



WP/08/235

# IMF Working Paper

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Growing Apart?  
A Tale of Two Republics:  
Estonia and Georgia

*Thorvaldur Gylfason  
and Eduard Hochreiter*



**IMF Working Paper**

IMF Institute

**Growing Apart? A Tale of Two Republics: Estonia and Georgia<sup>1</sup>**

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Authorized for distribution by Andrew Feltenstein

October 2008

**Abstract**

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We compare and contrast the economic growth performance of Estonia and Georgia since the collapse of the Soviet Union in 1991 in an attempt to understand better the extent to which the growth differential between the two countries can be traced to increased efficiency in the use of capital and other resources (intensive growth) as opposed to brute accumulation of capital (extensive growth). On the basis of a simple growth accounting exercise, we infer that advances in education at all levels, good governance, and institutional reforms have played a more significant role in raising economic output and efficiency in Estonia than in Georgia which remains marred by various problems related to weak governance in the public and private spheres.

JEL Classification Numbers: O16

Keywords: Economic growth, governance, transition economies

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<sup>1</sup> We thank Charles Dickens, Gernot Doppelhofer, Andrew Feltenstein, Michael Funke, Nikoloz Gigineishvili, Anne-Marie Gulde-Wolf, Jakob de Haan, Oleh Havrylyshyn, Archil Mestvirishvili, Ekke Nömm, Martti Randveer, Märten Ross, Pierre Siklos, and Timor Wollmershäuser for their detailed comments on earlier versions of the paper. We have also benefited from several suggestions received from seminar and conference participants at Cambridge University and CESifo in Munich. The views expressed in the paper should not be attributed to the institutions with which we are affiliated. An earlier version appeared as CESifo Working Paper No. 2155, December 2007.

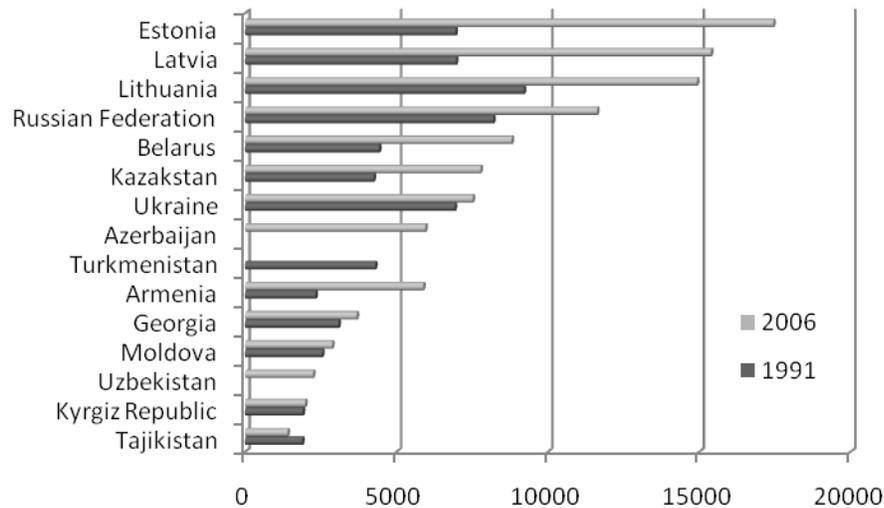
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## I. INTRODUCTION

Looking at the fate of the fifteen states that emerged from the Soviet Union, we find it striking how different their economic evolution has been since the collapse of the Soviet Union in 1991. One especially interesting feature is that the three Baltic States that are now members of the European Union (EU) have fared so much better in economic terms than any of the other Former Soviet Union (FSU) states, including Russia (Figure 1). The question is: Why?

**Figure 1. Gross National Income per capita 1991 and 2006**  
(International dollars at purchasing power parity)



Note: Data for Turkmenistan 2006 and Azerbaijan and Uzbekistan 1991 are not available.  
Source: World Bank, *World Development Indicators 2007*.

This paper aims to shed light on this question by applying standard growth economics to a comparison of the recent growth performance of two of the FSU countries, Estonia and Georgia, one from each tier in Figure 1. Both countries are small (45,226 km<sup>2</sup>, population 1.3 million, and 69,700 km<sup>2</sup>, population 4.7 million, respectively). Both are poorly endowed with natural resources, which may be good for their growth potential as suggested by Sachs and Warner (1995) and others, and both share a distant history of prosperity which, at the time, brought them considerable wealth. Estonia prospered when Tallinn (Reval) became part of the Hanseatic League, from 1285 onward. Georgia also prospered in its Golden Era from the 11<sup>th</sup> to the 13<sup>th</sup> century when the Georgian kingdom expanded to include most of the Caucasus before disintegrating in the 15<sup>th</sup> century following the Mongol invasions. Imperial Russia annexed Georgia in 1801. Estonia's fortune did not last either. Having first been brought under Swedish rule in the turbulent 16<sup>th</sup> and 17<sup>th</sup> centuries (southern Estonia briefly also came under Polish-Lithuanian rule), Estonia, like Georgia 80 years later, was annexed by Russia in 1721.

Both countries became independent in 1918. Estonia retained its independence until 1940, when it was annexed again, this time by the Soviet Union under the Hitler-Stalin Pact. At the time, Estonia's national income per capita was roughly on par with that of Finland across the

bay. Georgia's independence was much more short-lived, because the Soviet Union annexed the country in 1921. The reversal of fortune experienced by both countries accords with the view advanced by Acemoglu, Johnson, and Robinson (2002) and others that institutions matter for economic growth. Geography isn't everything.

Within the Soviet Union, the economic decline of the three Baltic republics – Estonia, Latvia, and Lithuania – was substantial but, overall, their economic situation remained better than in other Soviet republics, not least the Caucasus republics. However, official statistics may have overstated the differences because of Georgia's larger underground – that is, unrecorded – economy. In any case, the initial conditions for economic catch-up following Estonia and Georgia's secession from the Soviet Union in 1991 were more favorable in Estonia than in Georgia.<sup>3</sup> Even so, Estonia's gross domestic product (GDP) per capita adjusted for purchasing power parity (PPP) had sunk from approximate parity in 1940 to about one third of that of Finland in 1991.

Estonia, after regaining independence in 1991, quickly embarked on bold and decisive political, institutional, and economic reforms that were carried out by successive coalition governments from different parts of the political spectrum. We believe that the prospect of rapid EU integration, “the EU perspective,” provided a critical anchor for sustained political, institutional, and economic reforms across the political spectrum.<sup>4</sup>

Within less than fifteen years, Estonia was able to accede to the EU and its gross national income (GNI) per capita rose to a half of that of Finland. In 2004, Estonia also joined NATO. Today, Estonia is on a strong, sustainable path of rapid real growth and convergence to Finland and the rest of the EU membership. Moreover, apart from its inflation rate that, according to the Maastricht criteria, remains too high, Estonia is ready to adopt the euro and discard the kroon.

In contrast, Georgia, after regaining independence, was torn by civil war, was caught in a low-income trap, and suffered from corruption as well as from weak economic and institutional reforms. The absence of an EU perspective in Georgia as well as of a calm relationship with Russia did not help.

It was not until the Rose Revolution in 2003 that the situation of the country changed enough to rekindle hopes for fundamental political, institutional, and economic reforms that could at last make economic catch-up feasible. In 2007, Georgia became “the number one economic reformer” according to World Bank (2007). Between 2006 and 2007 Georgia skyrocketed from 112<sup>th</sup> place to 18<sup>th</sup> by the World Bank's Ease of Doing Business Index where Georgia is now just one place behind Estonia in 17<sup>th</sup> place (same source).

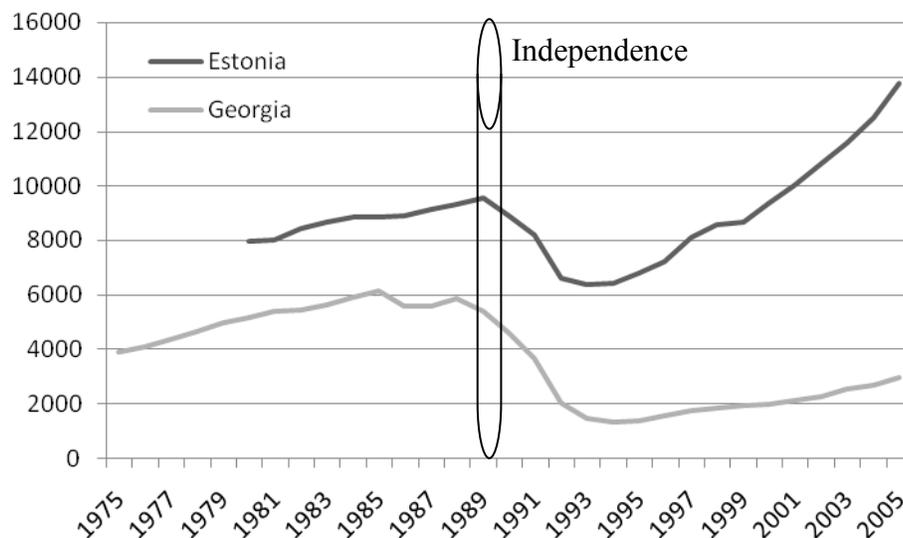
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<sup>3</sup> In particular, the initial conditions were also better in Estonia's energy sector where domestic reserves ensured a stable supply of energy, also during the winter.

<sup>4</sup> The EU perspective is a key factor today behind economic, institutional, and political developments in the Western Balkans.

The national economy of the Soviet Union and its constituent republics is now widely acknowledged to have been stagnant or worse for quite some time before the economic collapse that commenced in 1989. The severity of the plunge during and after 1989 varied from republic to republic and was probably closely related to the extent of the systemic failure of central planning as well as to local mismanagement that preceded the plunge. As Figure 2 shows, the plunge was significantly deeper and lasted longer in Georgia than in Estonia.<sup>5</sup> In Georgia, GDP per capita measured in constant US dollars at 2000 prices and adjusted for PPP contracted by almost 80 percent from 1988 to 1994 while in Estonia the contraction amounted to 33 percent from 1989 to 1993. Even so, since 1993, Estonia's GDP per capita has grown more rapidly than that of Georgia, or by 6.6 percent per year compared with 6.1 percent in Georgia.

