

An Application of the Growth Diagnostics Framework: The Case of Georgia

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Abstract: This paper applies the Growth Diagnostics framework and attempts to identify the binding constraints to economic growth in Georgia. While many policies potentially promote economic growth in practice only policies that relax the binding constraint do so. In contrast, policies that relax non-binding constraints will by definition do little or nothing to promote economic growth. This study builds on an existing growth diagnostics exercise by the Government of Georgia and the Millennium Challenge Corporation, but comes to different conclusions. The existing study found that human capital and road infrastructure are binding constraints to economic growth in Georgia. In contrast, we find that lack of property rights, broadly interpreted, is the binding constraint to economic growth in Georgia. We argue that lack of property rights is unlikely to be the risk of expropriation. Instead, property rights have to be interpreted broadly, and encompass issues such as political and institutional stability, regional conflicts, the rule of law, and judicial independence.

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Executive Summary

Georgia's growth performance since independence has gone through extremes, from an unprecedented -44.9 percent in 1992 to 12.3 percent in 2007. Although growth rates temporarily fell in the aftermath of the Russian-Georgian war and the world financial crisis they have since then recovered to 7 percent in 2011. With robust GDP growth since the Rose revolution economic growth should seemingly not be of particular concern to policymakers. On the other side, in this study we find that economic growth in Georgia is mainly driven by total factor productivity growth, and not by capital accumulation or increases in the labor force. This finding reflects the significant improvements in the economic and business environment in Georgia since the Rose Revolution, with Georgia simply catching up and converging to the higher productivity levels of other economies. On balance this is good news, but it also raises two concerns. First, about future growth prospects given that high productivity growth rates are hard to maintain as Georgia catches up. Second, in contrast to economic growth driven by capital accumulation growth driven by productivity improvements does not in itself generate employment. Given Georgia's persistently high unemployment rates we thus try not only to answer the question how economic growth rates can be raised, but also how capital accumulation can be fostered.

To answer these two interrelated questions we use the growth diagnostics framework by Hausmann, Rodrik and Velasco (2008), and attempt to identify the binding constraints to economic growth in Georgia. Binding constraints, by definition are those constraints that if relaxed will raise economic growth. Vice versa, relaxing non-binding constraints will do little or nothing to raise economic growth.

A first candidate for being a binding constraint is access to finance. We find that in Georgia real lending rates are some of the highest in the world, a finding consistent with low rates of capital accumulation. Potential explanations are low domestic saving rates or difficulties in accessing international finance. While access to international finance does not appear to be an issue domestic saving rates are indeed exceptionally low. But low domestic saving rates are not a convincing explanation given that the spread between real lending and deposit rates is one of the highest in the world. As the Georgian banking sector is relatively competitive the spread should be small as banks are competing for deposits in the face of high lending rates. That the spread is not small suggests an underlying uncertainty that makes banks reluctant to lend. Moreover, this underlying uncertainty would also explain relatively low domestic saving rates and low rates of capital accumulation.

In the growth diagnostics framework there are only two broad categories that potentially explain this underlying uncertainty. One, macroeconomic risks such as high inflation or unsustainable government debt can be ruled out given that the macroeconomic environment is stable. This leaves only microeconomic risks related to property rights as possible explanation. Property rights have to be interpreted broadly, with expropriation risk being only a minor part of the broader concept. More important are factors such as political and institutional stability, regional conflicts, the risk of reform reversal, the rule of law and judicial independence. All of these factors affect any current and expected future income derived from property, and thus property rights. The methodology does not allow to determine with certainty which factor dominates. But the evidence suggests that political and institutional stability and the risk of reform reversal are of higher importance.

This study also analyses other potentially binding constraints. In contrast to an existing study by the Government of Georgia/Millennium Challenge Corporation (2011) we do not find evidence that human capital or infrastructure are binding constraints. While this does not exclude the possibility that they might become binding constraints in the future, currently Georgia's labor force appears to be overeducated respectively Georgia's infrastructure over-dimensioned. We also do not find any conclusive evidence that economic growth in Georgia is held back by market failures that hamper innovation and experiments with new, non-traditional activities and industries.

Given that weak property rights, and in particular political and institutional instability are not easily fixed our policy recommendations are limited. Improvements take time, and are not only influenced by the actions and policies of the government, but also of opposition parties, civil society, media, and neighboring countries. This stands in contrast to other binding constraints which are largely if not exclusively the responsibility of the government.

