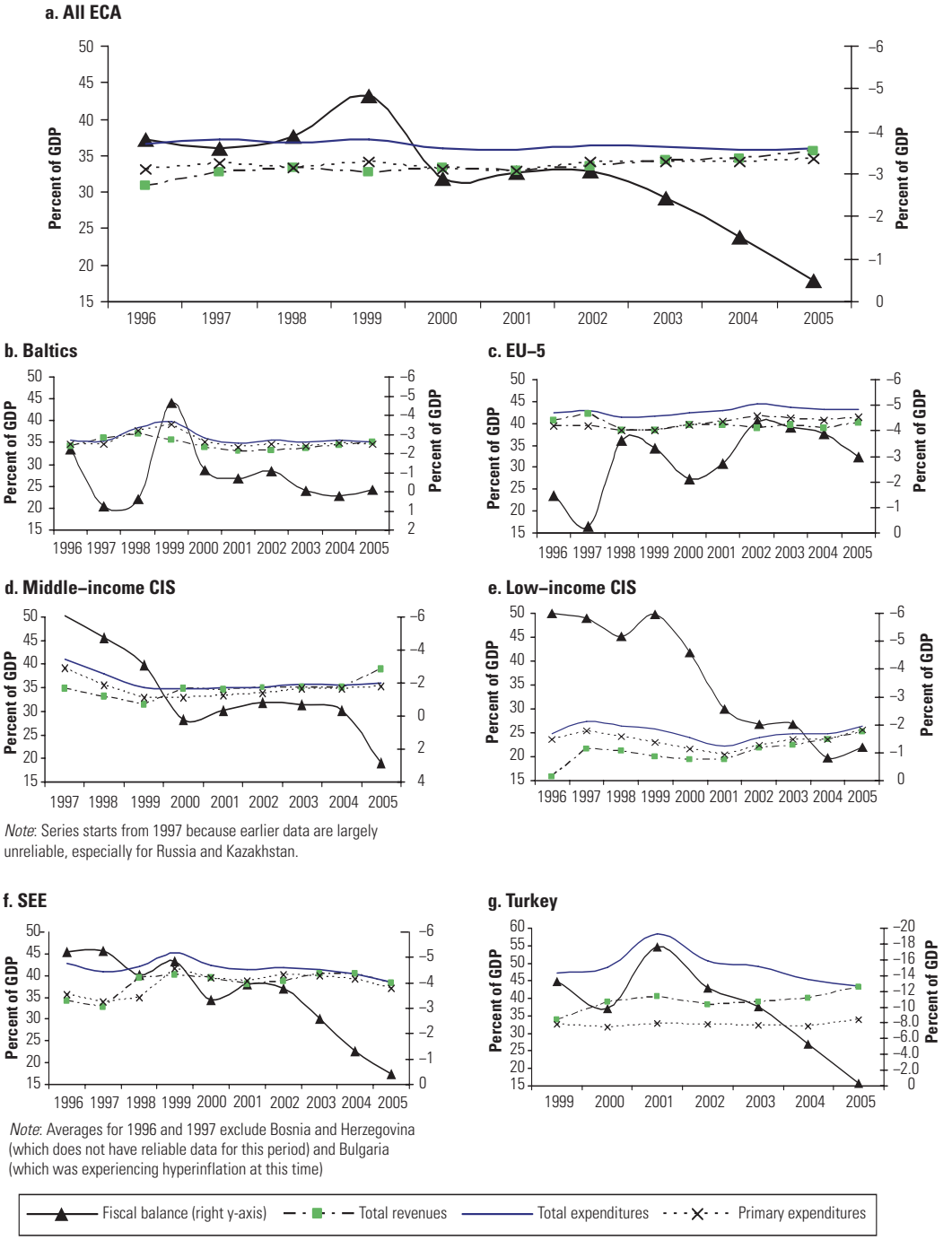
e. Chile, Ireland, Spain, Thailand, Uganda, and Vietnam. The table does not include data for Korea. Primary fiscal deficit does not include data for Thailand.

Macroeconomic stabilization aimed at curbing inflation eventually resulted in large fiscal adjustments and a reduction in unsustainably high fiscal deficits. The process of stabilization was not smooth, however, and in most subregions the fiscal deficit became sustainable only at the end of the 1990s, following a period of fiscal laxity caused by financial crises, regional armed conflicts, or politically motivated spending booms (or a combination). Figure 2.2 shows the evolution of the fiscal balance, public spending, and revenue as a share of GDP for the ECA region as a whole and for five subregions: the Baltics, EU-5, middle-income CIS,[7] low-income CIS, and SEE; and for Turkey (using data as described in box 2.1). Turkey's story is different from the others, of course, because it has long been a market economy and did not experience the same transition from socialism as other countries in the ECA region.

Fiscal consolidation has advanced markedly in CIS, most of SEE, and Turkey. In the middle-income CIS, fiscal balances improved through a combination of expenditure reductions (mostly pre-2000) and gradual revenue improvements. In Azerbaijan and, to a lesser extent, Russia, post-2000 revenue improvements were buoyed by high commodity prices, which led to improvements in the fiscal balance. Low-income CIS countries have similarly seen revenues recover

FIGURE 2.2

Fiscal Balance, Total Revenues, Total Expenditures, and Primary Expenditures in ECA, 1996–2005



Note: Series starts from 1997 because earlier data are largely unreliable, especially for Russia and Kazakhstan.

Note: Averages for 1996 and 1997 exclude Bosnia and Herzegovina (which does not have reliable data for this period) and Bulgaria (which was experiencing hyperinflation at this time)

Source: ECA fiscal database.
Note: Data show unweighted averages.

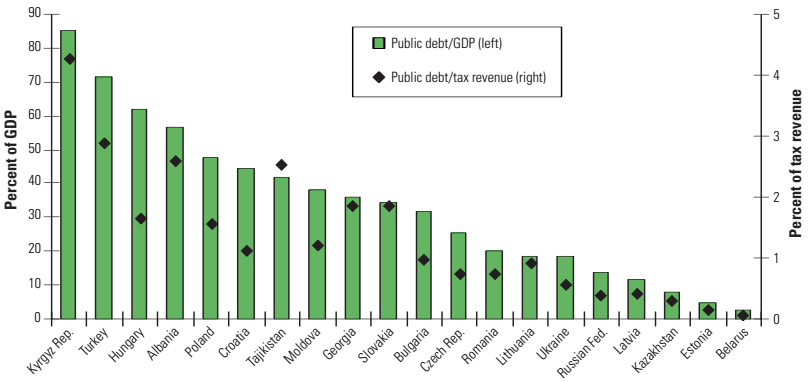
and have even managed to increase public spending in proportion to GDP while bringing down huge fiscal deficits to less than 1 percent of GDP on average. The countries of SEE have reduced their fiscal deficits through controlled public spending and moderate increases in revenues. The deficit has been substantial (more than 4 percent of GDP) in Albania and Croatia, while most other SEE countries run surpluses. In Turkey, resolute fiscal consolidation was initiated after the 2001 crisis, with the general government primary surplus kept above 6 percent of GDP since 2002, although the overall deficit has remained significant because of large interest payments on public debt.

In the EU-8, Maastricht criteria have constrained fiscal policies, and the fiscal deficit has stabilized at around -2 percent of GDP on average, but fiscal performance has been uneven among countries. In particular, fiscal adjustment lost momentum in the early 2000s in the Central European countries that had recently joined the EU. Although these countries managed to keep public expenditure under control during the early transition recession, they did not take full advantage of the fast growth recovery to reinforce public finances. After the Russian crisis, large fiscal imbalances returned, so that fiscal deficits in Hungary, Poland, the Czech Republic, and the Slovak Republic were on average larger in the mid-2000s than the late 1990s (table 2.1).

In response to the fiscal imbalances, public-debt-to-GDP ratios increased in most of the ECA region during 1994–2001.[8] Since then, improvements in fiscal balances have brought public debt ratios down

FIGURE 2.3

Gross Public Debt as a Share of GDP and Tax Revenue, 2005



Sources: Eurostat, IMF, and World Bank ECA data set.

Note: Tax revenues include social security contributions.

to more sustainable levels. In all but four ECA countries, gross public debt in 2005 was below 50 percent of GDP (figure 2.3). Among middle-income countries in Europe, public debt ratios are highest in Turkey, Hungary, and SEE (in particular, Croatia). In low-income CIS, debt is relatively high in the Kyrgyz Republic and, to a lesser extent, Moldova. By contrast, public debt in proportion to GDP is low in middle-income CIS, the Baltic countries, and Azerbaijan.

Despite ambitious adjustment in the region, several countries still have remaining fiscal imbalances and accumulated debt stock that

BOX 2.1

Data Sources and Issues

The study used fiscal data compiled according to *A Manual on Government Financial Statistics* 1986 (GFS 1986), consolidated at the general government level by the Ministry of Finance or the IMF, as reported by World Bank country teams. For non-ECA countries, data were collected from World Bank country teams, the IMF World Economic Outlook database, and OECD publications (where applicable). Series expressed in percentage of GDP were calculated using World Development Indicators GDP numbers.

The GFS 1986 standard was selected as the common denominator for all ECA countries to ensure consistency and comparability across countries and time. Eurostat (ESA 95 reporting framework) and GFS 2001 data have been used mostly for cross-comparison purposes, because only a subsection of ECA countries report under these standards. Because of methodological issues, some discrepancies exist between GFS 1986, ESA 95, and GFS 2001 (see references in note for detailed discussion of these differences). Some data gaps in early years were not possible to fill because of national reporting constraints or unreliability of fiscal data in the early transition period, or both.

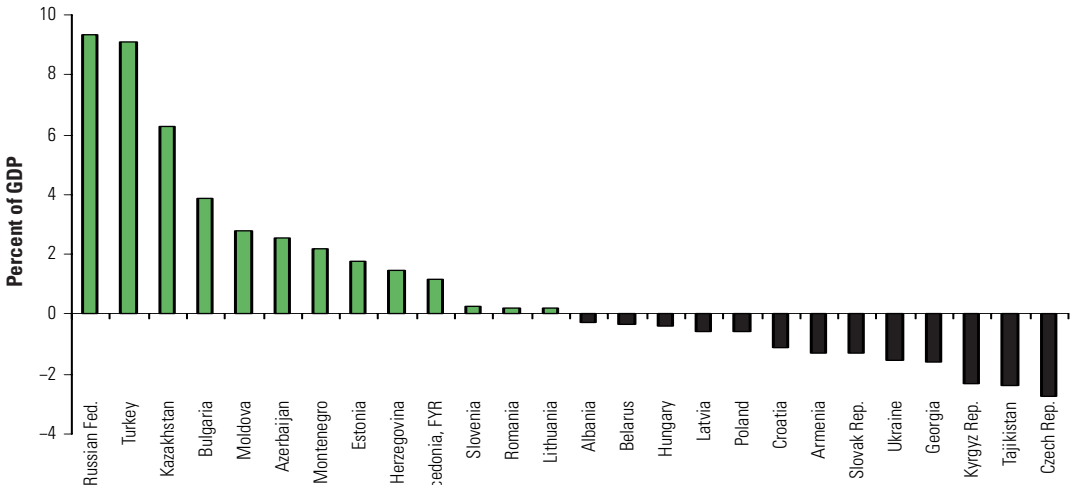
Official GDP figures in some countries (such as Bosnia and Herzegovina, Turkey, and Ukraine) are widely considered to be understated because they do not take the informal sector fully into account. A number of ECA countries have already adjusted GDP figures upward in an effort to account for the informal sector, and others are planning to do so in the near future. This study relies in all cases on official figures as reported by government authorities and makes no such additional adjustment. It should also be noted that the deflator for public expenditures may sometimes diverge from the GDP deflator, and caution should be used in interpreting expenditure-to-GDP ratios and assessing the size of the fiscal adjustment.

Note: "Government Finance Statistics Manual 2001 Companion Material: Classification of GFSM 1986 Data to *GFSM 2001* Framework," published by the IMF in 2002. "The Government Finance Statistics Manual 2001 and its Relationship with the European System of Accounts 1995," published by the IMF in 2004.

raise concerns of fiscal sustainability. Fiscal imbalances fundamentally hinder growth when they pose a risk of debt distress—that is, when the primary fiscal balance is inconsistent with the long-term sustainability of public debt under plausible circumstances. The public debt ratio will then increase, leading to rollover risk, higher real interest rates, and lower investor confidence, and eventually jeopardizing macroeconomic stability and prospects for long-run growth. Several ECA countries have generated sizeable primary fiscal surpluses that mitigate the risks of debt distress and allow for debt reduction (figure 2.4). However, in about half of ECA countries, primary fiscal balances are still in deficit. Primary fiscal deficits have been significant in recent years in four Central European countries (Hungary, Poland, the Slovak Republic, and the Czech Republic) as well as in Albania, Croatia, and the Kyrgyz Republic. In these countries, under normal circumstances (where real interest rates exceed long-term growth), the public debt ratio will have a tendency to increase—barring debt revaluations due to exchange rate appreciation or debt repayments due to one-off revenues such as privatization receipts. In countries lying below the "prudent zone" this does not necessarily imply that they should borrow more, and unfunded public sector and contingent liabilities need to be taken into consideration as well as future pressures on spending.

FIGURE 2.4

Primary Fiscal Balance, 2005



Sources: World Bank ECA data set; Eurostat.