**Figure 2. Gross Domestic Product per capita 1975-2005**  
(Constant 2000 international dollars at purchasing power parity)



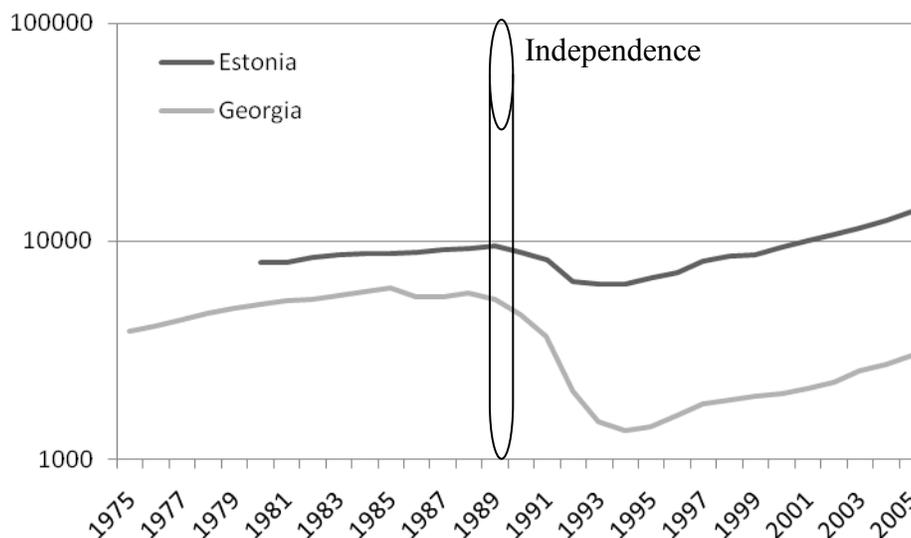
Source: World Bank, *World Development Indicators 2007*.

Estonia's more rapid growth after the initial plunge may seem surprising because it might have appeared easier for Georgia to grow more rapidly from such a low initial level of output after the fall. The fact that Estonia grew more rapidly than Georgia after the collapse suggests that initial output was only one of several determinants of the two countries' growth trajectories during this period. In 1980, Estonia's GDP per head was about 1.5 times that of Georgia. Since 1993, the income differential between the two countries has exceeded four, approaching five. A logarithmic representation of the evolution of GDP per capita in Figure 3 suggests that the income differential between the two countries in 2005, the latest year for which, at the time of writing, comparable GDP figures are available from the World Bank's

<sup>5</sup> The shadow economy is much larger in Georgia than in Estonia. If we corrected for this difference, the recorded income differential between the two countries could be smaller. In this context, Dreher *et al.* (2008) argue that the positive impact of institutional quality on official output and total factor productivity becomes smaller than otherwise would be the case.

*World Development Indicators 2007*, stems mostly from the fact that, of the two, Georgia suffered a much deeper contraction of measured output after 1989. The puzzle here is why, then, did Georgia not grow more rapidly than Estonia thereafter? Our hypothesis is that the rebound effect to be expected after a large initial decline in output did not materialize in Georgia because of the absence of a real growth effect emanating from rapid institution building, liberalization, and good governance as occurred in Estonia.<sup>6</sup>

**Figure 3. Gross Domestic Product per capita 1975-2005**  
(Constant 2000 international dollars at purchasing power parity, logarithmic scale)



Source: World Bank, *World Development Indicators 2007*.

To repeat, Estonia has enjoyed a double advantage over Georgia. Estonia grew much more rapidly from 1991 to 2006 both because the initial slump of output was shallower and more short-lived than in Georgia and also because, after the slump, Estonia managed to grow more rapidly than Georgia despite Georgia's much lower initial level of output per person when growth resumed in 1994.

The remainder of the paper is organized as follows: Section II lays out, in the simplest possible terms, the theoretical framework guiding the discussion to follow. In Section III, selected economic, political, and social indicators are employed to illuminate the possible reasons for the divergent economic developments in the two countries under review. We present a simple growth accounting exercise in an attempt to quantify the contributions of investment, education, and efficiency, including governance, to the income differential between the two countries. In Section IV, before summarizing our main findings, we briefly discuss the policy implications of the growth comparisons of the two countries and suggest potential lessons for other countries that lag behind their erstwhile equals.

<sup>6</sup> See Berengaut *et al.* (2002) and Havrylyshyn (2007, p. 16).

## II. THEORETICAL BACKGROUND

Economic growth can be either *extensive*, driven forward by the accumulation of dead capital, or it can be *intensive*, by which is meant growth that springs from more efficient use of existing capital and other resources. Among the numerous alternative ways of increasing economic and social efficiency, one of the most obvious is the accumulation of live capital – that is, human capital – through education, on-the-job training, and health care. There are many other ways as well to increase efficiency and economic growth. Adam Smith and David Ricardo showed how free trade can enable individuals and countries to break outside the production frontiers that, under autarky, would confine them to lower standards of life. Other examples abound, as the theory of endogenous economic growth and its empirical implementation in recent years have made clear.

In the rapidly advancing theoretical and empirical literature on economic growth in formerly centrally planned economies (e.g., Fischer and Sahay, 2000, and Campos and Coricelli, 2002),<sup>7</sup> it is now widely recognized that the quality of institutions and good governance can help generate sustained growth and so can also various other factors that are closely related to economic organization, institutions, and policy (Acemoglu and Johnson, 2005); see also Dixit, 2004).<sup>8</sup> We want to ascertain whether the growth differential between Estonia and Georgia since 1991 can be traced mostly to efficiency (i.e., intensive growth), as we suspect, rather than accumulation (i.e., extensive growth).

### A. Explaining Differences in Output per Capita

To set the stage, consider the constant-returns-to-scale production function:

$$(1) \quad Y = AH^{\alpha}K^{\beta}N^{\gamma}L^{1-\alpha-\beta-\gamma}$$

Here  $Y$  is national economic output,  $A$  is a parameter that reflects total factor productivity (TFP), or efficiency, that is, the ability to convert inputs into output,  $H$  is human capital,  $K$  is real capital,  $N$  is natural capital, including land, and  $L$  is raw labor. The four exponents are the output elasticities of the inputs and lie between zero and one. By dividing through the production function by labor, we obtain this standard expression for output per person:

$$(2) \quad \frac{Y}{L} = A \left(\frac{H}{L}\right)^{\alpha} \left(\frac{K}{L}\right)^{\beta} \left(\frac{N}{L}\right)^{\gamma}$$

Hence, output per capita depends on four factors:

- (i) Efficiency
- (ii) Human capital per person
- (iii) Capital/labor ratio
- (iv) Natural capital per person

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<sup>7</sup> For an excellent survey, see Havrelyshyn (2002).

<sup>8</sup> Klomp and Haan (2008) report that democracy also reduces economic volatility.

There are two things to note about this classification. First, if it so happened that human capital, real capital, and natural capital all grew at the same rate as the labor force, then advances in efficiency ( $A$ ) would remain as the sole source of economic growth, by which we mean the rate of growth of output per person. The second point is that just as, in nature, some plants grow faster than others, so do different types of capital grow at different rates. While experience suggests that real capital grows at roughly the same rate as output over long periods, rendering the capital/output ratio constant over time, human capital can easily grow more rapidly than real capital, while natural capital – certainly that part of it that is nonrenewable, but also some renewable natural capital such as fish in the sea – tends to grow less rapidly than real capital. This, by the way – or think of fixed land, if you prefer – is why increased population growth, against common intuition, tends to slow down economic growth.

Different growth rates of the different determinants of economic growth mean that the rate of growth of output per capita must be a weighted combination of the growth rates of the different inputs. We can simplify the story somewhat by acknowledging that, apart from farmland, natural capital plays an insignificant macroeconomic role in the two countries under review, allowing us to set  $c = 0$  in the production function. If we assume  $a = b = 1/3$  in equations (1) and (2), the sum of the output elasticities of  $H$  and  $L$  – that is, of total labor, if you like – is  $2/3$  compared with an output elasticity of capital of  $1/3$ , a familiar constellation of parameters (Mankiw, Romer, and Weil, 1992).<sup>9</sup> Further, we can impose on the production function the requirement that capital and output change in tandem, as is customary in parts of the growth literature. Those two modifications reduce the number of the determinants of long-run growth in our model from four to three: efficiency  $A$ , human capital per person  $H/L$ , and the capital/output ratio  $K/Y$ :

$$(3) \quad \frac{Y}{L} = A^{\frac{1}{1-b}} \left(\frac{H}{L}\right)^{\frac{a}{1-b}} \left(\frac{K}{Y}\right)^{\frac{b}{1-b}} = A^{1.5} \sqrt{\left(\frac{H}{L}\right) \left(\frac{K}{Y}\right)}$$

Even so, we want to emphasize not so much long-run growth of potential output as the medium-term growth of the actual level of output.

In our equations above, the efficiency parameter  $A$  comprises a variety of factors, among them technological advances and other types of efficiency gains from various sources, including internal as well as external trade, “good” institutions, and “good” governance (Williamson, 2005); see also Marsiliani and Renström, 2007). Governance, in turn, is a broad concept, and subsumes managerial, fiscal, monetary, financial, and external governance, each of which comprises several components. The examination of some of these “unbundled” governance factors is at the core of our attempt to answer the question of why Estonia has grown so much more rapidly than Georgia. However, we also need to compare human capital per person in the two countries as well as their capital/output ratios.

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<sup>9</sup> Senhadji (2000) estimates aggregate production functions for 88 countries, but neither Estonia nor Georgia is included in his sample.