While our findings differ from the Government of Georgia/Millennium Challenge Corporation study we cautiously agree with this study's finding that Georgia should invest into human capital and infrastructure. Relaxing the human capital and infrastructure constraints will do little or nothing to promote economic growth in the short-run. But as these investments are long-run in nature as human capital or infrastructure could easily become binding constraints in the future, these investments could be justified.

Introduction

The nature and causes of sustained long-run economic growth have always been on the minds of both economists and policymakers. The scholarly debate about the set of policies needed to promote sustainable economic growth is of particular importance for developing countries and countries in transition. In recent decades a large literature emerged that intends to explain the underlying mechanisms of sustained economic growth and to assist policymakers in choosing the right policies and reforms.

While this strand of the literature has advanced our understanding of the nature of economic growth and the set of ingredients needed for sustained economic growth, most of the prescriptions of this literature are extremely general. The one size fits all approach, which is exemplified by the Washington Consensus, typically leads to a situation where policymakers are faced with a long list of needed reforms. In practice only a few of those reforms can feasibly be implemented, given limited political capital and limited election cycles. In light of these challenges prioritizing reforms is crucial for policymakers.

A solution is provided by the growth diagnostic framework by Hausmann, Rodrik and Velasco (2008). The growth diagnostics framework attempts to identify the most binding constraints to economic growth, thus allowing policymakers to prioritize those reforms that relax the binding constraints. By definition, relaxing a binding constraint will raise growth rates, whereas relaxing a non-binding constraint will not.

After the Rose Revolution of 2003, Georgia's new government has implemented a number of crucial structural reforms. Perhaps the most significant among them were the reforms addressing corruption, and reforms of the police force, the bureaucracy, the energy sector, customs and the education system. In addition, Georgia has drastically improved the business environment by simplifying or abolishing taxes and business regulations. These changes had a profound impact on Georgia's economic performance and long term development prospects. Despite the progress made the existing data reveals that a number of areas are in need of significant improvements if high rates of economic growth are to be sustained in the future. In particular, the Georgian economy still has relatively low rates of capital formation.

This study attempts to identify the existing binding constraints to economic growth. It builds on a similar study by the Government of Georgia/Millennium Challenge Corporation (2011), but it comes to different conclusions. In particular, we do not find evidence that human capital or infrastructure are binding constraints. Instead we find that weak property rights and political instability are the most likely binding constraints, and thus suggest that reforms that strengthen property rights and improve political stability should be prioritized.

This study is organized as follows. In the first section we discuss and analyze Georgia's growth performance from Soviet times to today. In the second section we introduce the growth diagnostics framework and its methodology, discuss the literature and some common pitfalls of the literature. In the third and fourth section we discuss and analyze the various constraints to Georgia's economic growth.