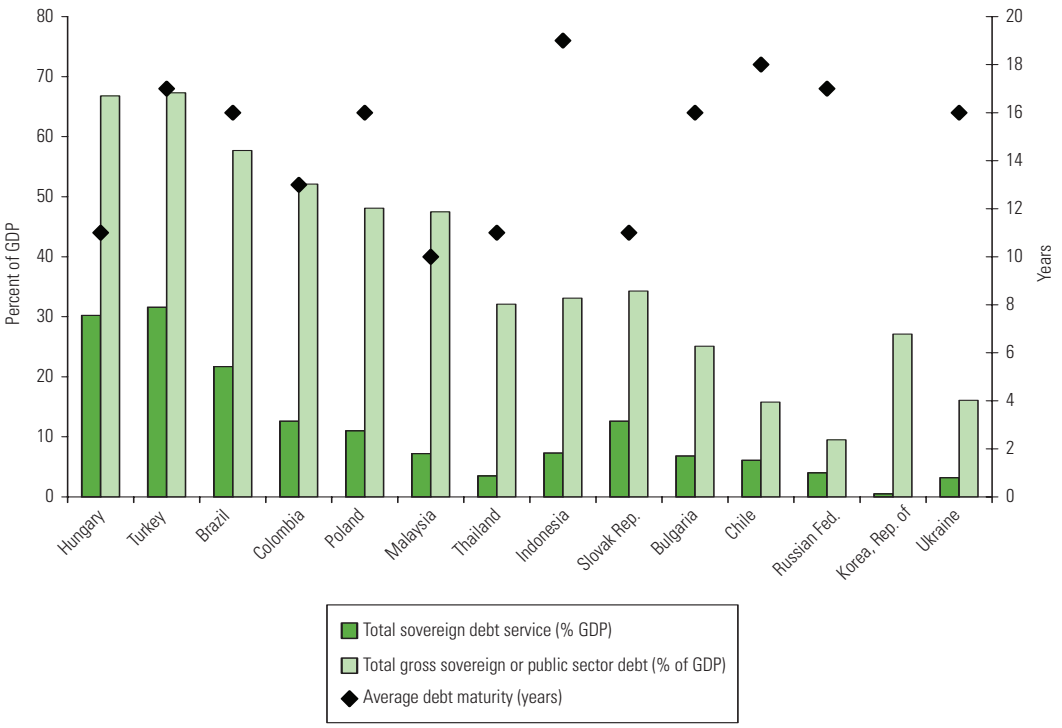
Note: Primary fiscal balance is defined here as total revenues (including interest and privatization revenues) minus primary (noninterest) expenditures.

Debt tolerance also depends on the quality of debt management and fiscal institutions. Even in countries where measured fiscal imbalances or public debt ratios (or both) seem low in international comparison, fiscal risks may arise from poorly managed contingent liabilities of the public sector—such as unfunded pension liabilities, distressed public utilities, nonperforming assets of state-owned banks, or debt guarantees issued for various public sector entities (state-owned enterprises, local administrations, trading offices). Off-budget activities may also add to public debt.

Financing conditions have been particularly favorable in recent years, as many ECA countries managed to borrow at a cost lower than their output growth. Favorable conditions on global financial markets, reflecting subdued inflation and exceptionally large savings and liquidity, contributed to this positive outcome.[9] However, this

FIGURE 2.5

Public Sector Debt, Debt Service, and Average Public Debt Maturity for Selected Emerging Market Economies, 2006



Sources: JP Morgan 2006, 2007; World Bank World Development Indicators.

Note: Public sector debt includes gross external and domestic sovereign debt. Debt service includes amortization and interest payments. Average official debt maturity is the ratio of official debt to debt amortization.

may not be sustained in the future if global liquidity conditions become tighter. Sudden reversals in capital flows could disrupt growth through higher interest rates and exchange rates, and stronger adjustments may be required to maintain fiscal sustainability. Mitigating such risks and stabilizing public debt at current levels would argue for running higher primary fiscal surpluses than those seen in recent years in several ECA countries.

In some instances, low-debt countries with strong institutions could find additional borrowing to be an attractive option to finance growth-promoting expenditure programs or tax reforms. Such debt could be serviced out of growing revenues in the future, assuming that the increased fiscal space is used wisely to finance growth-promoting expenditures in key areas such as education, infrastructure, and health care. Pension reforms that entail a transitional fiscal cost but provide long-term fiscal savings—for example, moving to a partly privately funded pension system—could also be financed by additional debt in these countries. Similarly, debt could be used to finance tax reforms that encourage investment and job creation yet entail a temporary fiscal cost. However, these are risky approaches and should be undertaken only when the likelihood of policy reforms or productivity-enhancing spending is strong, and other future claims on spending are also taken into consideration.

Patterns of Fiscal Adjustment and Public Spending

This section considers patterns of fiscal adjustment, and the success of adjustment is further considered in chapter 3. Fiscal consolidation has been achieved through a combination of cuts in public expenditure and increases in public revenues. The largest revenue increases since 1996 have occurred in low-income CIS countries, where primary expenditures have stabilized at about 25 percent of GDP (figure 2.2e). In middle-income CIS countries, public expenditure reductions have been more prominent, and primary expenditures have stabilized at a higher level of around 35 percent of GDP (figure 2.2d). Fiscal consolidation in these countries has been supported by buoyant revenues, in part reflecting high primary commodity prices. In SEE countries, expenditures and revenues both rose after 1997, with primary expenditures converging on average to around 40 percent of GDP (figure 2.2f). In Central European EU-5 countries, public expenditure in proportion to GDP has remained stable in the years following the early transition adjustment, with an upward trend in the early 2000s that worsened fiscal balances but with some recent recovery (figure 2.2c).

In contrast, in the three Baltic countries that joined the EU, general government primary expenditures are somewhat lower, at around 35 percent of GDP, and revenues have remained stable despite ambitious flat tax reforms (see discussion in chapter 8) (figure 2.2b). Turkey has been a notable exception to the overall ECA fiscal adjustment pattern. Turkey's ambitious fiscal consolidation has relied mainly on revenue-increasing measures rather than primary expenditure cuts, although steps have been taken recently to improve priority setting in public spending (figure 2.2g).

For purposes of this study, fiscal consolidation episodes were identified based on thresholds of fiscal deficit reductions. An episode of fiscal adjustment is defined as a period in which the general government primary balance improved by at least 2 percentage points of GDP within a year, or by 1.5 percentage points of GDP per year over two consecutive years (Purfield 2003).[10] Since 1991, 32 episodes fall within this definition: 5 in EU-8, 10 in SEE, 5 in middle-income CIS, 11 in low-income CIS, and 1 in Turkey. In two other episodes, improvements in primary balance were close to the threshold, and thus were added to the data set. The average size of adjustments in these episodes was 4.3 percentage points of GDP, with the 10 largest adjustments reaching an average 6.6 percentage points of GDP.

The 34 adjustment episodes are classified into four groups according to whether they were driven by (a) expenditure cuts exclusively; (b) expenditure cuts primarily; (c) tax revenue increases primarily; or (d) tax revenue increases exclusively[11] (see table 2.2):

- Fiscal adjustments were driven exclusively or primarily by expenditure cuts in the majority (19 out of 34) of identified episodes.
- Fiscal adjustments based exclusively on expenditure cuts were on average stronger than the other episodes.
- Expenditure cuts were larger when the initial primary fiscal deficit was large and the overall fiscal adjustment thus had to be ambitious. By contrast, tax revenue increases were more dominant when initial imbalances were moderate.
- Adjustments based only on expenditure reductions were more common in countries with high public spending as a share of GDP (40.3 percent on average) and a strong tax effort (see "Structure of Revenues in ECA" later in this chapter for a definition and analysis of tax effort). In contrast, exclusively tax revenue–driven adjustments prevailed in countries where the tax burden was initially low (25.2 percent of GDP on average), the tax effort was limited and public expenditures were low in proportion to GDP (27.2 percent on average).

TABLE 2.2

Features of Fiscal Adjustments in ECA, 1996–2004, percentage of GDP

Basis for adjustment	Number	Change in expenditures	Change in revenue	Fiscal adjustment	Initial primary balance	Public debt before adjustment	Expenditures before adjustment	Revenue before adjustment	Initial tax effort
Expenditure cuts only	11	-8.3	-3.2	5.1	-5.9	38.1	40.3	34.4	1.16
Expenditure cuts mostly	8	-2.4	1.1	3.5	-3.7	24.8	30.9	27.2	0.91
Revenue increases mostly	6	-1.1	3.1	4.2	-2.9	43.0	39.3	36.5	1.20
Revenue increases only	9	0.6	4.7	4.1	-2.0	41.9	27.2	25.2	0.90

Source: ECA fiscal database.

Large and sustained fiscal corrections typically resulted in sizeable reductions in primary spending in a short period. For example, primary spending as a share of GDP fell by 17.5 percentage points in Hungary and 15.8 percentage points in the former Yugoslav Republic of Macedonia between 1993 and 1997, a one-third reduction in four years. Similar adjustments took place in the CIS countries at the end of the 1990s. In Moldova, primary spending fell by over 40 percent (19.2 percentage points of GDP) between 1997 and 2001, and in Russia, spending fell by one-third (or 13.5 percentage points of GDP) between 1997 and 2000. Table 2.3 lists episodes of sustained reduction in primary expenditures, defined as reductions for three or more consecutive years.

As noted above, the extent of reduction in primary spending is positively correlated with the initial fiscal imbalance (figure 2.6). Consistent with the literature, we find that the pattern of consolidation is also determined by initial conditions. Hence, the pattern of adjustment is related to the starting condition in each country, and the biggest spending reductions are more likely to take place in economic and functional categories that are relatively high to begin with. Comparing these results with data from industrial countries during periods of fiscal adjustment in the 1980s and 1990s, further evidence is found that larger reductions occur when the initial spending levels are higher in proportion to GDP, whether for wages and salaries, transfers, health, or education (Hauptmeier, Heipertz, and Schuknecht 2006). Capital spending has been particularly prone to disruption during periods of expenditure consolidation. Given the small initial amounts involved, capital spending may not account for the majority of spending cuts, but compared with the initial year it has often been cut by more than 50 percent during periods of expenditure consolidation.[12]

TABLE 2.3

Periods of Sustained Primary Expenditure Reduction, 1994–2004

Country	Period	Decrease (percentage points of GDP)	Percentage reduction over starting year
Early expenditure reductions (initiated 1995 and earlier)			
Hungary	1993–97	17.5	29.3
Belarus	1993–96	16.6	29.1
Macedonia, FYR	1993–97	15.8	32.8
Albania	1992–94	15.7	34.7
Romania	1992–94	7.9	19.9
Kyrgyz Republic	1995–97	6.8	19.7
Ukraine	1994–96	6.2	13.8
Czech Republic	1995–98	6.2	14.2
Slovenia	1993–96	4.2	9.7
Lithuania	1994–96	3.5	9.6
Estonia	1995–97	3.3	8.1
Mid-period reductions			
Moldova	1997–2001	19.2	43.2
Bosnia and Herzegovina	1999–2001	15.3	22.8
Russian Federation	1997–2000	13.5	30.1
Ukraine	1997–99	10.6	25.1
Croatia	1999–2002	6.7	12.4
Georgia	1997–2000	6.5	29.5
Latvia	1999–2001	6.4	15.9
Estonia	1999–2001	5.3	13.3
Slovak Republic	1997–99	4.9	11.9
Kazakhstan	1997–2000	4.9	19.1
Azerbaijan	1999–2001	3.8	17.8
Armenia	1999–2002	3.6	15.3
Most recent expenditure reductions (2000 and later)			
Belarus	2000–02	4.2	9.1
Macedonia, FYR	2002–04	3.9	10.0
Hungary	2002–04	3.8	7.8
Russian Federation	2002–04	3.7	9.7
Slovak Republic	2002–04	3.6	9.5
Albania	2001–03	2.2	8.1
Romania	2000–02	0.8	2.6
Bosnia and Herzegovina	2002–04	0.8	1.4

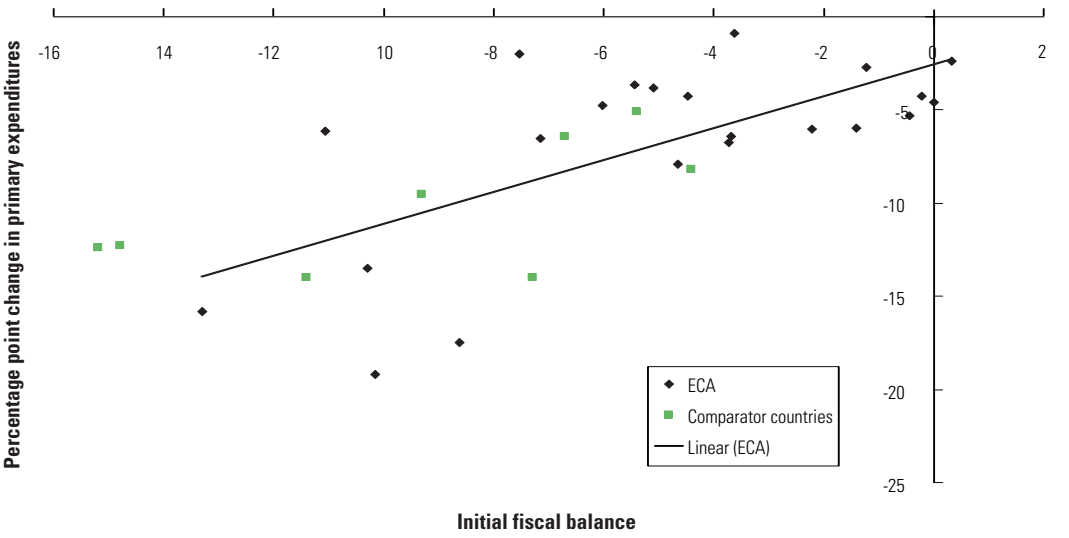
Source: ECA fiscal database.