Human capital per person depends on education as measured by the number of years  $u$  at school in the spirit of Mincer (1974):

$$(4) \quad \frac{H}{L} = e^{v u}$$

Here  $v$  is a positive number and  $u$  is the duration of education measured in years at school. Without education (i.e., if  $u = 0$ ), there is no need to distinguish human capital from raw labor, so  $H = L$ . Taking logarithms and differentiating, we see that

$$(5) \quad \frac{d \log H}{dt} = v$$

Therefore,  $v$  measures the proportional increase in human capital resulting from each additional year at school, a number like 0.1 according to several labor market and growth studies of advanced economies (see, e.g., Bils and Klenow, 2000).

The capital/output ratio is proportional to the investment rate  $I/Y$ , and follows from the standard dynamics of capital theory where  $K_t = I_t + (1 - \delta)K_{t-1}$ ,  $I_t$  is gross investment in year  $t$ , and  $\delta$  is the rate of depreciation:

$$(6) \quad \frac{K}{Y} = \left( \frac{1+g}{g+\delta} \right) \frac{I}{Y}$$

Here  $g$  is the rate of growth of output and capital.

Substitution of equations (4) and (6) into equation (3) gives

$$(7) \quad \frac{Y}{L} = A^{1-\delta} \sqrt{e^{v u} \left( \frac{1+g}{g+\delta} \right) \frac{I}{Y}}$$

If we allow efficiency  $A$ , years of schooling  $u$ , and investment rates  $I/Y$  to differ between Estonia and Georgia while the productivity of schooling  $v$ , the growth of the capital stock  $g$ , and depreciation  $\delta$  are assumed the same in the two countries, we can express the ratio of per capita output  $y = Y/L$  in the two countries as follows:

$$(8) \quad \frac{Y_E}{Y_G} = \left( \frac{A_E}{A_G} \right)^{1-\delta} \sqrt{e^{v u_E - v u_G} \left( \frac{I/Y_E}{I/Y_G} \right)}$$

## B. From Output to Efficiency

Before embarking on the empirical analysis to follow, we need to face the fact that our quantitative measure of economic performance, output per capita, differs from the ideal conceptual measure, output per hour worked, which takes explicitly into consideration the work effort behind the output produced. By definition, we have

$$(9) \quad \frac{Y}{L} = \frac{Y}{Q} \frac{Q}{L}$$

where  $Q$  is hours worked. Hours of work per person,  $Q/L$ , can be expressed as

$$(10) \quad \frac{Q}{L} = \left(\frac{N+U}{L}\right) \left(\frac{Q}{N}\right) \left(1 - \frac{U}{N+U}\right)$$

where  $N$  is employment and  $U$  is unemployment, so that  $(N+U)/L$  is the labor force participation rate,  $Q/N$  is hours of work per employed person, and  $U/(N+U)$  is the unemployment rate. If, as we should, we replace labor (i.e., population)  $L$  by hours worked  $Q$  in equation (3), we have

$$(11) \quad \frac{Y}{Q} = A^{1-\beta} \left(\frac{N}{Q}\right)^{1-\beta} \left(\frac{K}{Y}\right)^{\beta} = A^{1-\beta} \sqrt{\left(\frac{N}{Q}\right) \left(\frac{K}{Y}\right)}$$

This means that

$$(12) \quad \frac{Y}{L} = A^{1-\beta} \sqrt{\left(\frac{N}{Q}\right) \left(\frac{K}{Y}\right)} \cdot \frac{Q}{L} = A^{1-\beta} \sqrt{\left(\frac{N}{L}\right) \left(\frac{K}{Y}\right) / \frac{Q}{L}} \cdot \frac{Q}{L} = A^{1-\beta} \sqrt{\left(\frac{N}{L}\right) \left(\frac{K}{Y}\right) \left(\frac{Q}{L}\right)}$$

The upshot of this extension of our model is that hours worked per person – and hence, by equation (10), labor force participation, hours worked per employee, and unemployment – make an independent contribution to output per person. The corresponding expression for output per hour worked, from equation (11), is

$$(13) \quad \frac{Y}{Q} = A^{1-\beta} \sqrt{\left(\frac{N}{L}\right) \left(\frac{K}{Y}\right) / \frac{Q}{L}}$$

Equation (13) suggests that an increase in hours worked per person reduces output per hour worked, i.e., reduces labor productivity.

Part of our empirical strategy is to provide a rudimentary quantitative assessment of the contributions of education, investment, and labor market institutions to the relative per capita incomes of Estonia and Georgia by evaluating the expressions under the square root in equation (12). This will enable us to attribute the rest of the income differential between the two countries to differences in efficiency, the term outside the square root on the right-hand side of equation (12). This requires a comparative review of a number of different economic, political, and social indicators to which we now turn.

### III. EMPIRICAL EVIDENCE

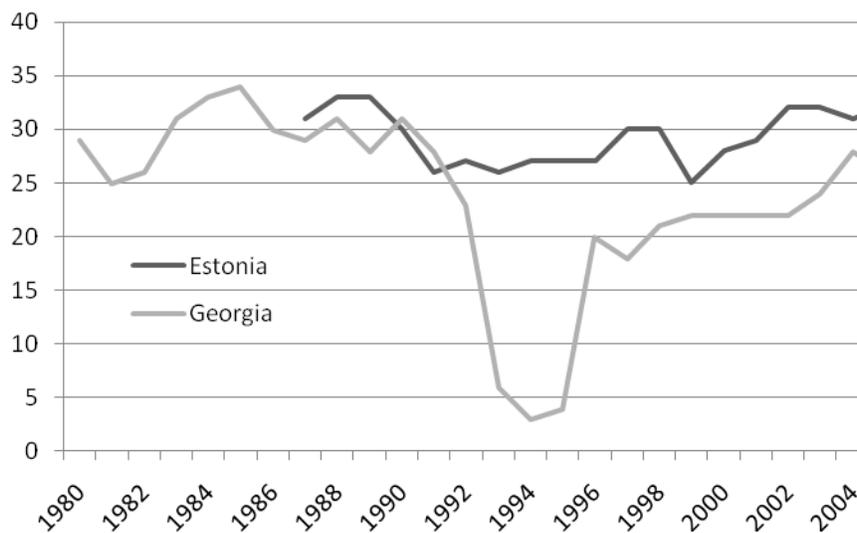
We are aware that fifteen years of macroeconomic data following the collapse of the Soviet Union that started in 1989 is too short a period to be amenable to a fully fledged long-run economic growth analysis in the spirit of, for example, Hall and Jones (1999). Instead, against the background provided in the preceding section, we intend to ask whether the pattern of those macroeconomic variables that recent growth research has identified as potentially important determinants of output per person and thereby also ultimately of long-run economic growth in cross-country comparisons have behaved in ways that can shed some

light on economic developments in Estonia and Georgia since independence. To this we add a simple growth accounting exercise intended to suggest the relative contributions of investment, education, labor markets institutions, and efficiency to the income differential between the two countries. Full-fledged growth accounting in which output growth could be traced in quantifiable proportions to all underlying inputs and the efficiency with which they were used is beyond the scope of the present exercise.

### A. Investment and Education

Let us start with domestic investment, a key determinant of the capital/labor ratio and of economic growth. Which of the two countries has put aside more resources for capital formation since 1989? As Figure 4 shows, Estonia invested 29 percent of GDP in machinery and equipment on average from 1989 to 2005 compared with 20 percent in Georgia. These are the investment rates we need to evaluate the second term under the square root in equation (8). The same applies to investments in human capital. With 95 percent enrolment at the primary-school level, Georgia has not quite achieved parity with Estonia's 100 percent primary-school enrolment rate. Moreover, Figure 5 shows that nearly all Estonian youngsters attend secondary schools compared with four fifths of Georgians. In 2004, nearly two thirds of young Estonians attended colleges and universities compared with 42 percent in Georgia. Before the end of this section, we will distill from these numbers estimates of years of schooling that we need to evaluate the first term under the square root in equation (8). In recent years, public and private expenditure on education amounted to about six percent of GDP in Estonia compared with two percent in Georgia. None of these input measures – school enrolment rates, years of schooling, or expenditures on education—capture the quality of education, however, a common problem in education research. With early reforms, Estonia sought harmonization with EU standards, another benefit of the afore-mentioned EU perspective. Education reform in Georgia started more recently.

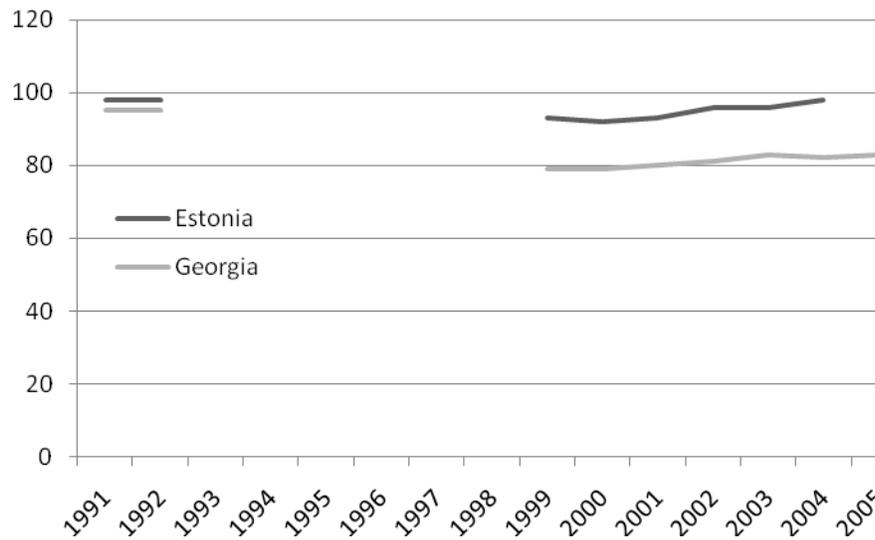
**Figure 4. Gross Capital Formation 1980-2005 (% of GDP)**



Source: World Bank, *World Development Indicators 2007*.