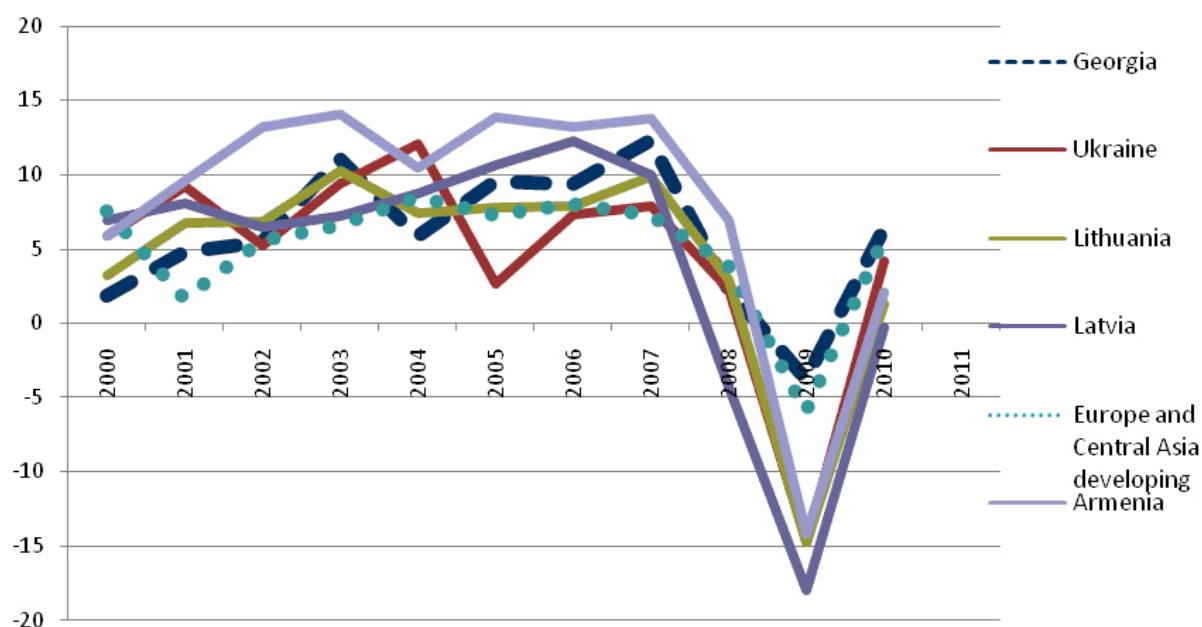
Georgia's Growth Performance

Current growth trends

In recent years Georgia's economy has staged a remarkable comeback. GDP growth rates in the years following the Rose Revolution have averaged 6.6 percent per annum – remarkable not only in light of the 5.3 percent average growth rate in the 1995-2002 period, but also considered that the average GDP growth rate for European and Central Asian developing countries was about 5.1 percent in the period between 2003-2010¹.

In addition, it is worth noting that compared to other countries in Eastern Europe and Central Asia the Georgian economy contracted significantly less in the aftermath of the 2008 global crisis. At the lowest point of the recession GDP growth declined by 3.8 percent as opposed to the average of 6% for comparable countries in the region.

Figure 1: Growth Rate of Real GDP (%)



Despite these relatively high growth rates sustaining the momentum of growth for the long-term is arguably the most important challenge for Georgia. Can the current growth rates be maintained in the future? The growth diagnostics framework generally starts with the assumption that in any given developing country, low capital formation due to low private investment is the primary cause of lacklustre output performance. The validity of this assumption is by no means uncontested, and in this section our task is to examine it more closely.

Recent empirical research on growth in developing countries has drawn attention to the “capital-driven” vs. “productivity-driven” growth patterns. The theoretical lessons of the basic growth framework by Solow (1956) suggest that output growth rooted in the

¹ The World Bank classification of European and Central Asian developing economies includes: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Georgia, Kazakhstan, Kosovo, Kyrgyz Republic, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Romania, Russian Federation, Serbia, Tajikistan, Turkey, Turkmenistan, Ukraine, Uzbekistan.

accumulation of physical capital cannot be sustained in the long run. Higher levels of physical capital require higher investment to maintain the already existing capital stock. As the returns to physical capital diminish, more of the additional output must be devoted to replacing the depreciated capital. Therefore, the initial growth rate, driven by capital accumulation will decline and eventually go to zero, unless supplemented by Total Factor Productivity (TFP) growth - more generally known as the rate of technological progress.

Krugman (1994), for example, argued that the “miracle” growth rates in some East Asian countries can be compared the rapid expansion of the Soviet economy in the 1960s. During this period, the Soviet Union was accumulating physical capital, but innovation and productivity were stagnating and both capital and labor inputs were used inefficiently in the production process. Without productivity growth the Soviet economic miracle was therefore bound to fizzle out.

Capital accumulation or TFP growth?

Krugman’s argument is supported by Easterly and Fischer (1995) in a study of Soviet economic growth between 1960 and 1989. While overall growth in the Soviet Union was about 2.4 percent, the contribution of total factor productivity to economic growth was low, or even negative, ranging from 1 percent to -1.2 percent. At the same time, Easterly and Fischer find that the economy of the Georgian union republic exhibited relatively high productivity growth rates. In the 1970-1990 time period Georgia’s productivity growth was 2.3 percent, one of the highest among the Soviet republics at the time, followed by Belarus at 2.1 percent and then Armenia and Azerbaijan with 1.8 percent and 1.4 percent productivity growth respectively.