The Size of Government

Despite ECA's experience with fiscal adjustment and expenditure consolidation, the size of government for the ECA region as a whole (general government spending in proportion to GDP) is still large in comparison with other regions at similar levels of per capita income. Much comparative fiscal analysis in the literature tends to focus on

FIGURE 2.6

Primary Expenditure Cuts and Initial Fiscal Imbalance



Source: ECA fiscal database.

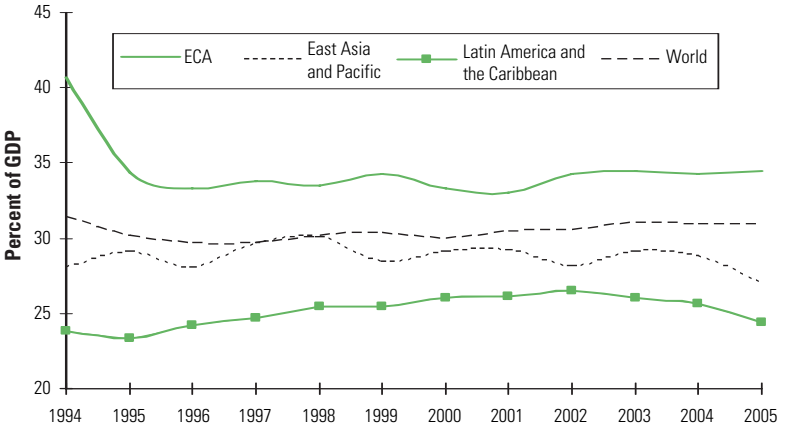
Note: Comparator countries include Belgium, Canada, Finland, Ireland, the Netherlands, Spain, Sweden, and the United Kingdom.

Organisation for Economic Co-operation and Development (OECD) economies, given the more comprehensive data available for these countries. While on average the size of ECA's public sector primary spending is below OECD or EU-15 averages, the latter are much richer, and EU-15 countries in particular tend to have large welfare states that result in high public spending as a share of GDP. Many of the EU-15 are now struggling to reform their public finances to ensure fiscal sustainability. When compared with other middle-income regions, primary spending as a share of GDP in ECA is well above East Asian and Latin American averages (figure 2.7).

The size of public spending varies enormously across the ECA region and is strongly linked to per capita incomes and proximity to Europe. Total public spending in 2005 ranged from almost one-half of GDP in Bosnia and Herzegovina, Croatia, and Hungary to under one-fourth of GDP in Armenia, Kazakhstan, Azerbaijan, and Tajikistan (figure 2.8). Compared internationally, about half the region has an "EU-15 size" public sector, with primary spending in proportion to GDP similar to Belgium (higher even than comparators such as Ireland and Spain), and the other half approximates East Asian and

FIGURE 2.7

Primary Spending, ECA and Other Middle-Income Regions, 1994–2005



Sources: ECA fiscal database; IMF 2007.

Latin American averages, with primary spending in proportion to GDP similar to that in Chile and Korea.

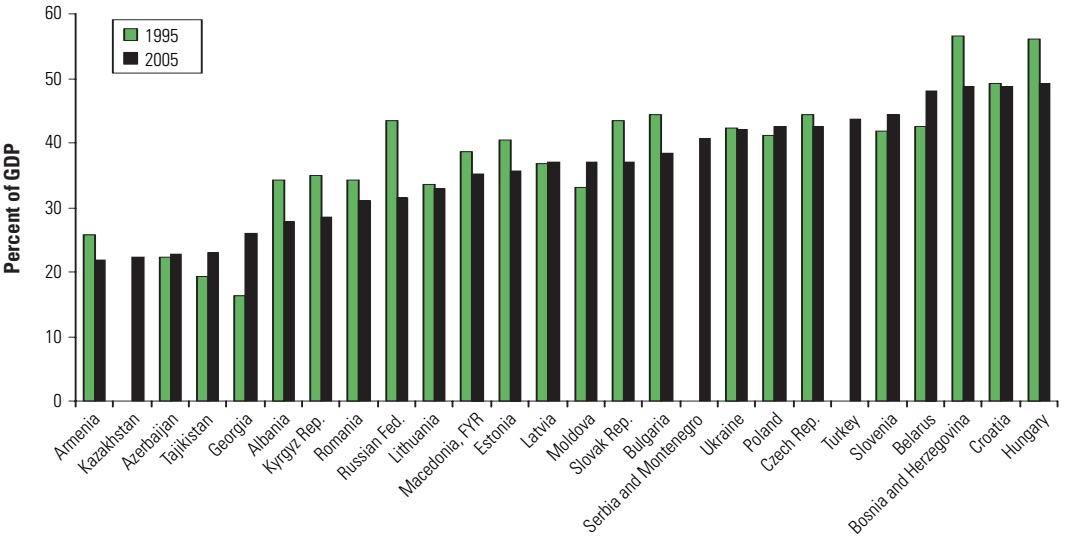
Primary spending as a share of GDP is positively correlated with per capita GDP (in purchasing power parity [PPP]) for ECA countries (figure 2.9), as is the general pattern worldwide. However, most ECA subregions (EU-8, SEE, and middle-income CIS countries) lie above the international trend line, and only the low-income CIS countries lie below it. Clearly, the ECA sample group is diverse, with Croatia being a particular outlier. The high-growth comparator countries, irrespective of per capita income levels, are all below—in some cases well below—the international norm for government size. Croatia and Thailand are the two most extreme cases, with primary expenditures almost three times higher in Croatia (a difference of 30 percent of GDP) despite the two countries being at similar per capita incomes.

Composition of General Government Spending

The item of spending that stands out when ECA countries are compared with non-ECA countries is transfers (figure 2.10). Unlike comparator countries outside the region, ECA countries spend a significant amount on social protection. This is perhaps one reason

FIGURE 2.8

Total Public Sector Spending, by Country in ECA, 1995 and 2005

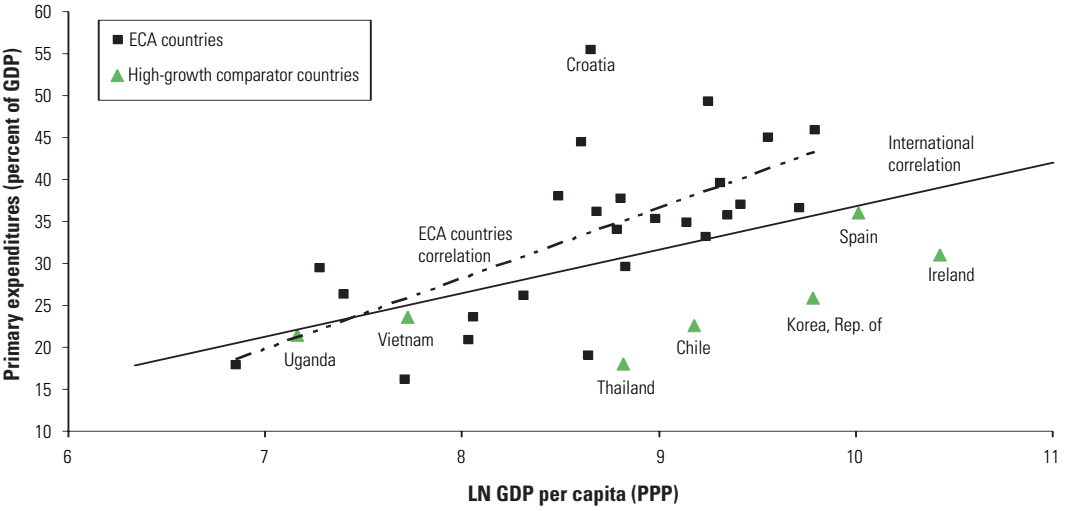


Source: ECA fiscal database.

Note: Initial year data for Bosnia and Herzegovina are 1996 and for the Russian Federation are 1997. Data for 1995 not available for Kazakhstan, Serbia and Montenegro, and Turkey.

FIGURE 2.9

Regional Primary Public Expenditures and Per Capita Incomes, Average 2000–04



Sources: WDI, WEO, and ECA fiscal database.

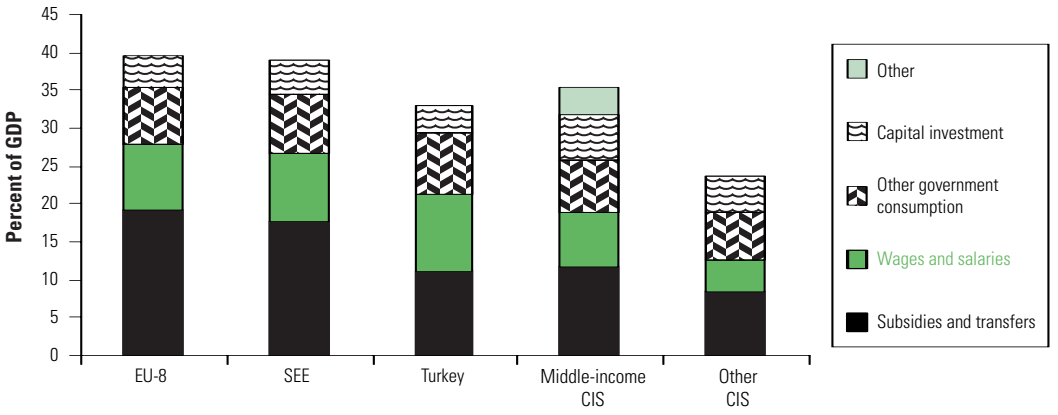
Note: The solid regression line is for a sample of 48 countries (not shown) and does not include the high-growth comparators or ECA countries (shown), with an R2 of 0.42. The dashed regression line is for ECA countries only, with an R2 of 0.39, based on the 2000–04 average for 26 ECA countries.

ECA countries have a high level of spending overall and, as shown in Part 3 of this book, one reason behind the reliance on relatively high levels of distortionary taxation. There is some variation across the region. At 18 percent of GDP in 2004, transfers are much higher in the EU-8 and SEE. In the CIS, transfers averaged about 10 percent of GDP in 2004, below the international average of 13 percent of GDP although above fast-growing middle- and low-income comparator countries. From a functional classification, spending on social security and welfare in the EU8 averaged almost 15 percent of GDP in 2004, about twice that of the CIS (figure 2.11) Despite the relative immaturity of their public institutions, countries in the ECA region have quickly put in place publicly provided pensions and social assistance programs as state-owned enterprises have shed their welfare roles. In contrast, the experience in other high-growth middle-income countries has been to keep public transfers lower, even as per capita incomes have increased. In Korea, for example, public transfers are less than 5 percent of GDP, or one-third the EU8 average. Even though state-funded transfers are supplemented by relatively generous privately funded social expenditures, the combined public and private spending on social expenditures is 8 percent of GDP in Korea, still lower than the ECA average (OECD 2003b).

Much of the ECA region is demographically similar to the EU-15, in that they have high ratios of old to working-age people and hence

FIGURE 2.10

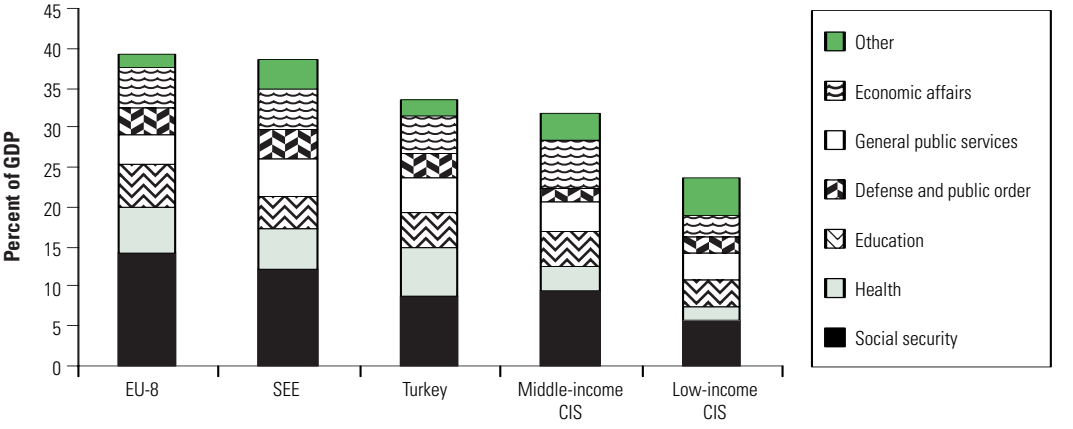
ECA Subregional Economic Composition of Primary Expenditures, 2004



Source: ECA fiscal database.

FIGURE 2.11

ECA Subregional Functional Composition of Primary Expenditures, 2004



Source: ECA fiscal database.