Other indicators point in the same direction. In Estonia, there were 483 personal computers per 1,000 inhabitants in 2005, almost the same figure as in Finland, compared with 42 personal computers in Georgia in 2004. Likewise, in Estonia, there were 513 internet users per 1,000 inhabitants in 2005, the same as in Finland in 2004; the Georgian figure for 2004 is 39 internet users per 1,000 inhabitants. Estonia now has more mobile phone subscribers than people, surpassing even Finland next door, while Georgia has 326 mobile phone subscribers per 1,000 inhabitants. Education and technological sophistication are clearly conducive to a business-friendly climate for domestic as well as foreign investment.

**Figure 5. Secondary-School Enrolment 1991-2005 (% of Cohort)**



Source: World Bank, *World Development Indicators 2007*.

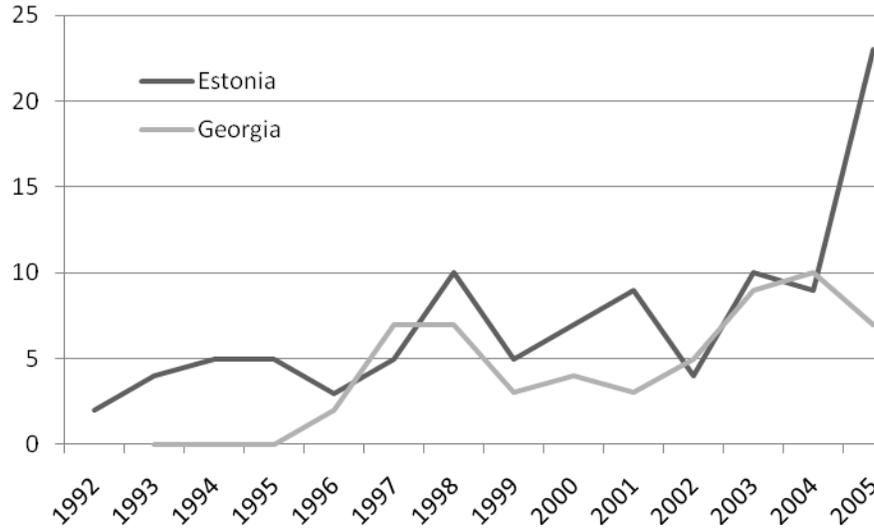
Understandably, foreign investment was virtually nonexistent in the early 1990s, but since then Estonia has attracted more capital from abroad than Georgia. Specifically, net inflows of foreign direct investment in Estonia amounted to seven percent of GDP 1992-2005 on average compared with four percent in Georgia (Figure 6).<sup>10</sup> Estonia has clearly been more open toward the influx of foreign capital.

Domestic and foreign investment and education at all levels are key sources of the accumulation of real capital and human capital. Together as well as separately, they are important determinants of output per person and economic growth. As far as those two time-honored pillars of productivity and growth are concerned, Estonia outperformed Georgia during the transition period, so there is perhaps little wonder, then, that Estonia's output per person has grown more rapidly than that of Georgia. Today, the people of Estonia enjoy a

<sup>10</sup> The difference between Estonia and Georgia is even larger if computed on a per capita basis.

markedly higher standard of living than they did under Soviet rule whereas the people of Georgia remain significantly worse off (recall Figures 1 and 2).<sup>11</sup>

**Figure 6. Foreign Direct Investment 1992-2005 (Net Inflows, % of GDP)**



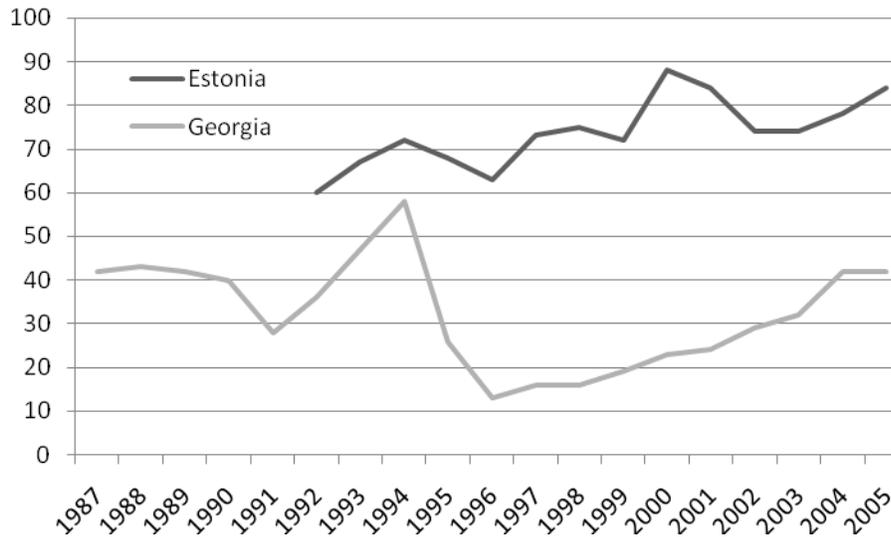
Source: World Bank, *World Development Indicators 2007*.

## B. Exports, Inflation, and Economic Structure

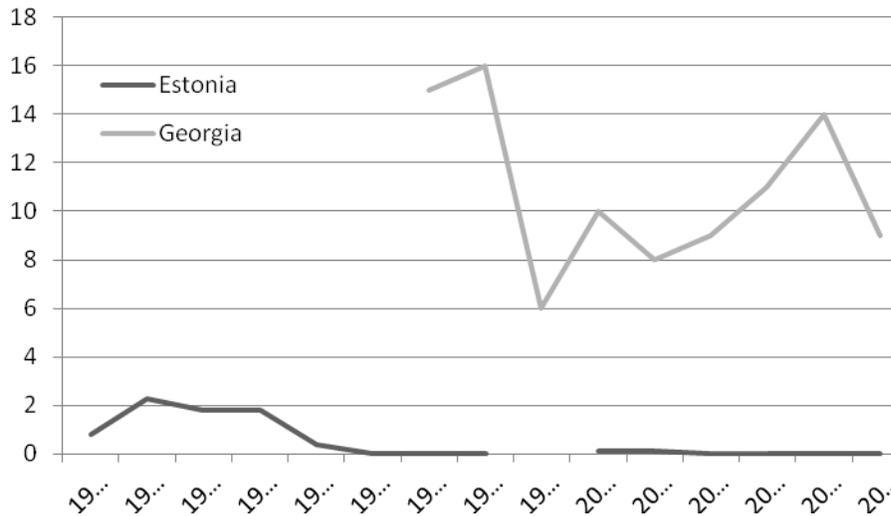
We now turn to TFP, the parameter  $A$  in equation (1). Recall that trade, stable prices, structural adjustment, etc., all encourage economic efficiency, and thus, are good for growth.

Estonia has also been more open than Georgia toward foreign trade. Exports of goods and services from Estonia amounted to 73 percent of GDP on average 1992-2005 compared with 33 percent in Georgia (Figure 7). The export figures include re-exports. Geography helped, and so did a liberal trade policy outlook: when Estonia's foreign markets collapsed in the 1990s, it was able to win new markets for its exports remarkably quickly in Western Europe. Georgia could not. While Estonia eliminated all import duties after 1995 in the context and framework of preparing for future EU accession, Georgia could, in the absence of such an EU perspective, only resort to unilateral liberalization of its trade. In practice, Georgia has continued to depend on import restrictions for about ten percent of its tax revenues (Figure 8), and much more if value added and excise taxes on imports are included. Further, it takes, on average, twice as long for importers to clear customs in Georgia (3.4 days) as in Estonia (1.7 days). Free trade is good for growth.

<sup>11</sup> It is difficult to compare data from the Soviet time with those of the post-Soviet period. Hence, the statement in the text has to be interpreted with care, especially if the cost of queuing, product range and quality, etc., is included in the GDP measure. If so, it could be argued that Georgians, on average, are already (2005/2006) better off than they were in Soviet times.

**Figure 7. Exports of Goods and Services 1987-2005 (% of GDP)**

Source: World Bank, *World Development Indicators 2007*.

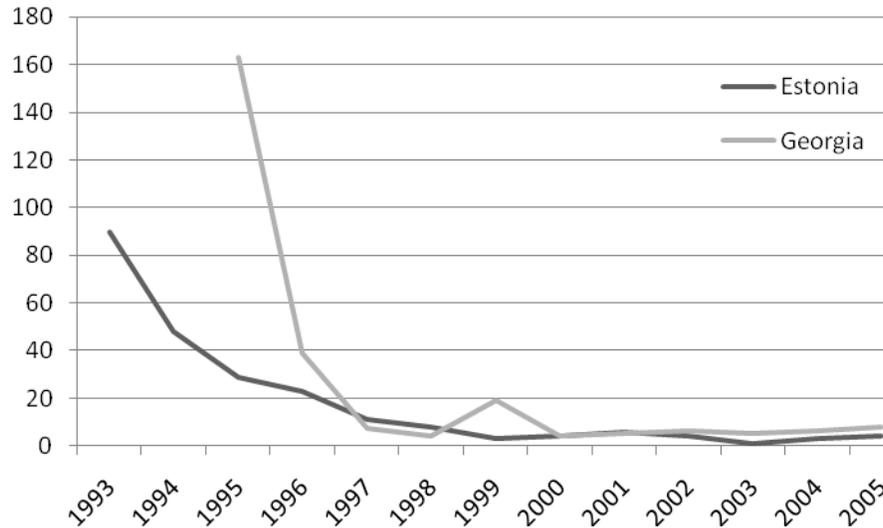
**Figure 8. Customs and Other Import Duties 1991-2005 (% of Tax Revenue)**

Source: World Bank, *World Development Indicators 2005 and 2007*.