This result is based on a growth accounting exercise using a standard Cobb-Douglas production function. In order to answer whether Georgia’s current economic growth is driven by capital deepening or total factor productivity, we recalculate the basic growth decomposition using data for 1980-2010 from World Development Indicators (WDI). In this growth accounting exercise we assume that the capital share in output is one third while the labor share is assumed to be two thirds. No restrictive assumptions are placed on the rate of capital depreciation. The depreciation rate is taken from the World Development Indicators time series available for individual countries and republics in the given years. The results are summarized in Table 1 and Table 2.

Table 1: Growth Decomposition, 1970-1988 in percent (Source: own calculations)

	USSR	Georgia	Armeni a	Azerbai jan	Ukraine	Belarus	Latvia	Lithuan ia	Estonia
Output Growth	4.03	5.00	5.51	5.51	3.61	5.60	4.13	4.48	3.93
Capital Contr.	2.12	1.83	2.15	1.95	1.81	2.41	1.82	2.25	1.85
Labor Contr.	0.72	0.91	1.69	1.68	0.36	0.66	0.48	0.69	0.53
Residual (TFP growth)	1.19	2.25	1.68	1.88	1.43	2.52	1.83	1.53	1.55

The historical pattern of economic growth in union republics indicates that much of the increase in output per capita was due to the accumulation of physical capital rather than productivity increases. The exception to this pattern is Georgia, given that in Georgia economic growth was mainly driven by productivity increases. Furthermore, the evidence suggests that Georgia's current growth pattern is not primarily relying on capital accumulation. If anything, low capital accumulation is a problem.

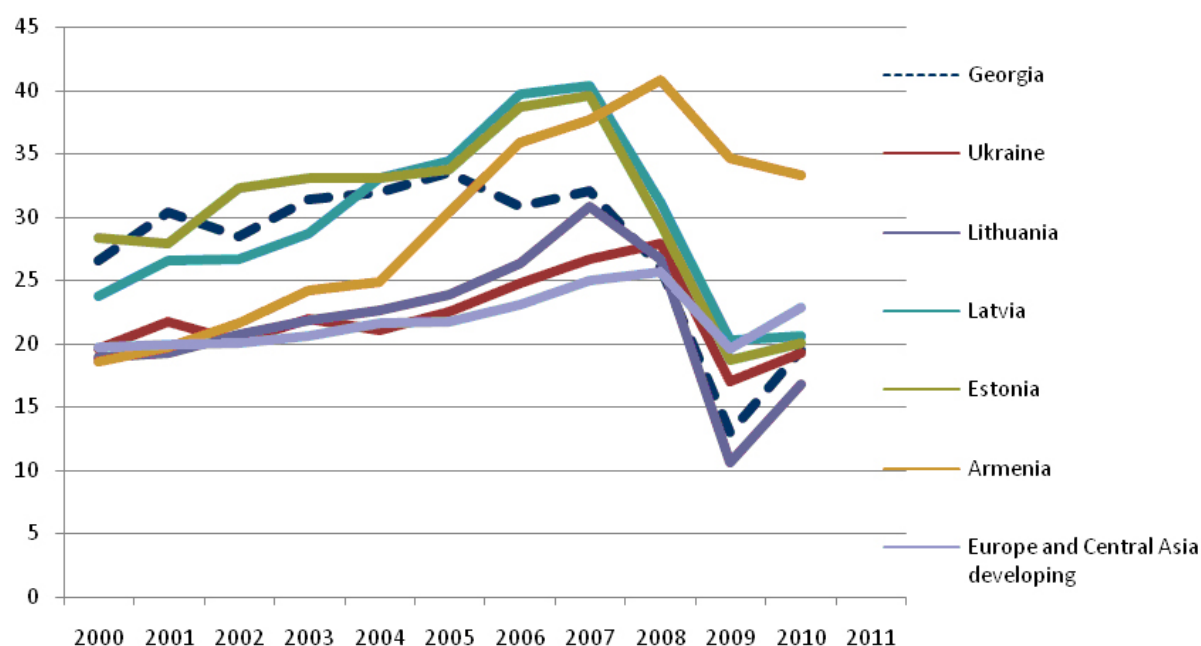
Table 2: Growth Decomposition, Georgia 1981-2009 in percent (Source: own calculations)