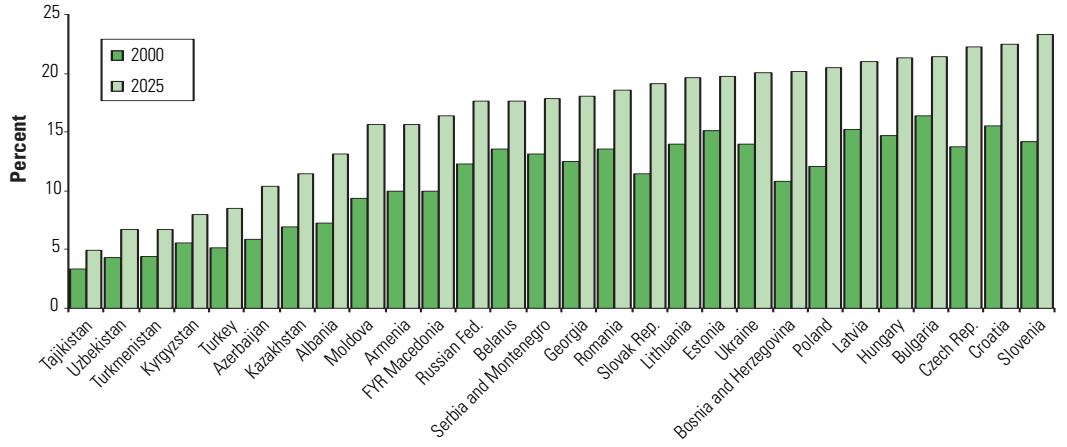
higher outlays on health and pension spending. This demographic trend is likely to continue, because the population over age 65 is growing in all countries in the region and will exceed 20 percent of the population in many Central and Eastern European countries in the next 20 years (figure 2.12). The high share of transfers, combined with the aging population, is likely to increase pressure on future public spending. Social security and welfare spending is predominantly on pensions and shows a strong correlation with the proportion of the population over age 65.

These differences in social assistance are not the whole story, however. Spending on other categories, such as government consumption, also contribute to the higher regional average. In SEE and the EU8, spending on wages and salaries has been on the rise since 2000 (figure 2.13), reflecting in part the need to professionalize the public sector. In the CIS countries, capital expenditures have increased since 2000, reflecting the need to address neglected infrastructure and the broader development challenges in the region (figure 2.14).

The average public sector wage bill in ECA is comparable to international averages, at around 7 percent of GDP, but there is wide variation among countries (figure 2.15). Furthermore, a greater share of the labor force in ECA works for the public sector for a given wage bill— the regional average shows public sector employment is 28 percent of total employment. In Korea, in comparison, public sector

FIGURE 2.12

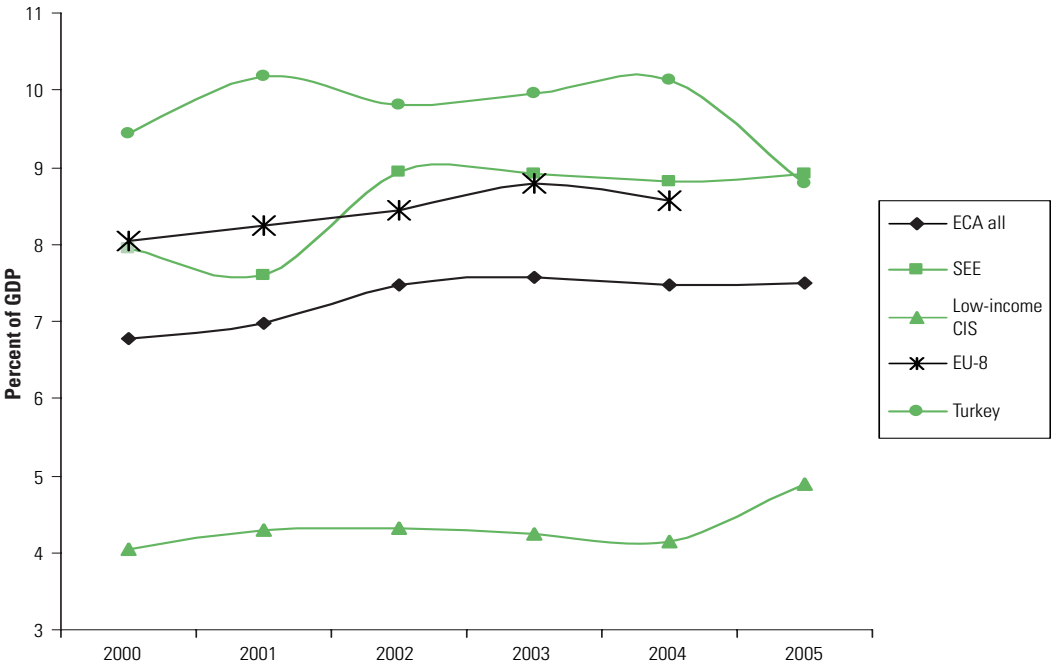
Percentage of Population Age 65 and Over, 2000 and 2025 (estimate)



Sources: World Bank projections; World Bank 2007.

FIGURE 2.13

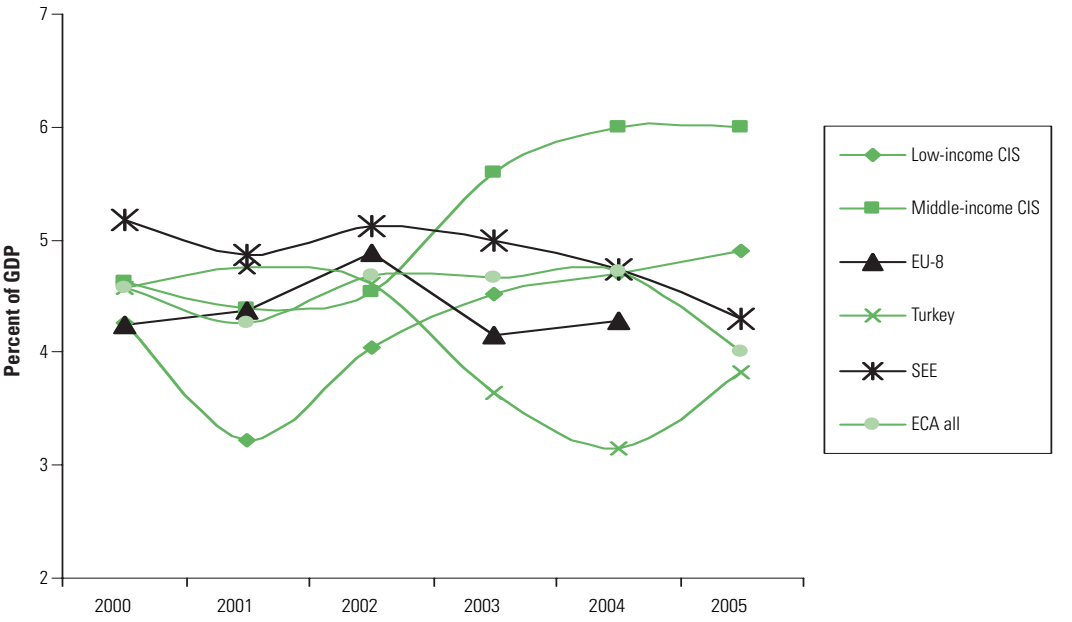
Trends in the Public Wage Bill in ECA, 2000–05



Source: ECA fiscal database.

Note: Middle-income CIS not shown here because wages and salaries expenditure data are patchy and unavailable for Russia and Ukraine for various years.

FIGURE 2.14
Trends in Capital Spending in ECA, 2000–05



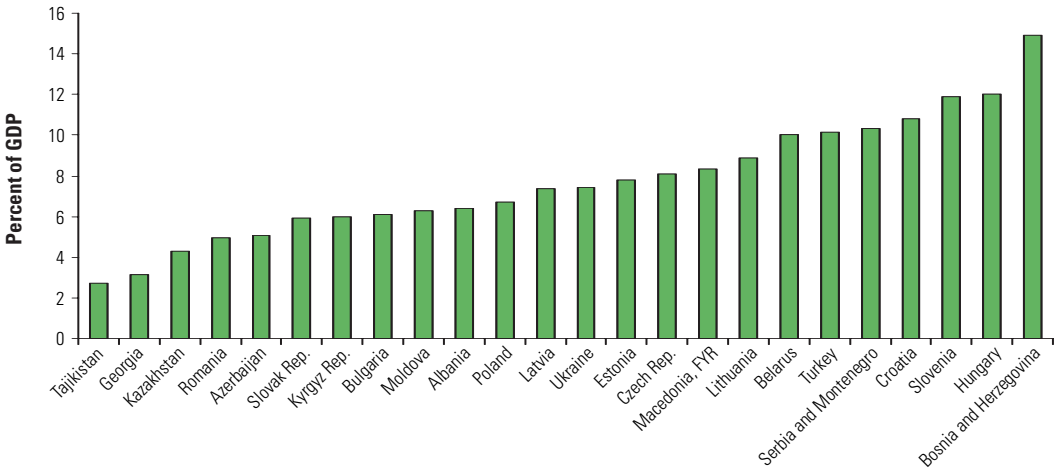
Source: ECA fiscal database.

employment is low, accounting for only 5 percent of total employment, and the wage bill tightly controlled at 6.7 percent of GDP. Spain and Ireland are spending about the same share of GDP on public sector wages and salaries as ECA countries, but public sector employment in proportion to total employment is almost half that of the ECA average.

Average capital spending in the region is consistent with international norms, at about 5 percent of GDP. While much lower in the low-income CIS countries at the beginning of the period, increases in capital spending since 2000 have brought this subregion up to the international average. Unlike spending on wages and salaries, there is little variation in capital spending in proportion to GDP, either between or within subregions. However, the outliers Croatia and Tajikistan each spent over 8 percent of GDP on public investment in 2004. In contrast, capital spending in the comparator group varies from 8 or 9 percent of GDP in the low-income countries, Uganda and Vietnam, to only 3.5 percent of GDP in Chile and Spain. Korea and

FIGURE 2.15

Public Sector Wage Bill in ECA Countries, 2004



Source: ECA fiscal database.

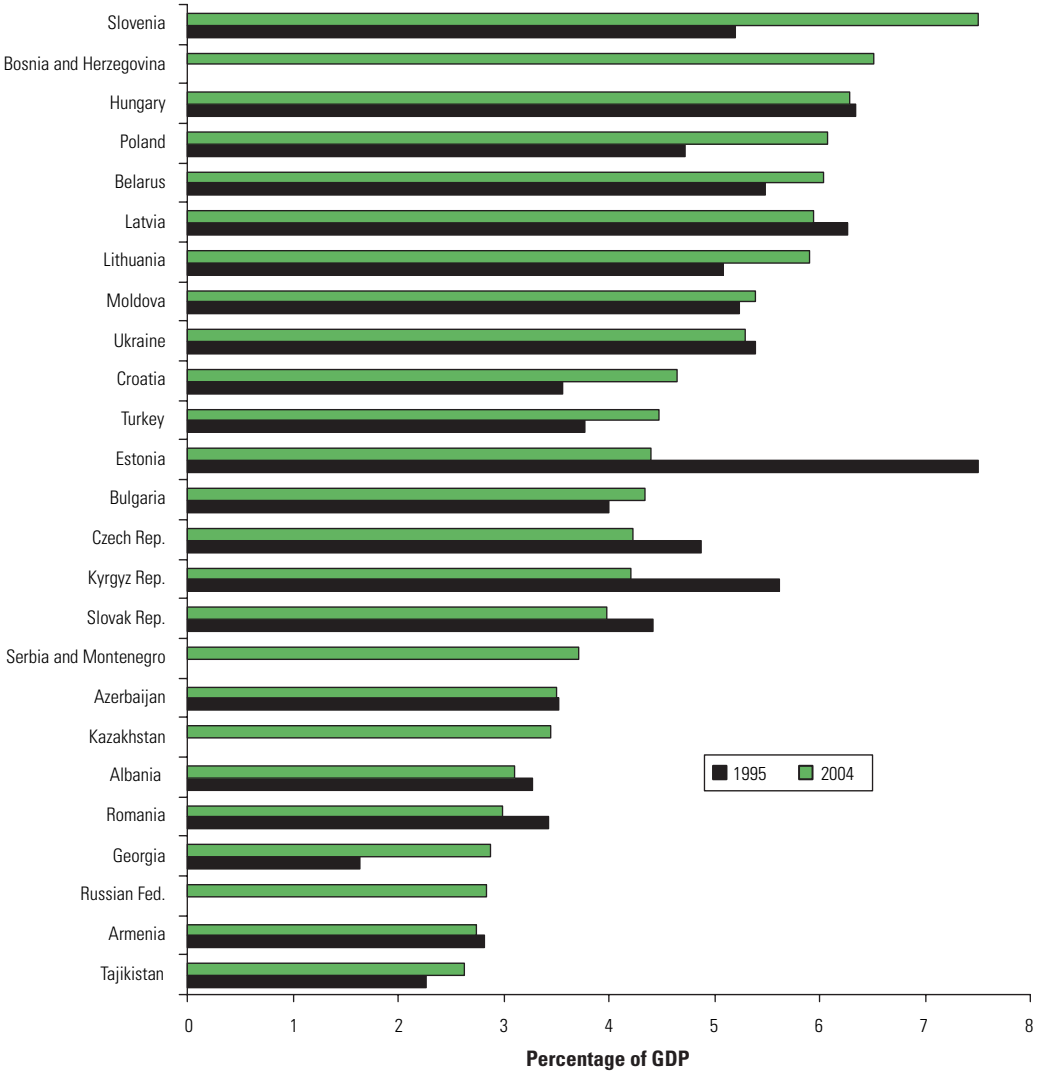
Ireland are consistent with the international average, at 5.0 percent and 4.5 percent of GDP, respectively. Issues surrounding infrastructure spending are discussed further in chapter 4.