Price stability is also good for growth. Figure 9 shows that in the 1990s Georgia managed to bring inflation down almost as far as Estonia. However, in the early 1990s inflation was much higher in Georgia than in Estonia as a result of severe initial monetary overhang and other problems. It is, therefore, not surprising that the process of monetization of economic transactions has been slower in Georgia than in Estonia (Figure 10). Most African countries have a higher ratio of broad money to GDP – that is, greater financial depth – than Georgia. High inflation tends to hold back economic growth through various channels. It tends to do

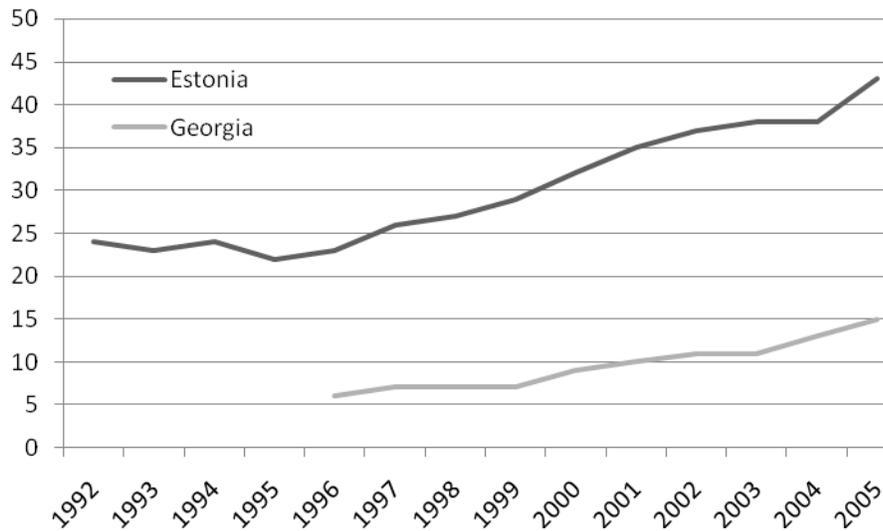
so by reducing financial depth, among other things, or, if you prefer, by discouraging the accumulation of financial capital, thus depriving the economic system of necessary lubrication in the form of adequate liquidity, and insufficient lubrication hampers economic efficiency and growth.

**Figure 9. Inflation 1993-2005 (% , Consumer Prices)**



Source: World Bank, *World Development Indicators 2007*.

**Figure 10. Financial Depth 1992-2005 (Broad Money as % of GDP)**



Source: World Bank, *World Development Indicators 2007*.

We now turn to the exchange rate regime. In transition economies, there is some evidence that exchange rate pegs go along with less inflation and less economic growth than do more flexible exchange rate regimes (see, e.g., Levy-Yeyati and Sturzenegger, 2003). Gosh, Gulde, and Wolf (2000), however, report that countries with hard pegs have not only less inflation but also more growth. The two countries under study opted for exchange rate regimes at opposite ends of the spectrum. Estonia adopted a currency board shortly after independence, and maintained it ever since. Georgia, instead, opted for a managed float, and has intervened to build up official reserves and smooth the exchange rate. The fact that Estonia has grown more rapidly than Georgia (Figure 3) and had less inflation (Figure 9) may, however, have less to do with their different exchange rate regimes than with the development of better fiscal, financial, and monetary institutions in Estonia than in Georgia.<sup>12</sup>

Even though inflation has been largely brought under control, macroeconomic management and organization remain problematic in Georgia. The interest-rate spread—that is, the interest rate charged by banks on loans to prime customers minus the interest rate paid by commercial or similar banks for demand, time, or savings deposits—is a simple measure of the efficiency of the banking system the commercial part of which, by the late 1990s, had in both countries been put into private hands. In Estonia foreigners own almost all banks assets compared with about two thirds in Georgia. In 2005, the interest spread was three percent in Estonia like in Finland in 2004, a respectable figure by international standards. In Georgia, however, the interest spread in 2005 was fourteen percent (*World Development Indicators 2007*),<sup>13</sup> suggesting continued inefficiency and lack of competition in the banking system, or high credit risks, despite full privatization (see Clark, Cull, and Shirley, 2004). Privatization and foreign ownership may not be enough, however, to increase competition and efficiency in the banking system. What matters most is the transfer of know-how, managerial experience, and fresh capital. Still, the Georgian figure of fourteen percent constitutes a significant improvement from earlier years when, from 2000 to 2004, the interest spread was between 20 percent and 24 percent even if inflation had been brought down to single digits (recall Figure 9).

Also, the Georgian economy remains heavily dependent on agriculture that still accounts for about a fifth of GDP as it did in the 1980s. By contrast, Estonia has little by little managed to diminish the share of its agriculture in GDP down to five percent which is only a little more than the EU average (Figure 11). This suggests both a stronger effort by the government to modernize the economy – by reducing farm support, for example – as well as greater mobility of labor and other factors of production between industries in Estonia than in Georgia. Accordingly, manufacturing and services have grown more rapidly in Estonia than in Georgia. During 1995-2005, manufacturing accounted for almost three fourths of Estonia's exports compared with about a third in Georgia (Figure 12). This matters because a strong manufacturing sector is ordinarily an important source of economic growth, partly because it is conducive to research and technological progress far beyond agriculture as well as to the buildup of human capital. Estonia's infrastructure is being modernized at a rapid

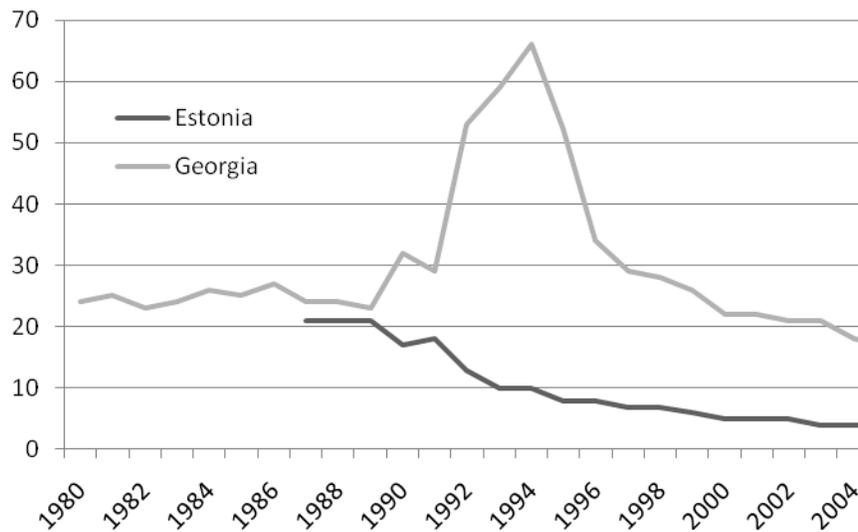
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<sup>12</sup> In the mid-1990s, according to Maliszewski (2000), the central banks of both countries were by law roughly equally independent in an economic as well as political sense.

<sup>13</sup> The National Bank of Georgia reports a spread of 8.7 percent in 2005. Definitions differ.

pace. Electrical outages are rare: in 2005, electrical power was interrupted for one day compared with 39 days in Georgia. While, in 2006, it took 35 days to start a business in Estonia against 16 days in Georgia, more recent figures (World Bank, 2007) show that the time required to start a business in Estonia has fallen to a maximum of 7 days compared with 11 days in Georgia. Further, the cost of registering a business is much lower in Estonia than in Georgia, or five percent of GNI per capita in Estonia in 2006 against eleven percent in Georgia, down from 23 percent in 2003 (same source). The World Bank's Ease of Doing Business Index that ranks 178 countries by how conducive the regulatory environment is to business operation now puts Estonia in 17<sup>th</sup> place and Georgia in 18<sup>th</sup>, up from 112<sup>th</sup> place in 2003, as mentioned before (see <http://www.doingbusiness.org>). If this improvement of the Ease of Doing Business Index is maintained, investment could rise and Georgia's growth rate could also rise.

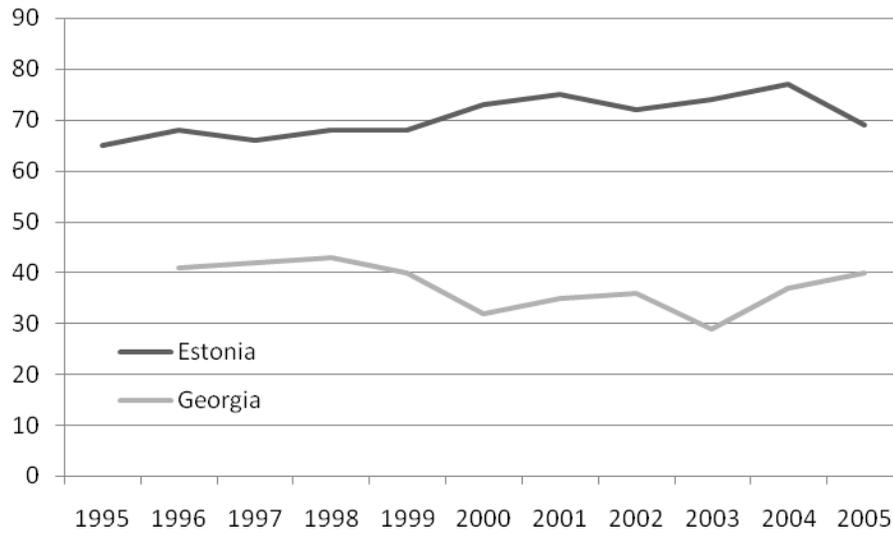
**Figure 11. Agriculture 1980-2005 (Value Added as % of GDP)**



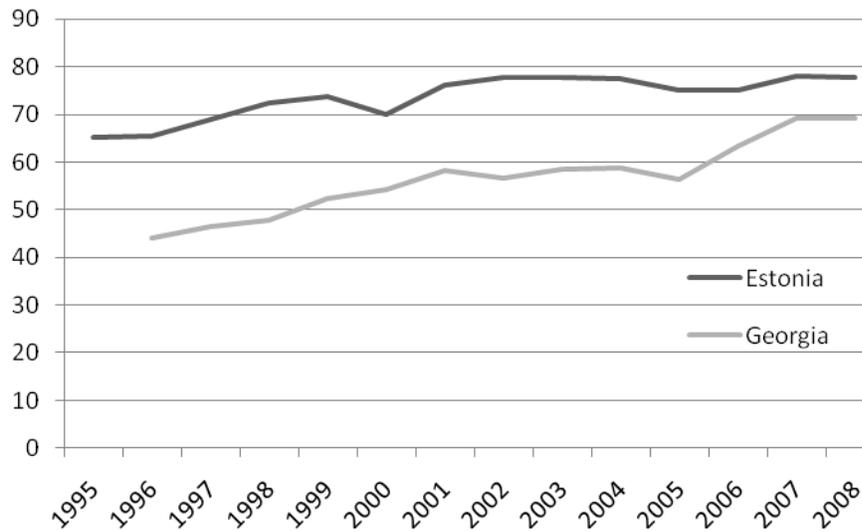
Source: World Bank, *World Development Indicators 2007*.