	Output growth	Attributed to Capital	Attributed to Labor	Residual (TFP growth)
1981-1988	2.45	1.02	0.73	0.70
1989-1995	-21.41	-0.78	-3.23	-17.40
1996-2003	6.10	-2.64	0.22	8.52
2004-2009	5.65	0.79	-0.33	5.18

The high total factor productivity component in overall output growth, in particular in the period shortly before and after the Rose Revolution might appear somewhat puzzling, given low product innovation and low levels of experimentation with new technologies in Georgia. The answer most likely lies in that most of productivity growth stems from process innovation rather than product innovation. Process innovation is defined by the OECD as “implementation of a new or significantly improved production or delivery method”. An increased efficiency of the production process due to the removal of external constraints to businesses - such as corruption, high taxes, or bureaucracy – is likely to increase total factor productivity.

This evidence is further supported by the fact that the private investment to GDP ratio is relatively low in Georgia, as shown in Figure 2. Low rates of private investment and low capital accumulation can therefore be considered as serious impediments to sustainable economic growth.

Figure 2: Gross Capital Formation, % of GDP (Source: WDI, 2012)



Growth Diagnostics Methodology

There is an extensive theoretical and applied literature on economic growth and development, providing advice and guidance on how to promote economic growth. Unfortunately most of the literature is ignoring country specific circumstances or institutions and is prescribing one size fits policies that are identical across countries. The prescriptions, of which the most well-known is the Washington Consensus, are usually based on cross-country growth regressions, growth accounting exercises or international benchmarking. Those parts of the literature that take country differences into account are almost always only in the context of a narrow policy area such as monetary policy, international trade, education or infrastructure.

To date the growth diagnostics framework developed by Hausmann, Rodrik and Velasco (2008) is the only widely used growth framework that is based on economic theory and takes into account the country-specific context. The growth diagnostics framework uses a standard endogenous growth model and assumes that growth can be held back by a wide variety of constraints. These constraints, for example include poorly developed infrastructure, corruption, lack of human capital, poorly functioning credit markets or political instability. Following Hirschman's (1958) idea of unbalanced growth most of these constraints are not binding, and only a relaxation of the binding constraints will increase economic growth. In contrast, a relaxation of a non-binding constraint will not increase economic growth.

Most standard growth strategies recommend implementing a wide variety of reforms, thus addressing most or all potential constraints. If this is not feasible standard growth strategies recommend targeting those constraints in which the country is lagging the most relative to its international peers. Unfortunately the former is rarely a feasible strategy, as governments usually lack the capacity to implement more than a few reforms at the same time. The latter strategy solves the implementation problem, but does not necessarily result in economic growth. The reason is that those constraints in which a country is lagging relative to international peers are not necessarily the binding constraints that hold back economic growth.

The constraints that hold back economic growth are the binding constraints. While other constraints are also of importance, the binding constraints matter the most and are the ones with the highest shadow price. Relaxing the binding constraints thus promises the highest return in terms of economic growth. Identifying the binding constraints allows policymakers to prioritize reforms.