Trends and levels of education spending vary widely among ECA countries, both as a share of GDP (from 3 percent in Georgia to 8 percent in Slovenia) and in the extent and direction of change in the last decade. Some high spenders in the mid-1990s (Estonia and Kyrgyz Republic) have reduced education spending by several percentage points of GDP, while some moderate spenders in the mid-1990s, including Slovenia, Poland, and, to a lesser extent, Georgia and Croatia (figure 2.16), have increased education spending considerably. Demographics explain some of the variation in education spending. The positive association between the share of spending on education and the percentage of population under age 14 confirms that countries with a younger population devote a greater share of public expenditure to education. The "younger" ECA countries, with over 25 percent of the population below age 14, lie below international norms, suggesting possible underinvestment in human capital. Policies affecting education spending are discussed further in chapter 5.

There is also wide variation in public spending on health across the ECA region (figure 2.17) from the high spending in the Slovak

FIGURE 2.16

Public Education Spending in ECA Countries, 1995 and 2004



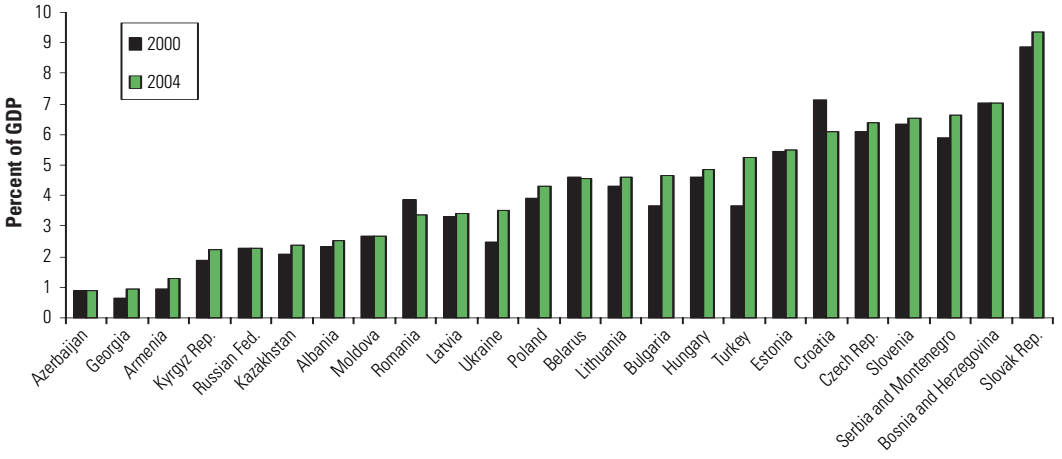
Source: ECA fiscal database.

Note: Initial year data for Slovak Republic are 1996; final year data for the Russian Federation are 2003. No 1995 data available for Bosnia and Herzegovina, Serbia and Montenegro, Kazakhstan, and the Russian Federation.

Republic (more than 9 percent of GDP) to less than 1 percent of GDP in Azerbaijan. As discussed in chapter 6, public spending on health is closely associated with per capita income level and is more stable over time than education spending.

FIGURE 2.17

Public-Sector Health Expenditures in ECA Countries, 2000 and 2004

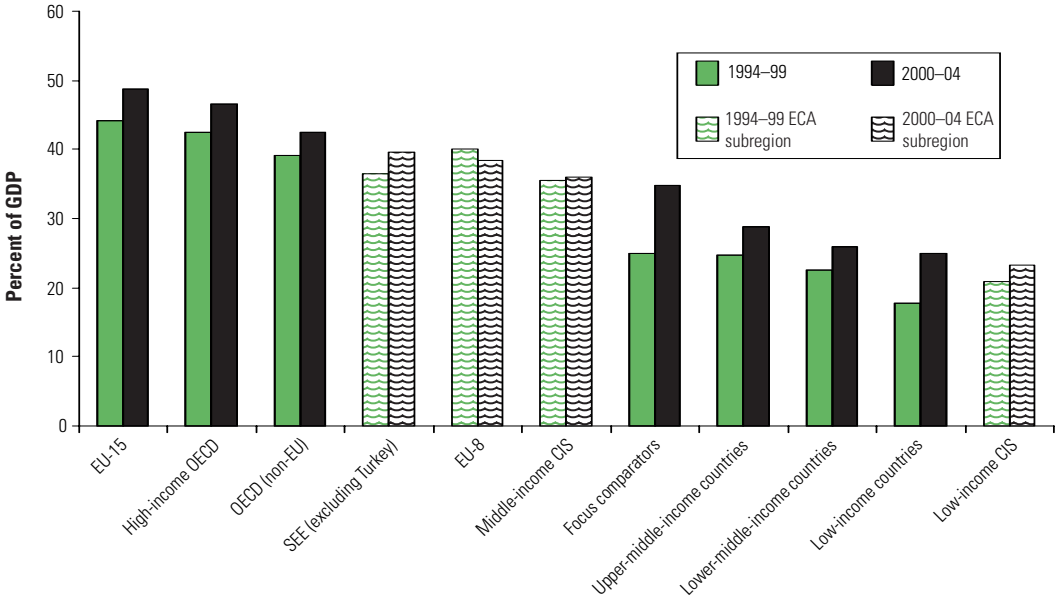


Source: ECA fiscal database.

Note:
a. Data for Russian Federation are for 2000 and 2003.

FIGURE 2.18

Total General Government Revenues, 1994–99 and 2000–04



Source: ECA fiscal database; IMF 2007.

Structure of Revenues in ECA

Total revenues, including grants, ranged from approximately 40 percent of GDP in SEE and the EU-8 to 24 percent of GDP in the low-income CIS in 2004. This compares to the EU-15 average of 45 percent of GDP (figure 2.18). The share of tax revenues in most subregions is between 80 and 90 percent of total revenues, which is close to the international group and EU-15 averages. By comparison, in the low-income CIS countries, nontax revenues and grants account for almost 35 percent of revenues, and in Turkey for almost 25 percent.

There has been some convergence in the overall size of revenues, as the lower-income countries have been catching up either through an expanded tax base or resource-based revenue collections, and as several outliers in the SEE region (most notably Bosnia and Herzegovina and Croatia) have brought revenues down over time as a share of GDP. There is also considerable variation within subregions, other than the EU-8. Total revenue in proportion to GDP varies by a factor of two from the highest to lowest country within a subregion. SEE varies from 49 percent of GDP in Bosnia and Herzegovina to 25 percent of GDP in Albania, the middle-income CIS from 28 percent of GDP in Kazakhstan to 47 percent of GDP in Belarus, and the low-income CIS from 20 percent of GDP in Armenia to 36 percent of GDP in Moldova (figure 2.19).

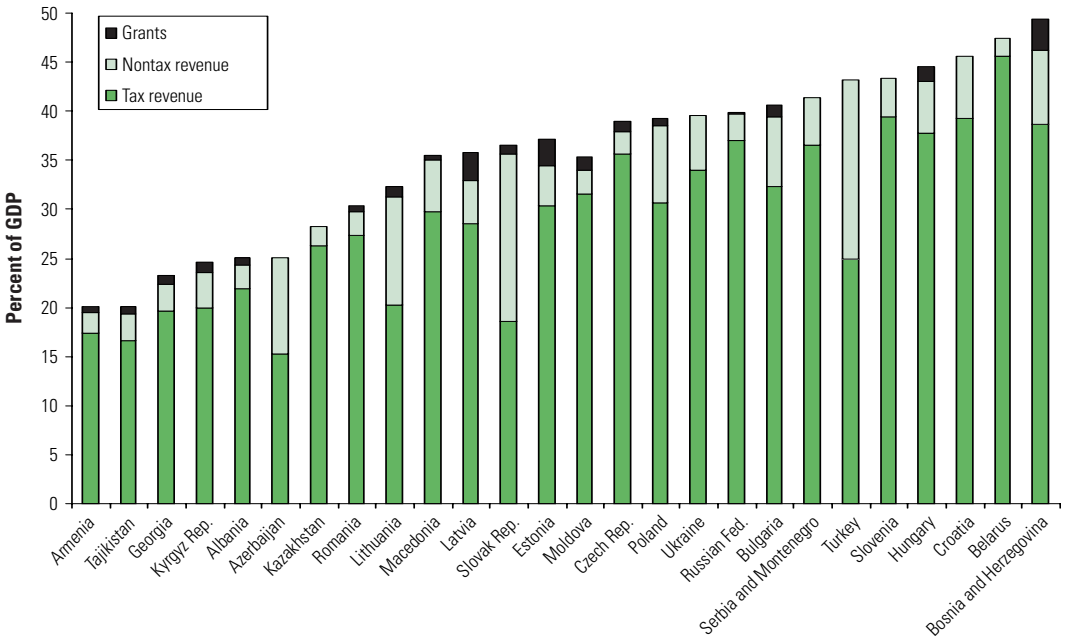
The total revenue share is positively correlated with per capita income (figure 2.20). As with expenditures, the non-ECA focus countries lie below the trend line, because their governments are smaller than average.

Sources of tax revenue vary across ECA country groups. The composition of tax revenues is relatively stable in the EU-8 subregion (figure 2.21b). In the low-income CIS countries, however, the increase in tax revenues has come through expansion of indirect taxes levied on goods and services and international trade (figure 2.21d), reflecting in part the introduction of a value added tax (VAT), the primary source of indirect tax revenues (table 2.4). Social security contributions are a particularly important source of tax revenue in the EU-8, middle-income CIS, and SEE countries, where they are equivalent to or even exceed the share of direct income taxes. The impact of labor taxes on growth and associated reform options are examined in chapter 9.

Tax performance[13] is affected by several factors, including fiscal policies, economic structure, and institutions. Although tax ratios tend to vary by income level, some high-income countries, such as the Baltics, have chosen to levy somewhat lower taxes. Moreover, institutions are important because inefficient tax administrations and

FIGURE 2.19

Regional Variation in Revenues, 2005



Source: ECA fiscal database.

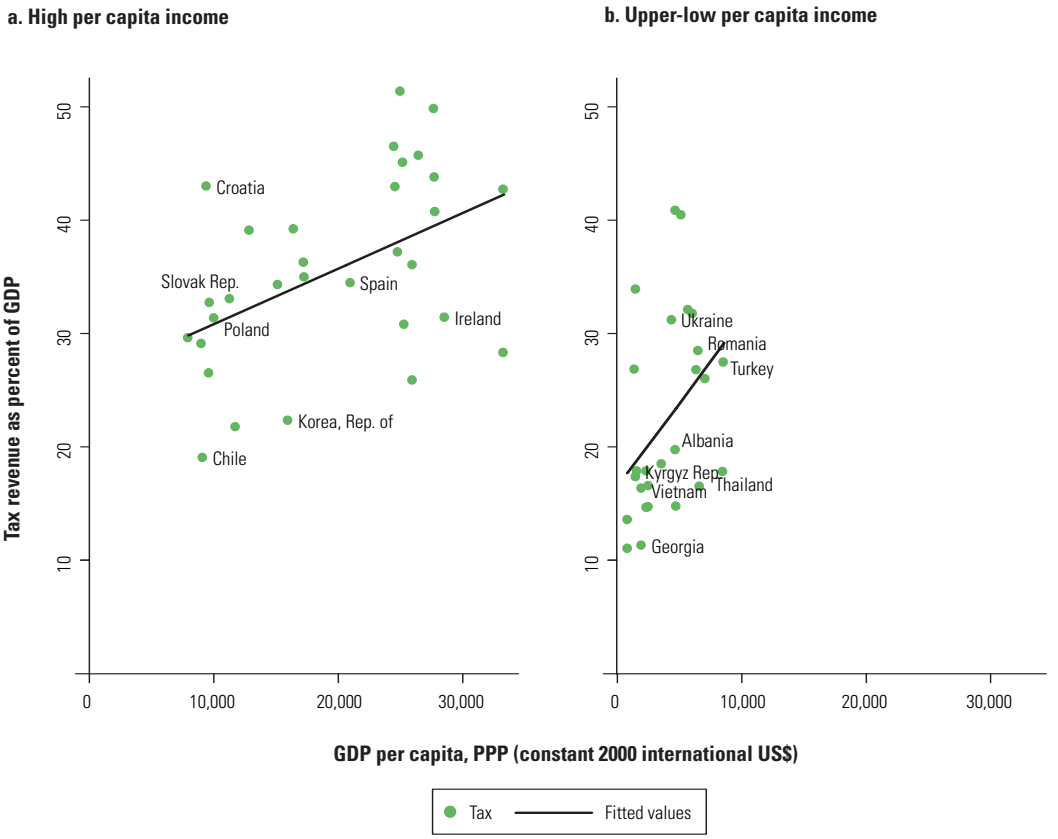
weak domestic legal and institutional structures can create opportunities for corruption and impair efforts to raise tax revenues.