To give one more example, in Estonia, tax rates were cited as a major business constraint by three percent of the managers surveyed in 2005 compared with 36 percent in Georgia.<sup>14</sup> These numbers suggest that different standards of governance may help explain why the transition from agriculture to manufacturing, trade, and services has been slower in Georgia than in Estonia. Figure 13 describes the advance of economic freedoms in Estonia and Georgia since 1995; the scores shown are composites of individual scores for ten different aspects of freedom, including trade freedom, business freedom, investment freedom, and property rights.

<sup>14</sup> Funke (2006) shows how Estonia's 2000 Income Tax Act led to higher per capita income and investment.

**Figure 12. Manufactures Exports 1995-2005 (% of Merchandise Exports)**

Source: World Bank, *World Development Indicators 2007*.

**Figure 13. Economic Freedom Index 1995-2008**

Source: Heritage Foundation, [www.heritage.org/index/](http://www.heritage.org/index/).

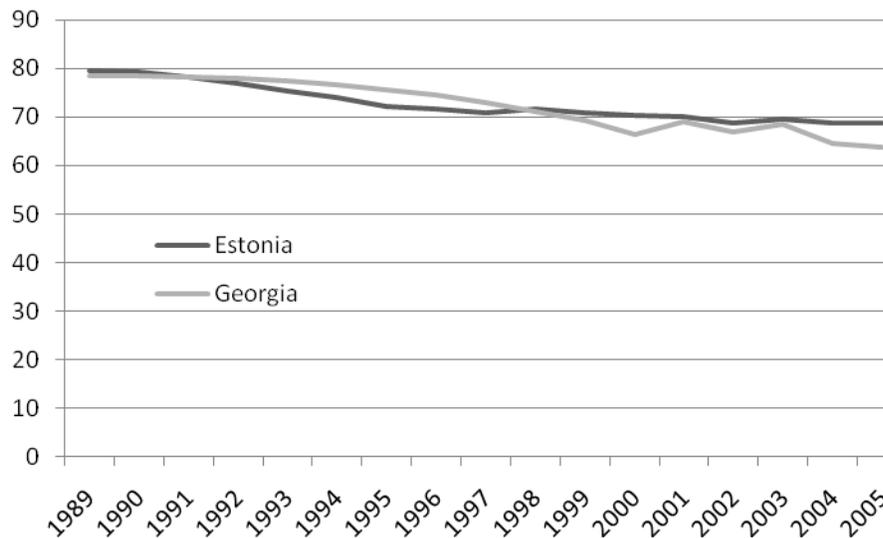
To recapitulate, economic growth requires capital to be accumulated and to be efficiently used: real capital, human capital, foreign capital, and financial capital, all of which we have covered thus far, and also social capital to which we now turn.

### C. Labor Markets

Our model in Section II permits us to consider labor market institutions as an independent potential determinant of growth (Forteza and Rama, 2006). The key is the distinction between labor and hours of work. More work increases output per person as in equation (12), but the need for a lot of work may also be a sign of inefficiency as in equation (13). By definition, as in equation (10), hours worked per person reflect labor force participation, hours of work per employee, and unemployment all of which, in turn, depend on prevailing labor market institutions, among other things. For example, rigid labor markets tend to be conducive to high unemployment. Available data on labor markets do not, however, unmask any major differences between labor market institutions in Estonia and Georgia.

Figure 14 shows that throughout the transition period labor force participation rates among 15-64 year olds declined in tandem in the two countries. Figure 15 shows a gradual increase in hours of nonagricultural work in Estonia from 33 hours per week to 35, but the International Labor Organization reports data on hours in Georgia only for 1998 and 1999. The difference between the two countries in those two years is hardly significant, half an hour per week in 1998 and one hour in 1999. At last, Figure 16 shows rather similar average unemployment rates in the two countries from 1998 to 2004. We surmise that Georgia experienced a similar increase in joblessness as Estonia 1989-1997 even if we do not have comparable data to show it. If so, unemployment has behaved similarly in the two countries in the post-Soviet period.

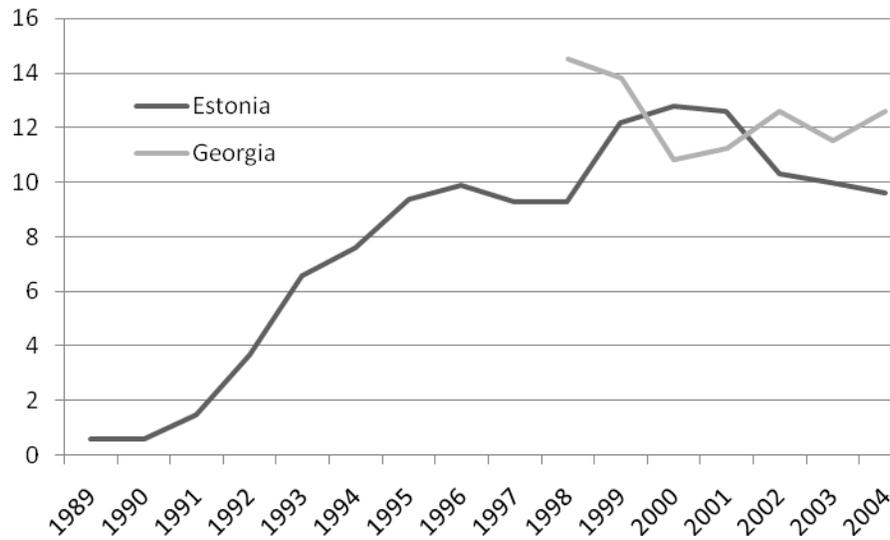
**Figure 14. Labor Force Participation 1989-2005 (% of Population)**



Source: World Bank, *World Development Indicators 2007*.

**Figure 15. Hours of Work per Employee per Week 1995-2008**

Source: International Labor Organization, [www.ilo.org](http://www.ilo.org).

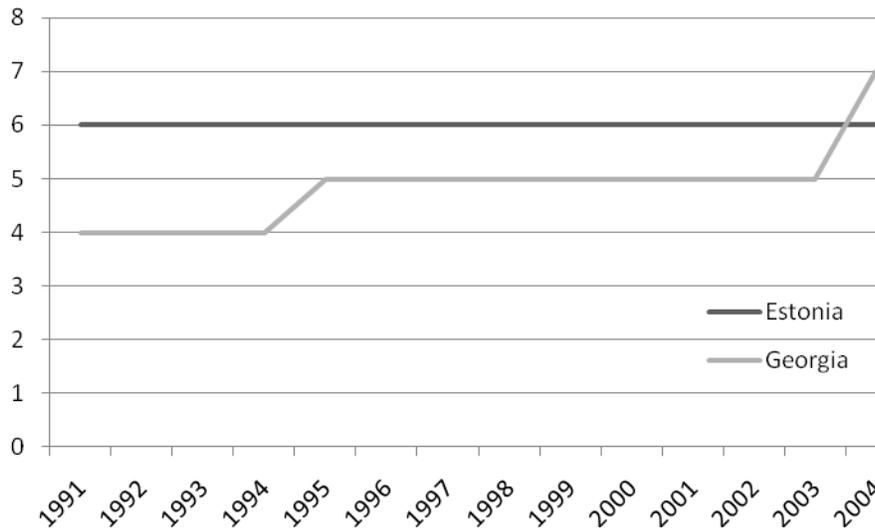
**Figure 16. Unemployment 1989-2004 (% of Total Labor Force)**

Source: World Bank, *World Development Indicators 2007*.

### D. Democracy, Governance, and Demography<sup>15</sup>

Because of unresolved issues with its Russian citizens, Estonia does not score as high in surveys of democracy as its neighbors, Latvia and Lithuania. According to political scientists at the University of Maryland (the Polity IV Project; see Marshall and Jagers, 2001), Lithuania has scored a perfect ten since reclaiming its independence in 1991, Latvia eight, and Estonia six. For comparison, Georgia has scored between four and five since 1992 and, more recently, in 2004, seven (Figure 17).<sup>16</sup> Democracy, we think, is good for growth because it improves governance. Democratization can be viewed as an investment in social capital by which we mean the infrastructural glue that holds society together and keeps it working harmoniously and well. Social capital comprises several other ingredients, including trust, the absence of rampant corruption, and reasonable equality in the distribution of income and wealth (see Paldam and Svendsen, 2000). The idea here is that political oppression, corruption, and excessive inequalities tend to diminish social cohesion and thereby also the quantity or quality of social capital.

**Figure 17. Democracy 1991-2004 (Index from -10 to 10)**



Source: Marshall and Jagers (2001).