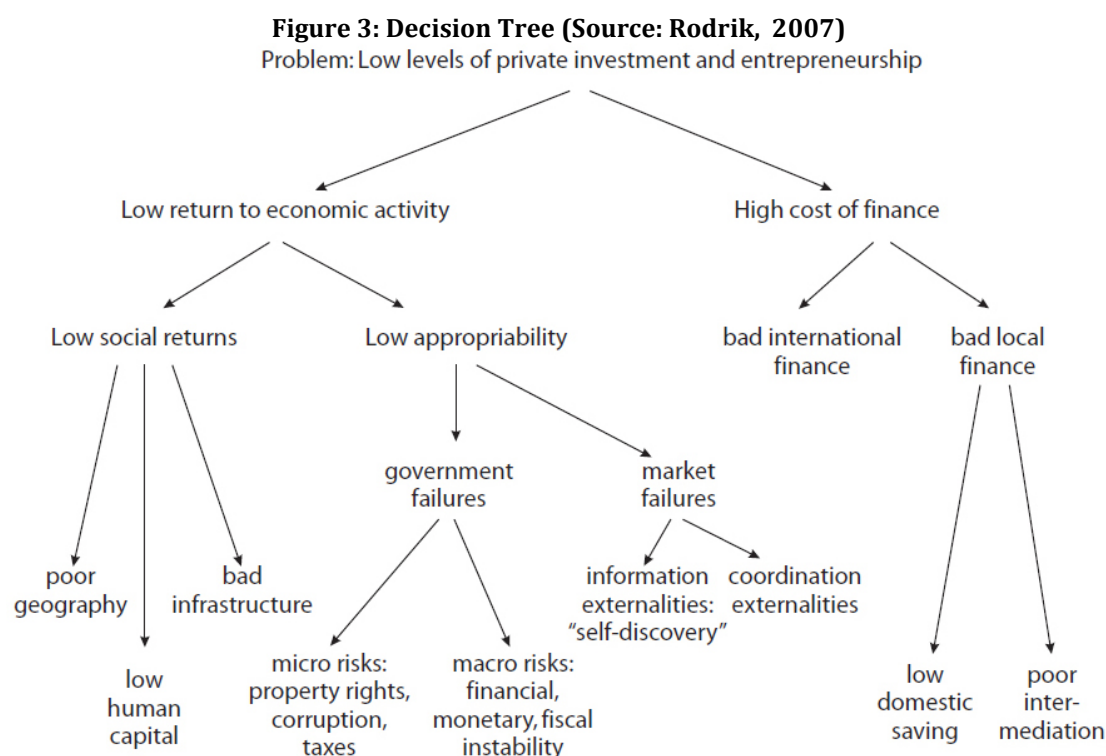
The growth diagnostics framework has been extensively applied by the World Bank in 2005, in a collaboration of Hausmann, Rodrik, and Velasco and World Bank economists (Leipziger and Zaghera, 2006). These studies focused on eleven countries, Armenia, Bangladesh, Cambodia, India, Thailand, Bolivia, Brazil, Egypt, Madagascar, Morocco and Tanzania. Similar studies have been commissioned by the Asian Development Bank for the Philippines and the Inter-American Development Bank for Argentina, Belize, Colombia, Panama and Peru. Various other countries have been studied by international organisations, individual researchers, and in the case of South Africa by the government itself.² The growth diagnostics framework has also been applied to sub national entities

² For a comprehensive list see <http://www.hks.harvard.edu/fs/drodrik/GrowthDiag.html>.

as for example Aceh in Indonesia by Blanco Armas et al. (2009) or North Eastern Afghanistan by Lea, Gorter, and Ehrke (2011).

With the exceptions of Georgia, Moldova, Armenia, the Kosovo, Mongolia and a planned, but never completed study on the Baltic countries, few growth diagnostic studies exist for transition countries. Of particular relevance for Georgia are the growth diagnostics studies for Armenia by Mitra et al. (2007), for Mongolia by Ianchovichina and Gooptu (2007), and two studies for Moldova by Bozu, Caragia and Gotisan (2007) respectively BenYishay and Wiebe (2009). The latter two studies were commissioned by the Millennium Challenge Corporation, and are to date the only examples where a growth diagnostics study directly influenced the aid priorities of a foreign donor.

The Millennium Challenge Corporation also commissioned a growth diagnostics study for Georgia, in cooperation with the Prime Minister's office of the Government of Georgia. This study's purpose was to justify a new compact, which is supposed to focus on a binding constraint.³ This study was prepared in close collaboration with the chancellery of the Georgian prime minister, and drew extensively on surveys of firms and other stakeholders. It finds that for Georgia road infrastructure and human capital are binding constraints. In contrast, for Moldova, Armenia and Mongolia the studies identify both road infrastructure and bureaucracy and corruption as binding constraints. This in itself of course does not come as a surprise, given Georgia's reforms since the Rose Revolution.



Most growth diagnostics studies rely on a decision tree, with different nodes representing different constraints. While in theory a binding constraint is easy to identify uniquely, in practice identifying binding constraints is difficult and sometimes impossible. The decision tree starts with the fundamental explanation for low economic

³ This was not the first growth diagnostics study for Georgia, as it was preceded by an unpublished study by Burkadze (2011).

growth – low levels of private investment and low levels of entrepreneurship. Firms and entrepreneurs could be held back because either the returns to economic activity are low, or because they are unable to finance any new investment or venture. The reasons for why access to finance is a problem are related to the supply of finance, which could either be restrained by a limited supply of international or domestic finance, or by poor intermediation between savers and borrowers. Low returns to economic activity can be explained by low social returns or by the inability of firms and entrepreneurs to appropriate the returns on their investment.