A more formal analysis of tax effort across ECA countries is outlined in annex 2A. For the period 1995–2004, the analysis confirms that per capita income, the share of agriculture in GDP, and the ratio of trade to GDP are the most consistent explanatory variables for the proportion of tax revenues to GDP.[14] A comparison of actual tax collection with that predicted by the model indicates that ECA countries have a strong tax effort overall with an index close to 1.0.[15] Tax effort in the ECA region is generally stronger than in the Latin America and East Asia regions. However, effort is uneven in ECA, ranging from high tax effort in Belarus, Bosnia and Herzegovina, Croatia, Macedonia, Moldova, Turkey, and Uzbekistan, to low tax effort in Armenia, Georgia, and Tajikistan (where the tax effort index is below 0.8).[16]

Some convergence in tax effort is observed across ECA countries (see table 2.5 for data on ECA and non-ECA focus countries). Over time those countries that had high tax efforts in 1995 generally experienced a downward trend (with the exception of Turkey and Moldova), while several of those with initially low tax efforts, includ-

FIGURE 2.20

Correlation of Revenue with Per Capita Incomes, 1995–2004 average

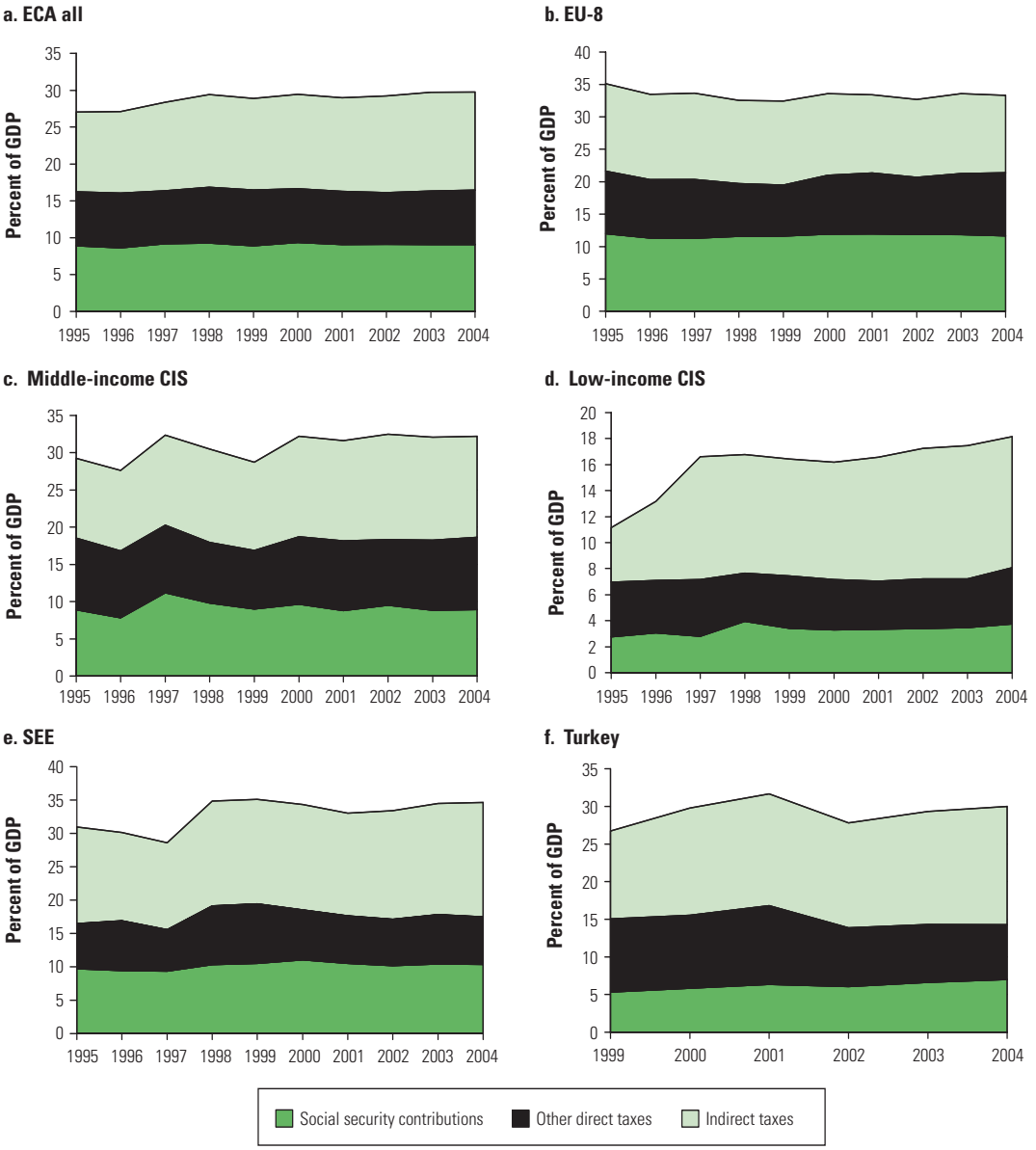


Source: WDI and ECA fiscal database.

ing Tajikistan, Georgia, Armenia, and Albania, increased their tax efforts in recent years. The non-ECA focus countries generally have low, stable, or declining tax effort indexes. The tax effort has been on the rise, particularly in Turkey, because of increases in indirect tax efforts to support fiscal consolidation (figure 2.22). In Albania the overall tax effort is now close to potential, but collection of direct taxes has outperformed other taxes. In contrast, the Slovak Republic, Ireland, and Poland have experienced downward trends in their tax effort indexes, because of sizeable declines in direct tax effort (see figure 2.23 for Slovak Republic). Where indexes of tax effort have fallen, the reduction has been more in direct than in indirect taxes, with only Hungary and Vietnam being exceptions. Where indexes have

FIGURE 2.21

Composition of Tax Revenues, 1995–2004



Source: ECA fiscal database.

Note: Data before 1999 not available for Turkey.

TABLE 2.4

Tax Revenue Improvements in the CIS, 1994–2004

Country	Period	Total tax revenue increase	Tax increase components			
			Tax on goods and services	Tax on trade	Social security contributions	Other taxes
Armenia	1994–99	6.71	1.27	5.13	0.89	-0.58
Georgia	1995–2001	7.49	4.15	0.42	0.88	2.46
Moldova	2001–04	5.42	2.10	0.32	0.94	2.06
Kyrgyz Republic	1994–95	1.52	1.33	0.45	0.14	-0.40
Kyrgyz Republic	2000–04	3.28	2.94	0.06	0.16	0.13

Source: ECA fiscal database.

improved, the improvement has been more balanced, with Armenia, Georgia, Tajikistan, and Turkey increasing indirect taxes and Armenia and Kazakhstan increasing direct tax effort.

Care must be taken in interpreting the tax effort index. A low tax effort could result either from ineffective or inefficient tapping of a country's potential tax base (for example, as a result of weak tax administration) or from a policy choice for smaller government and hence lower levels of taxation. In some cases it could reflect a deliberate policy to attract foreign direct investment (as in the Slovak

TABLE 2.5

Tax Effort Trends in Selected ECA and Non-ECA Countries

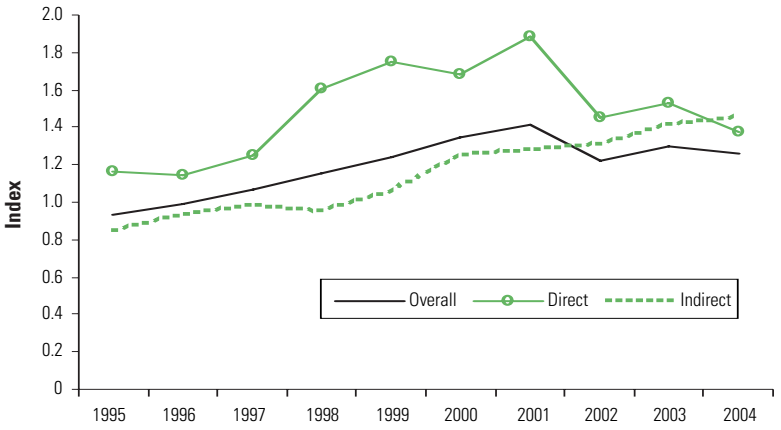
ECA countries	1995	1996	1997	1998	1999	2000	2001	2001	2003	2004
Albania	0.8	0.6	0.6	0.8	0.8	0.9	0.9	1.0	1.0	n.a.
Croatia	1.6	1.2	1.6	1.5	1.6	1.2	1.5	1.3	1.3	1.4
Georgia	0.3	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	n.a.
Kyrgyz Republic	1.3	1.2	1.1	1.2	1.0	0.9	0.9	0.9	1.1	n.a.
Poland	1.2	1.2	1.1	1.1	1.0	1.0	0.9	0.9	1.0	0.9
Romania	1.1	1.2	1.0	1.1	1.2	1.1	1.0	1.0	0.9	n.a.
Slovak Republic	1.2	1.2	1.1	1.0	1.0	0.9	0.8	0.8	0.9	0.8
Turkey	0.9	1.0	1.1	1.2	1.2	1.3	1.4	1.4	1.2	1.3
Ukraine	1.2	1.3	1.3	1.2	1.1	1.0	1.0	1.0	1.1	1.0
Non-ECA countries										
Chile	0.7	0.7	0.7	0.7	0.7	n.a.	n.a.	n.a.	n.a.	n.a.
Ireland	0.9	0.9	0.8	0.8	0.8	0.7	0.7	0.6	n.a.	n.a.
Korea	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	n.a.
Spain	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	n.a.
Thailand	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.6	0.6	n.a.
Vietnam	1.1	1.1	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8

Source: Staff calculations.

Note: Not applicable.

FIGURE 2.22

Trends in Tax Effort Indexes in Turkey



Source: Staff calculations.

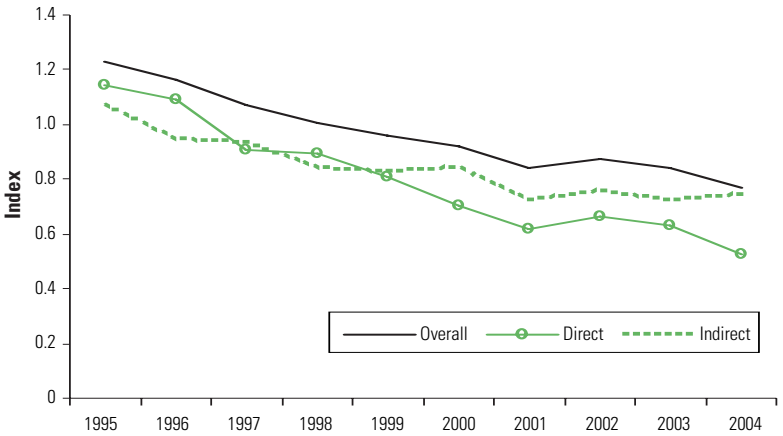
Republic). A case-by-case analysis would thus be needed to draw policy-relevant conclusions. A high tax effort coupled with sound institutions (good governance) tends to suggest a high tax burden given a country's level of development and economic structure, most likely reflecting high tax rates. For a given tax effort, however, broadening the tax base can create room to lower marginal tax rates and thus lessen the harmful impact of taxes on economic growth.

Measuring the effectiveness of tax administration by comparing statutory tax rates with effective tax yields (that is, using "productivity" indexes[17]) reveals "low tax effort" countries with both relatively effective tax administrations (the Baltic countries, Ireland, Korea, the Slovak Republic, Vietnam) and weak tax administration (Armenia, Georgia, Tajikistan), as shown in figures 2.24 and 2.25 and table 2.6. For the latter countries, low tax effort may become a serious obstacle in the attempt to develop effective fiscal policy. These countries have the potential to increase tax revenues through both better use of their tax bases and strengthening of tax administration. They may also want to consider widening the tax base by subjecting previously exempt income to taxation or reducing credits and allowances, and, where possible, lowering marginal tax rates to discourage tax avoidance and evasion.

Relatively low tax effort in countries with good tax administration[18] may result from a lower social preference for publicly provided

FIGURE 2.23

Trends in Tax Effort Indexes in the Slovak Republic



Source: Staff calculations.

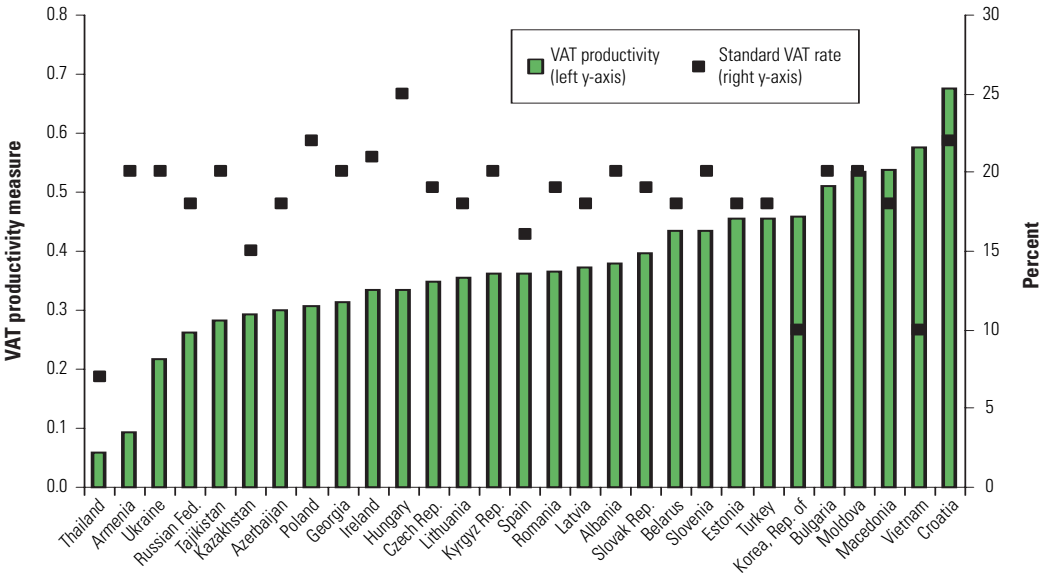
goods and services, and hence a choice to expend less tax effort to boost private sector–led growth. In contrast, Belarus, Bulgaria, Croatia, Turkey, and Moldova represent countries with relatively high tax effort and stronger tax administration. Some of these countries still have fairly large untaxed sectors and high tax rates on other sectors. These countries may need to consider lowering taxes to enhance their growth rates.[19] For Hungary, Kazakhstan, the Kyrgyz Republic, Russia, and Slovenia, addressing institutional weaknesses in tax and customs administration could be a viable option to enhance the economy's tax-generating capacity. Hungary, FYR Macedonia, and Slovenia might improve compliance by reducing both tax rates and the progressivity of individual and corporate income taxes.