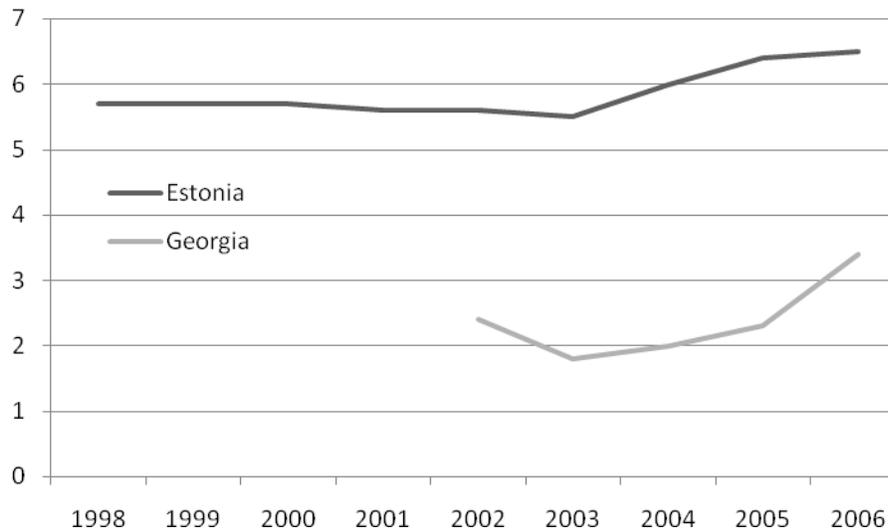
According to the World Bank's Enterprise Surveys, about the same proportion of managers surveyed in 2005 said they lacked confidence in the court system to uphold property rights (30 percent in Estonia, 29 percent in Georgia). Even so, in Estonia, only two percent of the managers surveyed described their lack of confidence in the courts as a major business constraint compared with twelve percent in Georgia. In Estonia, two percent of the managers surveyed described crime as a major business constraint compared with 24 percent in

<sup>15</sup> Note that for a number of variables discussed here only soft, survey data are available.

<sup>16</sup> Even so, freedom ratings for Estonia by Freedom House are consistently higher than for Georgia, also for earlier years. See <http://www.freedomhouse.org/uploads/fiw/SubScoresFIW2007.xls>. Also, recall Figure 13.

Georgia. Further, according to Transparency International, there is a marked difference between Estonia and Georgia in terms of corruption. Figure 18 shows a three-to-four-point difference between the corruption perceptions indices for Estonia and Georgia. The World Bank reports a similar finding. In 2005, 20 percent of managers surveyed in Georgia described corruption as a major constraint on their business operations compared with four percent of managers in Estonia. Since 1999, Estonia has made some progress in the battle against corruption. However, Georgia has not, and corruption remains a big challenge. This probably makes a difference because corruption is not good for growth (Mauro, 1995; see also Bardhan, 1997). Georgian managers say they have to spend three percent of their time dealing with officials compared with two percent in Estonia.

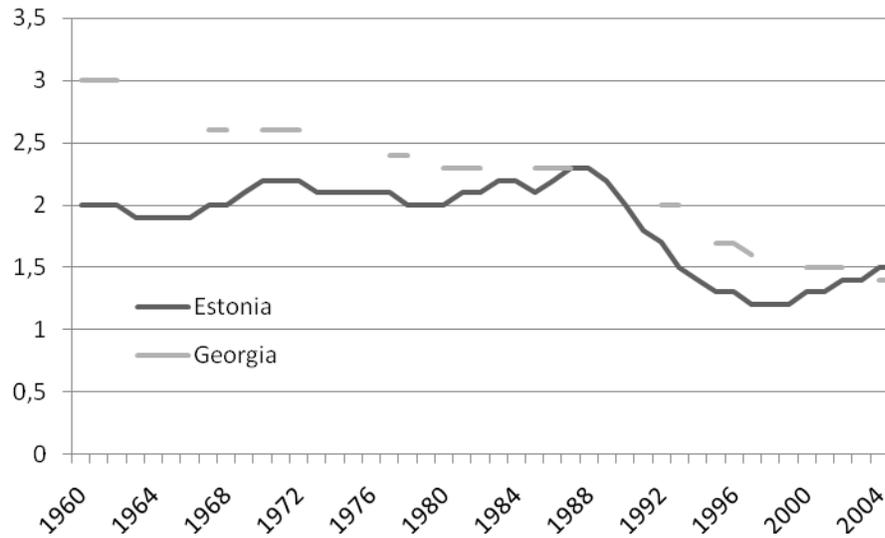
**Figure 18. Corruption 1998-2006 (Index from 1 to 10)**



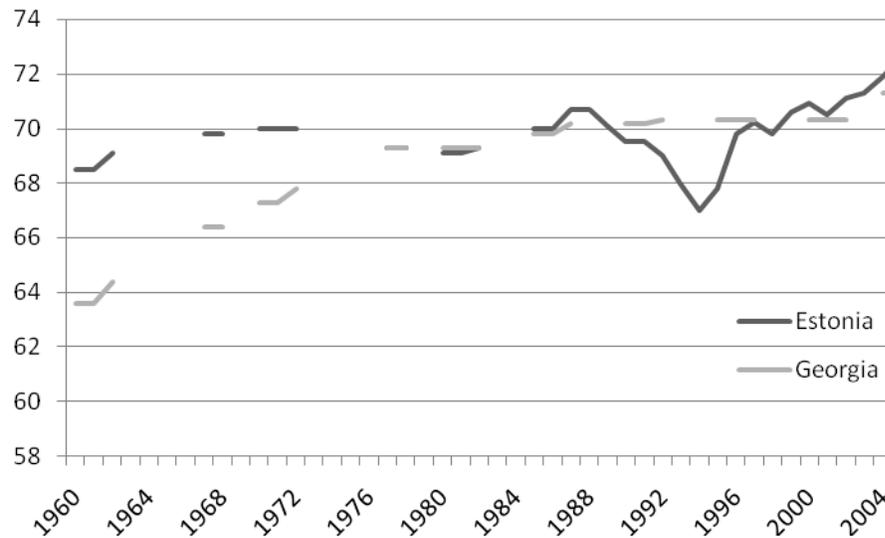
Source: Transparency International, 1999-2007, [www.transparency.org](http://www.transparency.org).

The distribution of income has become somewhat less unequal in Estonia than in Georgia; in 2003, the Gini index of inequality was 36 in Estonia and 40 in Georgia, whereas in the late 1990s it was 38 in both countries.

Figure 19 shows that both countries have suffered a collapse in fertility as measured by the number of births per woman since 1987. Estonia has had a partial recovery since 1996, but Georgia has not. The population of both countries continues to decline. Even if excessive fertility holds back economic growth in many developing countries, population decline is not likely to increase per capita growth in Estonia and Georgia, on the contrary. Life expectancy at birth took a deep dive in Estonia before 1990, did not recover until a decade later, and then sailed past that of Georgia in the late 1990s (Figure 20). Public and private health expenditures in Estonia have exceeded those in Georgia in recent years, but the gap between the two countries has narrowed. In 2001, Estonia had 6.7 hospital beds per 1,000 inhabitants compared with 4.3 in Georgia. In recent years, all child births in Estonia have been attended by skilled medical staff compared with 92 percent in Georgia. Public health and fertility are closely related to human capital accumulation and hence important to economic growth over time.

**Figure 19. Fertility 1960-2005 (Births per Woman)**

Source: World Bank, *World Development Indicators 2007*.

**Figure 20. Life Expectancy at Birth 1960-2005 (Years)**

Source: World Bank, *World Development Indicators 2007*.

### E. Accounting for the Income Differential

We now return to equation (12). We know the extent of the income differential that we want to understand. In 2005, Estonia's per capita GDP was 4.73 times larger than that of Georgia (recall Figure 1). We have reported the average investment rates we need for the second term under the square root in equation (12), 0.29 in Estonia and 0.20 in Georgia. We now need to count years of schooling. To this end, we could use existing measures of school life

expectancy, defined by UNESCO as the total number of years of schooling which a child can expect to receive, assuming that the probability of his or her being enrolled in school at any particular future age is equal to the current enrolment ratio at that age. According to UNESCO, school life expectancy in 2005 was sixteen years in Estonia and twelve in Georgia. We prefer to reassess the UNESCO measures of school life expectancy to cover the whole period under review, 1991-2005, rather than just the final year. We do this by adding the number of years of primary, secondary, and tertiary education (nine, three, and five, respectively), weighted by average enrollment rates over the period. For Estonia, the imputed years of schooling are  $9 \cdot 0.96 + 3 \cdot 0.86 + 5 \cdot 0.60 = 14.2$  and for Georgia,  $9 \cdot 0.92 + 3 \cdot 0.78 + 5 \cdot 0.42 = 12.7$ .<sup>17</sup> This is the information we need to assess the first term under the square root in equation (12). We take the third and last term under the square root in equation (12) to be the same in the two countries in view of the small differences between the three determinants of hours of work per person in equation (10).

Now that we have the numbers we need, let us plug them into equation (12) and solve for the implicit efficiency differential:

$$(14) \frac{dE}{dG} = \left(\frac{Y_E}{Y_G}\right)^{\frac{1}{2}} (g^{12E} - 14.2)^{\frac{1}{2}} \left(\frac{Y_E}{Y_G}\right)^{\frac{1}{2}} = 4.736 (g^{12E} - 14.2)^{\frac{1}{2}} \left(\frac{0.20}{0.29}\right)^{\frac{1}{2}} = 2.32 \cdot 0.61 \cdot 0.39 = 1.51$$

To complete the computation, we plug this solution for the efficiency differential back into equation (12):

$$(15) \frac{Y_E}{Y_G} = \left(\frac{dE}{dG}\right)^{1.5} \sqrt{g^{12E} - 14.2} \left(\frac{Y_E}{Y_G}\right)^{\frac{1}{2}} = 1.51^{1.5} \sqrt{g^{12E} - 14.2} \sqrt{\frac{0.20}{0.29}} = 1.36 \cdot 2.12 \cdot 1.20 = 4.73^{18}$$

This back-of-the-envelope computation suggests that differences in education measured by years of schooling could by themselves explain a bit more than a twofold per-capita-output difference between Estonia and Georgia. Different investment rates could likewise explain a 20 percent income differential. This leaves an 86 percent per-capita-output difference between Estonia and Georgia to be explained by the 51 percent efficiency differential from equation (14), including differences in trade, inflation, economic structure, and various aspects of governance as we have discussed.<sup>19</sup> Put differently, our computation suggests that

<sup>17</sup> The primary school-enrolment rates are net, and refer to the ratio of children of official school age who are enrolled in school to the population of the corresponding official school age. The secondary and tertiary rates are gross, and refer to the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education in question.