Hausmann, Klinger and Wagner (2008) suggest several techniques for identifying binding constraints, all based on the idea that a binding constraint is associated with high shadow costs. These shadow costs can sometimes be observed or inferred from market prices. Even if shadow costs cannot be measured by the researcher they can be inferred from the actions of firms and entrepreneurs. In particular, the attempts of firms and entrepreneurs to overcome the binding constraint can create tell tale signs that are observable to the researcher. For example, if human capital is a binding constraint firms and entrepreneurs will try to overcome the binding constraint by paying a wage premium to skilled workers, or by investing into staff training. The researcher will also observe that those sectors of the economy that are less intensive in the constraint will grow, whereas those sectors more intensive in the constraint will stagnate. Trivially, if road infrastructure is a binding constraint one would expect the trucking sector to stagnate, whereas sectors relying on air freight will not. Lastly, binding constraints can be identified by looking for changes in the tightness of constraints. If a constraint is binding and is relaxed we would expect growth to pick up. Vice versa if a constraint is not binding and relaxes we would expect growth to remain unchanged.

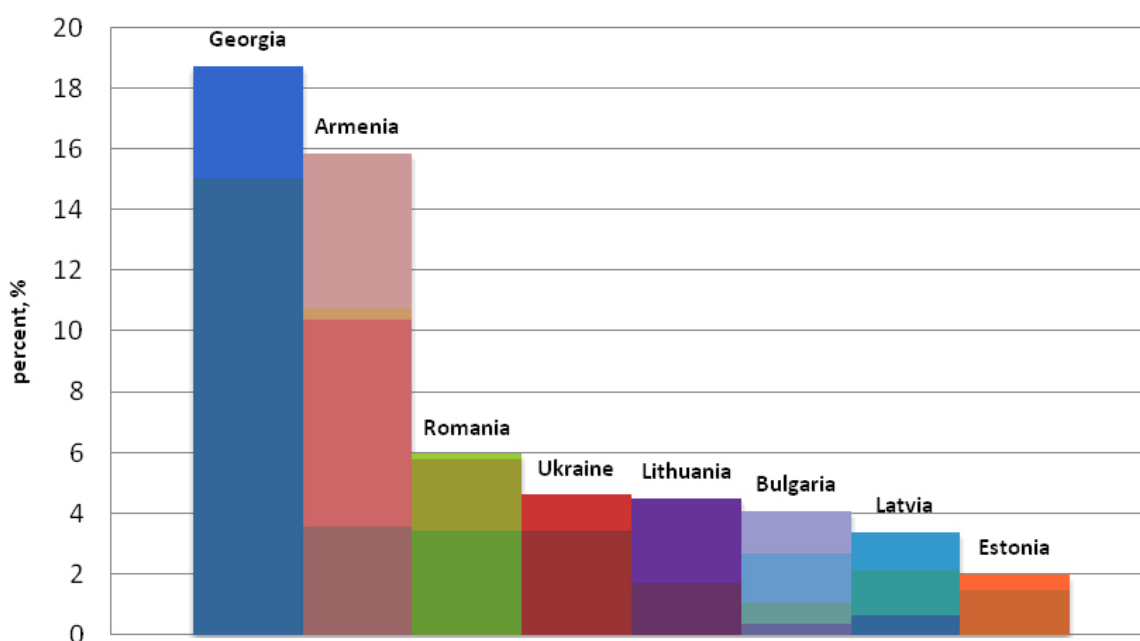
While the theory is simple, in practice identifying binding constraints is difficult and has its pitfalls. One common mistake is to rely on surveys of firms, and to essentially ask firms what binding constraints they face. While these surveys can be helpful they are also subject to self-selection bias. By definition surveys only include existing firms, or even worse only the most successful ones. But these are exactly the firms that might have figured out how to successfully overcome the binding constraint. In fact, if only successful firms are surveyed, the focus should be on what characteristics allowed these firms to be more successful in overcoming binding constraints than others. For example, if most successful firms rely extensively on expatriate workers this could indicate that human capital is a binding constraint.

High Cost of Finance

High cost to finance is a potential constraint to private investment and entrepreneurship. This constraint typically manifests itself in high lending interest rates and low domestic credit to the private sector. Financial bottlenecks, when they exist, can arise both from domestic and international sources. In this section we assess the state of the private credit market in Georgia, and explore in turn each of the possible constraints.