Measures of tax effort also help to pinpoint appropriate policies for creating fiscal space. If a country is facing a budget deficit and is already making the maximum use of its taxable capacity, as indicated by a comparatively high tax effort index, then restoring budget balance (or reducing the debt level) is likely to require expenditure rationalization and efficiency gains rather than tax increases. Several ECA countries, such as Croatia and Turkey, fall into that category (see figures 2.26 and 2.27).

The non-ECA comparator countries are generally in a favorable budget position, despite fairly low tax effort. The low tax effort appears to reflect more choice than difficulty in raising tax revenue—most of these countries are characterized by strong institutional struc-

FIGURE 2.24

VAT Revenue Productivity, 2004



Source: World Bank staff calculations.

Note: VAT or CIT productivity is defined as VAT or CIT revenue as a share of GDP divided by the standard top rate.

tures and relatively small shadow economies. Moreover, stronger institutions can allow countries to sustain a relatively low tax effort index (Ireland, Korea) and a relatively high long-term growth rate (table 2.6).

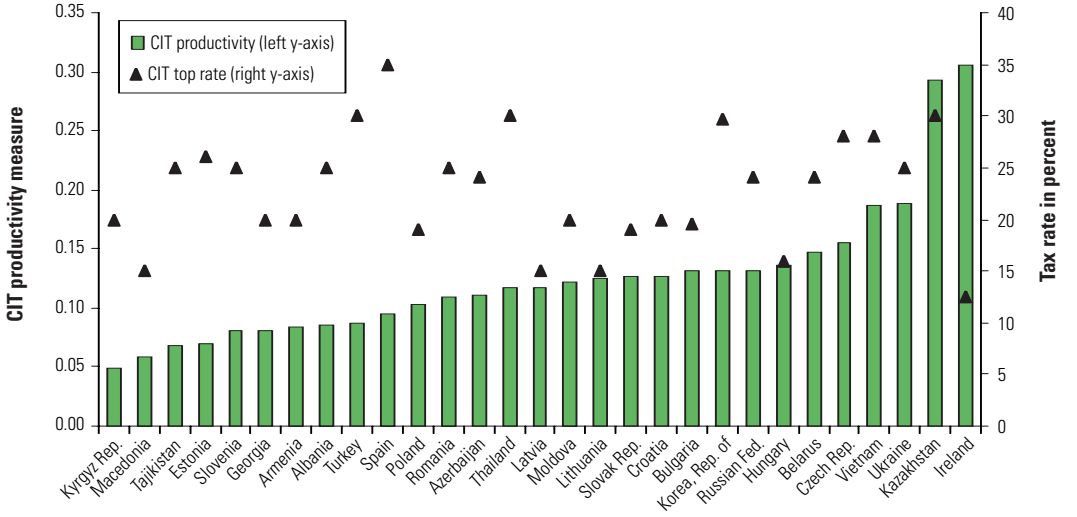
Conclusions

The transition to a market economy has required a massive overhaul of public finance systems in ECA countries. While some common trends exist across ECA countries (especially the continued need for fiscal consolidation), the size of public expenditures, tax performance, debt levels, and risks to fiscal sustainability remain quite varied. Some key findings of this chapter are summarized below.

First, fiscal adjustment in ECA has been strong, but continued vigilance is needed. Despite ambitious efforts in many ECA countries, remaining fiscal imbalances deserve close attention to ensure a robust fiscal framework conducive to long-run growth. Although debt levels

FIGURE 2.25

Corporate Income Tax Revenue Productivity, 2004



Source: World Bank staff calculations.

Note: VAT or CIT productivity is defined as VAT or CIT revenue as a share of GDP divided by the standard top rate.

remain generally low, in some ECA countries more ambitious fiscal consolidation would help to reinforce fiscal sustainability in the long run and create fiscal space for growth-promoting expenditures or for lower taxes, especially because exceptionally favorable global financial conditions may not last.

TABLE 2.6

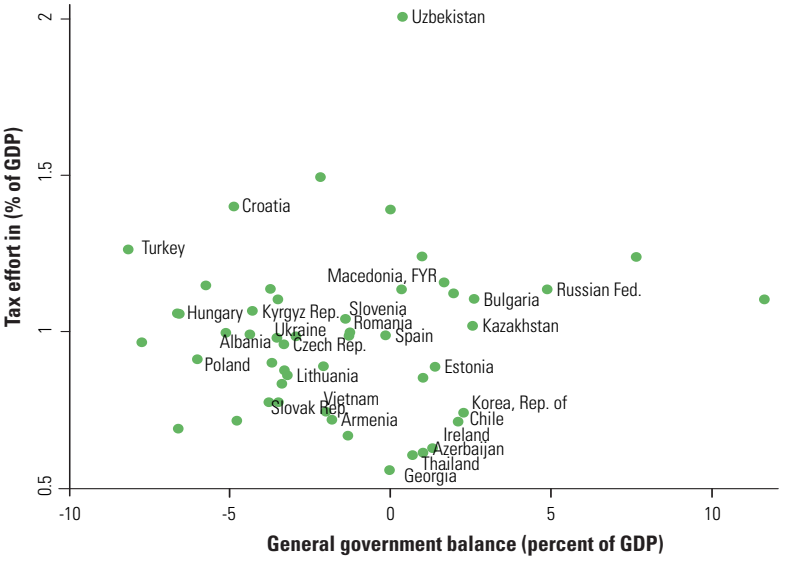
Tax Effort and Tax Productivity, Average 1995–2004

Tax Type	High tax effort, stonger administration	High tax effort, weaker administration	Low tax effort, stonger administration	Low tax effort, weaker administration
Value added tax	Croatia, FYR Macedonia, Moldova, Turkey, Bulgaria, Belarus	Russian Fed., Kazakhstan	Vietnam, Rep. of Korea Estonia, Slovakia, Slovak Rep., Ireland	Tajikistan, Armenia Thailand
Corporate income tax	Belarus, Bulgaria Croatia, Moldova	FYR Macedonia, Kyrgyz Rep.	Ireland, Vietnam, Rep. of Korea, Slovak Rep, Lithuania	Tajikistan
Personal income tax	Turkey, Croata, FYR Macedonia	Hungary, Slovenia	Thailand, Rep. of Korea Azerbaijan	Armenia, Georgia, Vietnam Tajikistan

Source: Staff calculations.

FIGURE 2.26

Tax Effort Index versus General Government Balance, 2004



Sources: IMF WEO, staff calculations.

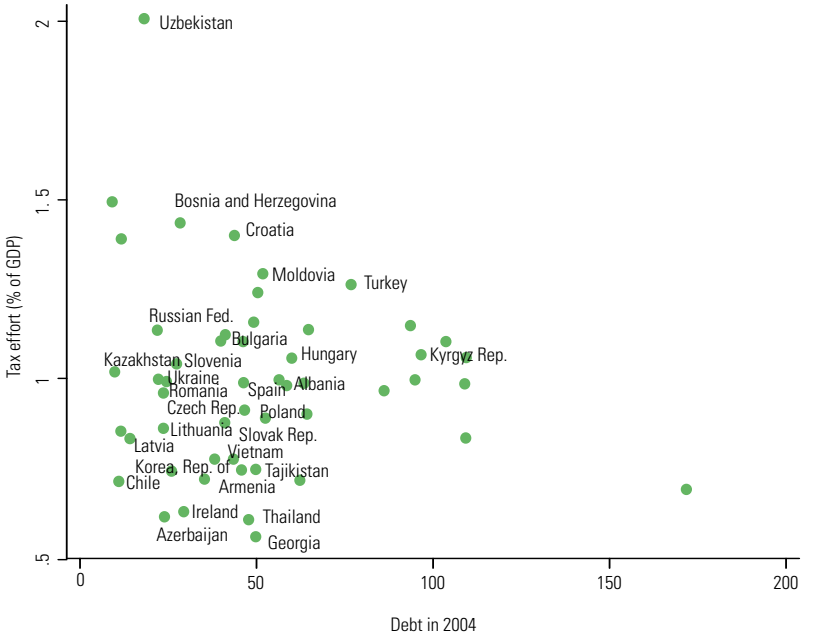
Second, fiscal adjustments driven by reductions in public spending have generally been more sustainable than those driven by revenue increases. Expenditure cuts were on average higher when the initial primary fiscal deficit was large and, as a result, the overall fiscal adjustment had to be ambitious. By contrast, tax revenue increases were more common when initial imbalances were moderate.

Third, governments in ECA tend to be large. With the exception of the low-income CIS countries, the average size of public sector spending in the ECA region is above international norms at similar levels of per capita income, and well above the high-growth comparator countries outside the region.

Fourth, the large size of governments in part reflects socialist legacies. Influenced by a history of state-sponsored provision of welfare security throughout the life cycle, ECA countries tend to spend more on social protection than do international comparators. Moreover, this spending has increased in the past five years, and many ECA countries have aging populations that will continue to put pressure on spending for pensions and health. But economic policy needs to be informed by the trade-off between large public sectors today and economic growth tomorrow.

FIGURE 2.27

Tax Effort Index versus Debt, 2004



Sources: IMF WEO, staff calculations.

Fifth, the composition of spending varies across the region. EU-8 and SEE have seen increases in public-sector wages, while the CIS countries have begun to increase capital investments from, in many cases, a very low base. Other productive expenditures, such as health and education, show variation across and within subregions. These are examined further in Part 2.

Finally, tax ratios reflect spending levels, and range from 45 percent of GDP in EU-8 countries to 24 percent of GDP in low-income CIS. Tax effort in ECA countries is close to the predicted potential, and is generally higher than in the Latin America and the Caribbean and East Asia and Pacific regions. However, in some ECA countries tax performance may be overstretched, indicating that fiscal space can only be created through expenditure rationalization. The region also has several low tax effort countries with good institutions, indicating a possible preference for smaller government and policies for encouraging private sector activity in these cases.

Annex 2A Tax Performance: A Regression Model

There has been only limited effort to date to develop comprehensive tools for assessing tax performance across countries. Typically, there are two main approaches used to measure a country's tax effort. In its simplest form, comparisons can be based on differences between the effective tax rates and the standard tax yield following the methodology developed in Tanzi (1981) and Schaffer and Turley (2001). An alternative is to calculate a tax effort index as the ratio of actual tax share to the predicted (or potential) tax share. The predicted tax ratio is determined through regression relating tax shares to various explanatory variables that serve as proxies for tax bases or other factors that might affect a country's ability to tax.

Basic Model

Following recent tax effort literature (Stotsky and WoldeMariam 1997; Piancastelli 2001; Eltony and Nagy 2002; Bird, Martinez-Vazquez, and Torgler 2004; and Hudson and Teere 2004), a stochastic model was used to examine tax revenue in selected ECA and non-ECA countries, where T/Y is the tax ratio and Xi (i = 1...n) represent various independent variables expected to influence the tax ratio, while U is the error term:

$$T/Y = f(Xi \ldots Xn, U)$$

The independent variables employed in the basic model were similar to those used in the most recent literature: gross national product per capita, the ratio of trade to GDP (imports plus exports over GDP), the share of the manufacturing sector and the agricultural sector in GDP, and population growth. An overview of the variables applied in previous empirical studies is provided in table 2A.1. Other variables, such as external debt, consumer price index (CPI), rural population, and the like, were used to check the robustness of the base results. A time variable was included to capture any overall trend in taxation.

The analysis used panel data for 57 developed and developing countries, including 26 ECA and 6 non-ECA comparator countries over the period 1995–2004. The choice of sample was motivated by the need to obtain a data set composed of countries with similar characteristics to ECA and comparator countries. Data were obtained from the Bank's World Development Indicators, IMF Regional Fiscal Data Set, IMF Country Profile Chapter IV, Schneider 2005 and government

finance statistics from Ministries of Finance in the countries. A set of 57 countries was used, comprising three groups: 10 in the lower-middle-income group,[20] 16 in the upper-middle-income group, and 31 in the higher-income group,[21] as defined by the World Development Indicators 2004.