<sup>18</sup> Note that factors like trade, governance, and economic structures, discussed earlier, are all part of TFP and, hence, all enter the term  $A$  in the equation.

<sup>19</sup> If we were to take at face value the average differences between labor force participation rates, hours of work per employee, and unemployment rates in the two countries shown in Figures 14-16, these differences could explain a 22 percent difference in income per person, thus reducing the residual per-capita-income difference to be explained by the overall efficiency differential from 86 percent to 52 percent. In this case, the contribution of  
(continued...)

education and efficiency make roughly comparable contributions to explaining the income differential between Estonia and Georgia while investment plays a less significant role. Intensive growth is what counts.

#### IV. CONCLUSION

Our comparison of the different development trajectories of Estonia and Georgia since 1991 suggests policy implications that seem especially relevant to Georgia and other second-tier FSU states as well as to other countries elsewhere that have lagged behind their erstwhile equals (recall Figure 1). In brief, rapid economic growth requires

- (i) Public policies that foster education and training, free trade, and domestic as well as foreign investment in a business-friendly environment.
- (ii) Monetary and fiscal policies that support price stability and sound private banking and other financial intermediation, sustainable government budget positions, and international, consumer-friendly competition.
- (iii) Sound and transparent societal institutions that support the rule of law.
- (iv) Good governance of both the public sector and the private sector.

Further, in countries such as those under review the prospect of EU membership may create favorable conditions for sound economic policies, rapid structural change, and institution building. Such an EU perspective may also help to forge a broad-based political consensus on the policy actions required for change.

By and large, it seems that on all counts Estonia, up to now, has surpassed Georgia. While recent developments and data suggest that Georgia, at last, has begun to catch up, doubts remain regarding the country's institutional reform agenda as well as the still unresolved territorial disputes.

Referring back to the classification of the main determinants of economic efficiency and growth implied by the aggregate production function presented in Section II, we can now summarize our findings as follows.

First, Estonia has invested significantly more relative to GDP than Georgia and also attracted more foreign investment than Georgia, thereby accumulating capital and increasing output per person. Increased high-quality investment contributes to more rapid growth over long periods, other things being the same.

In second place, Estonia sends more young people to secondary schools as well as to colleges and universities than Georgia does, thereby building up precious human capital that, like real capital accumulation, helps lift output per person to higher levels and encourage long-term

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the labor market variables to the per-capita-income differential is similar to that of the investment differential. We are indebted to Timor Wollmershäuser for this observation.

growth. Estonia's strong emphasis on education at all levels is reinforced by its rapidly increasing technological sophistication as evidenced by widespread personal computer and mobile phone ownership.

Third, Estonia has done more than Georgia to increase economic efficiency – that is, total factor productivity. This effort has taken many different forms. Let us start with the important trinity of liberalization, privatization, and stabilization. Estonia has managed to

- (i) Increase its openness to trade in goods, services, and capital,
- (ii) Privatize its banks and other erstwhile state enterprises while ensuring competition through, among other things, foreign ownership, and
- (iii) Stabilize prices following the temporary bout of inflation that was bound to follow the rapid liberalization of prices at the beginning of transition.

Georgia has not managed to liberalize trade to the same extent, nor has Georgia managed to privatize its banks and other state-owned enterprises while ensuring strong competition. On the other hand, Georgia has successfully stabilized prices, albeit a bit less rapidly than Estonia. On top of all this, according to almost all the different governance indicators that we compared for the two countries, Estonia has moved farther and faster in a growth-friendly direction. Most notably, corruption and associated problems are much less of an issue in Estonia than in Georgia.

In view of all this, we are not surprised that Estonia has grown more rapidly than Georgia, despite Georgia's advantage of starting from a much lower level of initial income after the plunge following independence. Our story suggests that the growth differential between the two countries since 1993 would probably have been significantly larger than half a percentage point – that is, the difference between Estonia's 6.6 percent growth per year and Georgia's 6.1 percent – had both countries started out in the same initial position. Likewise, the growth differential would have been significantly smaller had Georgia embarked earlier on fundamental reforms. The proportions in which the different factors we have discussed, including the rebound effect and the various aspects of efficiency, account for the growth differential between the two countries since 1991 remain to be quantified in detail. Even so, we think the qualitative point we have made is pretty clear. You judge.

## References

- Acemoglu, D., S. Johnson, and J. Robinson (2002), "Reversal of Fortune: Geography and Development in the Making of the Modern World Income Distribution," *Quarterly Journal of Economics*, Vol. 117, No. 4, November, 1231-1294.
- Acemoglu, D., and S. Johnson (2005), "Unbundling Institutions," *Journal of Political Economy*, Vol. 113, No. 5, October, 949-995.
- Bardhan, P. (1997), "Corruption and Development: A Review of the Issues," *Journal of Economic Literature*, Vol. 35, No. 3, September, 1320-1346.
- Berengaut, J., E. De Vrijer, K. Elborgh-Woytek, M. Lewis, and B. Lissovolik (2002), "An Interim Assessment of Output Developments in Ukraine, 2000-01," *IMF Working Paper* WP/02/97. Washington.
- Bils, M., and P. Klenow (2000), "Does Schooling Cause Growth or the Other Way Around?," *American Economic Review*, Vol. 90, No. 5, December, 1160-1183.
- Campos, N. F., and F. Coricelli (2002), "Growth in Transition: What We Know, What We Don't, and What We Should," *Journal of Economic Literature*, Vol. 40, No. 3, September, 793-836.
- Dixit, A. (2004), "Lawlessness and Economics: Alternative Institutions of Governance," Princeton: Princeton University Press, Chapter 1. Available at <http://pup.princeton.edu/titles/7729.html>.
- Dreher, A., P-G. Méon, and F. Schneider, (2008), "The Devil is in the Shadow: Do Institutions Affect Income and Productivity or only Official Income and Official Productivity?," *CEifo Working Paper* No. 2150.
- Fischer, S., and R. Sahay (2000), "The Transition Economies after Ten Years," *IMF Working Paper* WP/00/30. Washington.
- Forteza, A., and M. Rama (2006), "Labor Market 'Rigidity' and the Success of Economic Reforms Across More Than 100 Countries," *Journal of Economic Policy Reform*, Vol. 9, No. 1, March, 75-105.
- Funke, M. (2006), "Taxation, Growth and Welfare: Dynamic Effects of Estonia's 2000 Income Tax Act," *Finnish Economic Papers*, Vol. 19, No. 1, Spring, 25-38.
- Gosh, A. R., A. Gulde, and H. C. Wolf (2000), "Currency Boards: More Than a Quick Fix?," *Economic Policy*, Vol. 15, No. 31, 269-335.
- Hall, R. E., and C. I. Jones (1999), "Why Do Some Countries Produce So Much More Output Per Worker Than Others?," *Quarterly Journal of Economics*, Vol. 114, No. 1, February, 83-116.

- Havrylyshyn, O. (2001), "Recovery and Growth in Transition: A Decade of Evidence," *IMF Staff Papers*, Vol. 48, Special Issue, 53-87.
- Havrylyshyn, O. (2007), "Growth Recovery in CIS Countries: The Sufficient Minimum Threshold of Reforms," mimeo, University of Toronto.
- Klomp, J., and J. de Haan (2008), "Political Institutions and Economic Volatility," mimeo, University of Groningen.
- Levy-Yeyati, E., and F. Sturzenegger (2003), "To Float or to Fix: Evidence on the Impact of Exchange Rate Regimes," *American Economic Review*, Vol. 93, No. 4, December, 1173-1193.
- Maliszewski, W. S. (2000), "Central Bank Independence in Transition Economies," *Economics of Transition*, Vol. 8, No. 3, November, 749-789.
- Mankiw, N. G., D. Romer, and D. N. Weil, "A contribution to the empirics of economic growth," *Quarterly Journal of Economics*, Vol. 107, No. 2, May 1992, 407-437.
- Marshall, M. G., and K. Jagers (2001), "Polity IV Project: Political Regime Characteristics and Transitions, 1800-2000." Available at <http://www.cidcm.umd.edu/inscr/polity/>.
- Marsiliani, L., and T. I. Renström (2007), "Political Institutions and Economic Growth," *Economics of Governance*, Vol. 8, No. 3, May, 233-261.
- Mauro, P. (1995), "Corruption and Growth," *Quarterly Journal of Economics*, Vol. 110, No. 3, August, 681-712.
- Mincer, J. (1974), *Schooling, Experience and Earnings*, Columbia University Press, New York.
- Paldam, M., and G. T. Svendsen (2000), "An Essay on Social Capital: Looking at the Fire behind the Smoke," *European Journal of Political Economy* Vol. 16, No. 2, June, 339-366.
- Sachs, J. D., and A. M. Warner, (1995, revised 1997, 1999), "Natural Resource Abundance and Economic Growth," *NBER Working Paper* 5398, Cambridge, Massachusetts.
- Senhadji, A. (2000), "Sources of Economic Growth: An Extensive Growth Accounting Exercise," *IMF Staff Papers*, Vol. 47, No. 1, November, 129-157.
- Williamson, O., 2005, "The Economics of Governance," *American Economic Review*, Vol. 95, No. 2, May, 1-18.
- World Bank (2007), *Doing Business—Economy Rankings*. Available at <http://www.doingbusiness.org>. See also <http://www.enterprisesurveys.org>.