The panel data model was estimated with both "fixed effects" (using the least squares dummy variable approach) and "random

TABLE 2A.1

Overview of Empirical Findings in Tax Effort Studies

Variable	Piancastelli (2001)	Bird, Martinez-Vazquez, and Torgler (2004)	Stotsky and WoldeMariam (1997)	Grigorian (2005)	Hudson and Teerea, 2004	Eltony and Nagy (2002)
1. Economic development						
GDP per capita	+	+/-	+	+	+/-	+
Population density					+	
Population growth		-				
Urban Population				+		
2. Economic structure						
Agriculture, value added as % of GDP	-	+	-	-	-	-
Manufacturing, value added as % of GDP	+		+		+/-	
Mining, value added as % of GDP			-			-
Services, value added as % of GDP GDP	+					
3. Openness						
Import, as % of GDP			+/-			+
Export, as % of GDP			+			-
Trade (eExport + iImport as % of GDP)	+	-		-	+	
4. Control variables						
External dDebt, as % of GDP					-	
Consumer pPrice iIndex				-		
Inequality		-				
Aid, as percentage to% of GDP					+	
Share of fFuel in total exports				+		
5.Institutions						
Shadow economy, as % of GDP		-		-	+/-	
Index governance		+				
Regulation to of entry		-				
Composite iInstitutional quality				+		
Tax morale		+/-				
Method of estimation	Fixed effects model	OLSOrdinary least squares	Fixed and random models	Fixed effects model	Fixed effects model, Heteroskedasticity-consistent standard errors	Fixed effects model

Source: World Bank Staff calculations.

Note: + = positive coefficient (increases tax revenues). - = negative coefficient (decreases tax revenues). +/- = non-conclusive result; the coefficients appeared to be positive or negative

effects" (applying the generalized least squares [GLS] approach). The Hausman test consistently rejects the random effects model in favor of the fixed effects model.

However, in the next step the normal distribution of the error term was rejected and diagnostic tests revealed problems of cross-sectional correlation. To deal with the problem of cross-sectional correlation, the Prais-Winsten estimators[22] were employed.

The model performed generally well (table 2A.2), with estimated coefficients for the explanatory variables in line with previous findings in the literature. Higher GDP per capita is associated with a higher tax ratio. The structure of the economy seems also to matter. The tax ratio is negatively related to the share of agriculture in GDP and positively related to the share of the manufacturing sector in GDP, but the latter variable proved to be statistically insignificant (equation 1). The insignificance of manufacturing is somewhat surprising, although it may potentially be explained by a negative correlation with the agricultural share or the fact that the manufacturing share varies across countries according to the stage of development. Thus, the regression was reestimated with interactive terms between manufacturing and GDP per capita (equation 6); manufacturing then became significant. The significantly negative coefficient on the manufacturing-GDP per capita interactive term may indicate that as countries develop the importance of manufacturing as a source of tax revenue declines. Moreover, the agriculture sector is much more difficult to tax for less developed countries, as indicated by the significantly positive coefficient on the agriculture-GDP per capita interactive term. A faster rate of population growth leads to a lower tax ratio, while openness is associated with a higher tax ratio. Inclusion of dummy variables controls for differences in stage of development in the sample and reveals that the lower-middle-income countries have a statistically significant lower tax ratio than other countries in the sample. On the contrary, it is observed that high-income countries have a statistically significant higher tax ratio than other countries in the sample.

Moreover, to get a more realistic picture of a country's taxable capacity vis-à-vis its natural resource base, a dummy variable[23] for important oil producer countries was included. The ease of taxing natural resource extraction is likely to generate more tax revenue than nonfuel activities. The coefficient for the oil dummy has the predicted negative sign and is statistically significant in all equations. Finally, the trend variable is generally negative, indicating that, all else equal, tax ratios are on a downward trend, perhaps as a result of global tax competition. However, it is not statistically significant

TABLE 2A.2

Panel Regression Outcome (Prais-Winsten estimation), 1995–2004

Variable	EQ1	EQ2 Base	EQ3 Sensitivity	EQ4 Sensitivity	EQ5 Sensitivity	EQ6	EQ7
GDP per capita	.001*	.001*	.001*	.001*	.000*	.001*	.001*
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Trade	.059*	.056*	.056*	.051*	.046*	.056*	.025**
	(.007)	(.006)	(.007)	(.007)	(.010)	(.009)	(.013)
Agriculture	-.137*	-.113*	-.112*	-.149*	-.185*	-.104*	-.224*
	(.048)	(.046)	(.051)	(.062)	(.049)	(.039)	(.033)
Manufacturing	.098					.161*	.222*
	(.064)					(.082)	(.091)
Population growth	-1.881*	-1.767*	-1.729*	-1.720*	-1.356*	-1.643*	-1.781*
	(.320)	(.309)	(.329)	(.342)	(.373)	(.318)	(.306)
Dummy lower middle income	-3.368*	-3.135*	-1.324*	-.719*		-3.249*	0.734
	(1.232)	(1.028)	(1.119)	(1.119)		(1.161)	(0.100)
Dummy high income	.438	1.028*	1.618*	1.691*		1.467*	1.598*
	(.432)	(.410)	(.248)	(.375)		(.539)	(.518)
Oil dummy	-5.437*	-4.742*	-5.356*	-5.147*	-6.863*	-5.410*	-3.817*
	(1.285)	(.927)	(.966)	(.966)	(.928)	(1.320)	(1.312)
Trend	-.151						
	(.099)						
Population rural			-.008*	-.008*	-.010*		
			(.001)	(.001)	(.001)		
CPI				-.039*	-.031*		
				(.015)	(.019)		
External dDebt					-.046*		
					(.012)		
GDP per capita interaction with *manufacturing.						-.00002*	-.000*
						(2.391)	(1.750)
GDP per capita interaction with agriculture							.000*
(5.690)							
GDP per capita interaction with trade							2.740*
							(4.150)
Constant	324.56	20.96*	22.26*	29.59*	17.38*	(1.386)	16.51*
	(198.52)	(.867)	(.867)25.72*	(1.754)	(2.271)	(1.337)	
Observations	485	509	426	426	282	485	485
R-squared	0.59	0.59	0.59	0.60	0.44	0.60	0.63

Source: World Bank Staff calculations. yes

Note: External debt variable only available for developing countries.

*significant at five5 percent level.

** significant at ten 10 percent level.

(equation 1). A similar exercise was carried out with respect to indirect and direct tax collection across countries.

Modified Model: The Role of Institutional Variables

The discussion now turns to the cross-section estimates that allowed inclusion of the institutional (demand) variables such as governance indicators (government effectiveness, regulatory quality, corruption) and to control for the size of the shadow economy.[24] They had not been included in the panel estimation regression because they do not reveal much variation over time. The explanatory variables follow those employed in panel model (the basic regression corresponding to equation 2 from table 2A.2) because the regression passed the test of the omission variable (suggesting that the functional form is correct).

The empirical results, presented in table 2A.3, suggest strongly that conventional factors play a significant role in the determination of the

TABLE 2A.3

Cross-Section Results, Mean Values for Years 1995–2004 for 57 Countries

Variable	EQ1 base	EQ2	EQ3	EQ4	EQ5	EQ6	EQ4
GDP per capita	.001**	.001**	.001**	.001**	.001**	.001	.000
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Trade	(.072**	.080**	.086**	.078**	.068**	.068**	.079**
	(.032)	(.032)	(.034)	(.034)	(.033)	(.033)	(.035)
Agriculture	-.118	-.226*	-.169	.016	-.182	-.168	-.016
	(.014)	(.016)	(.143)	(.163)	(.152)	(.143)	(.178)
Population growth	-2.281**	-1.966**	-2.188**	-1.863**	-2.311**	-2.440**	-1.869**
	(1.163)	(1.152)	(1.172)	(1.176)	(1.227)	(1.167)	(1.167)
Shadow economy			-.069	-.169*			-0.126
			(.095)	(.103)			(.113)
Shadow economy_1					-.019		
					(0.226)		
Corruption						2.740	1.706
						(2.337)	(2.401)
GDP per capita interaction with agriculture		.001**					.000
		(.000)					(.000)
GDP per capita interaction with shadow economy				.001**			.001**
				(.000)			(.000)
Constant	20.39	16.21**	22.63**	19.62**	21.23**	22.85**	20.24**
	(3.975)	(4.525)	(6.560)	(1.386)	(10.66)	(1.386)	(6.572)
Observations	57	57	56	56	57	57	56
R-squared	0.54	0.56	0.54	0.67	0.54	0.58	0.56

Source: World Bank staff calculations.
Note: *Significant at 10 percent level; **significant at 5 percent level.

tax ratio, while the institutional factors perform less well. Although in some cases (shadow economy, corruption index) institutional coefficients took the correct sign, they were often insignificant. The lack of significance of the institutional variables may be caused by potential causality between the level of development, the shadow economy, and the governance variables. For example, more affluent countries usually have better quality institutions and smaller shadow economies (confirmed by the significantly positive coefficient on the shadow economy-GDP per capita interactive term in equation 4). Moreover, causality may run from taxes to the informal sector (high taxes tend to encourage informality). Although the instrumental variable approach was experimented with,[25] it did not improve the estimates (equation 5).

This suggests that considerable caution should be exercised in calculating the effects of institutional variables on tax performance, and further work should seek to identify those magnitudes more reliably.

Notes

1. Central Europe is defined here as the Czech Republic, Hungary, Poland, the Slovak Republic, and Slovenia.
2. Estonia, Latvia, and Lithuania.
3. Albania, Bosnia and Herzegovina, Croatia, Bulgaria, the former Yugoslav Republic of Macedonia, Romania, and Serbia and Montenegro.
4. Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, the Kyrgyz Republic, Moldova, the Russian Federation, Tajikistan, Ukraine, and Uzbekistan.
5. Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, the United Kingdom.
6. Armenia, Azerbaijan, Georgia, the Kyrgyz Republic, Moldova, and Tajikistan.
7. Belarus, Kazakhstan, the Russian Federation, and Ukraine.
8. Macroeconomic imbalances at the beginning of the transition in some countries led to high inflation that wiped out the real value of debt inherited from the socialist period.
9. ECA countries have turned out to be among the largest beneficiaries of the favorable global financial environment. This environment allowed them to save about 0.8–1.4 percent of GDP on interest payments in 2005. For details, see Hauner and Kumar (2005: 13, 15). The estimates include 10 ECA countries: Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, Russia, the Slovak Republic, Turkey, and Ukraine.
10. Cyclically adjusted data, available for EU-8 countries, is used to verify whether these thresholds are set at levels suitable for the isolation of exclusively discretionary fiscal reductions. In the verification procedure the thresholds assumed by Alesina and Perotti (1996) were applied to

check whether in isolated periods of substantial primary deficit improvement, primary structural balance increased by at least 1.5 percentage points of GDP within one year or by 1.25 percentage points of GDP per year over a period of two years.

11. Fiscal adjustments are considered to be based "mostly on expenditure cuts" (or "mostly on tax increases") if more than 50 percent but less than 100 percent of the improvement in the primary balance reflects a curtailment in primary spending (or a rise in general government revenue).
12. Typically, the empirical literature finds four important factors influencing the consolidation process, namely macroeconomic and fiscal conditions, the composition of fiscal adjustments, and the existence of fiscal rules. See Guichard, Kennedy, Wurzel and Andrél (2007).
13. Tax performance is a government's ability to raise adequate revenue to maximize social welfare. The yield of the tax system is a function of the tax bases available (economic structure), the rates applied to these bases, and the capacity to levy taxes effectively. Given these, the success of the authorities in exploiting the tax potential and in attaining the taxation target will depend on the need and desire for government spending, or willingness to tax.
14. Generally, the findings are robust to the inclusion of additional variables that have been used to model the tax ratio in the literature (inflation, external debt, rural population).
15. Tax effort is measured by comparing the actual tax ratio of a country with that predicted by using a panel regression, equation 2 of table 2A.2. An index of 1.0 means the country's tax effort is at the expected level, given the structural factors of the country. In other words, the country is using its taxable capacity at a level consistent with the average of the other countries in the sample.
16. The following classification is used: high index (equal to or greater than 1.2), medium index (between 0.9 and 1.1), and low index (less than or equal to 0.8).
17. The VAT or CIT productivity rate is the ratio of VAT or CIT collections to GDP divided by the nominal VAT or CIT rate. The PIT productivity measure is personal income tax revenue as percent of GDP divided by the top marginal income tax rate, and multiplied by the top income tax bracket value. Measuring tax productivity is fraught with difficulties stemming from imperfect approximations of the gross tax bases (lack of data) as well as types of tax deductions and credits that are available from country to country. Thus, it should be treated with caution.
18. The following classification is proposed: stronger administration (VAT/CIT/PIT productivity is greater than average productivity in the sample) and weaker administration (VAT/CIT/PIT productivity is less than average productivity in the sample).
19. The international empirical evidence on the links between taxes and growth is inconclusive, although some findings seem relatively robust. Many studies found a significant negative relation between the aggregate tax–to-GDP ratio and growth although the size of the effect differs considerably (Engen and Skinner 1996; Cashin 1995; Fölster and Henrekson 2001; World Bank 2006h).
20. $825–$3,255 GNI per capita.

21. Above $10,065 GNI per capita (31 countries in the sample).
22. The method is an alternative to feasible generalized last squares for fitting the linear cross-sectional time series models when disturbances are not assumed to be independent and identically distributed, and it is preferable to the feasible generalized least squares when the number of observations and time span are limited.
23. OIL dummy takes value of 1 if the share of fuel (and related products) in total merchandise exports exceeds 40 percent.
24. The shadow variable reflects tax evasion.
25. Following Davoodi and Grigorian (2006) we assumed that the shadow economy is driven mainly by tax burden, quality of institutions, and GDP per capita.