Among the developing countries of Europe and Central Asia Georgia has one of the highest real lending interest rates. In 2010 the real lending interest rate was 14.2 percent - down from 28.1 percent in the previous year. Figure 4 compares the average real interest rates among a group of transition economies, including Georgia, for the period between 2000 and 2010.

Figure 4: Real Lending Interest Rates, 2000-2010 (Source: WDI, 2012)

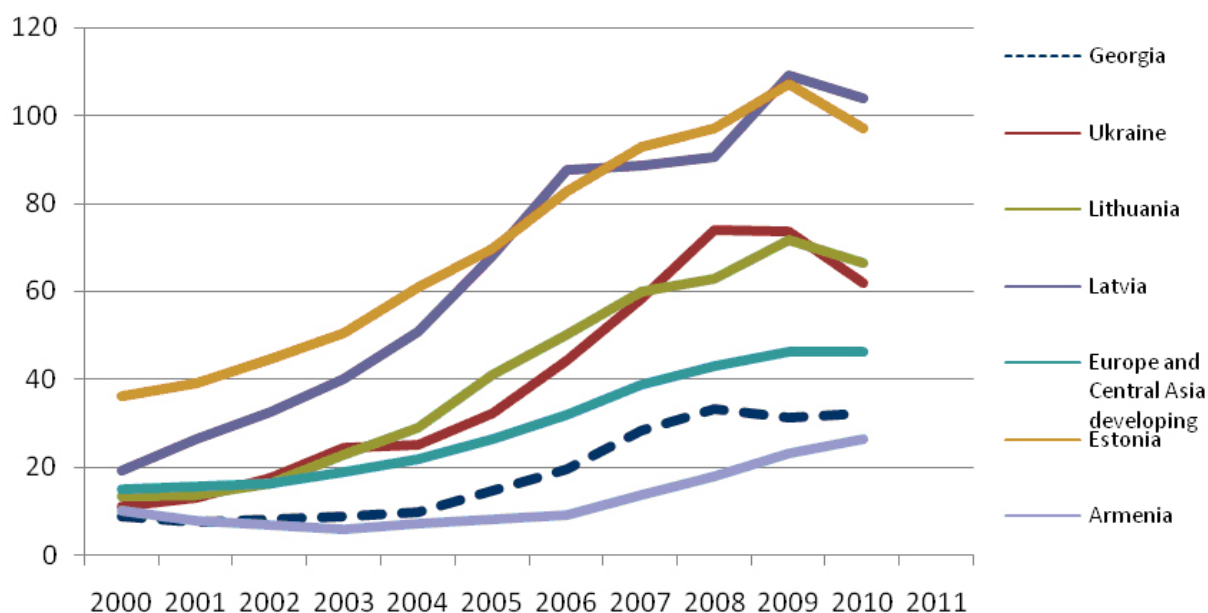


Georgia's real lending interest rate is not only high compared to other developing countries in Europe and Central Asia, but also compared to all countries in the world. According to the World Development Indicators, in 2010 the Georgian real lending interest rates were the ninth-highest in the world, only below the real lending interest rates of the D.R. Congo, Madagascar, Brazil, Kyrgyzstan, Sao Tome and Principe, Gambia, Paraguay, and Malawi. This is particularly striking given that real lending interest rates in the major economies were at record low levels. It is also not an aberration given that already in 2007 Georgia had the eighteenth highest real lending interest rate in the world.

As shown in Figure 5, the availability of domestic credit to the private sector is also significantly below the regional average. While the share of domestic credit to the private sector in GDP is only 32.4 percent in Georgia in 2010, the comparable number is 46 percent for a group of developing European and Central Asian economies. Credit to the private sector as a share of GDP has been increasing since 2003, but it came to a stop

in the aftermath of the global financial crisis. Although GDP growth has since then recovered credit to the private sector has remained stagnant.

Figure 5: Domestic Credit to Private Sector, % of GDP (Source: WDI, 2012)



The current trend in the private credit market is indicative of high cost of finance being a binding constraint. This constraint can stem from two main sources, inadequate access to financing from abroad (i.e. international finance) and inadequate access to domestic financing. Inadequate access to domestic financing could be due to a low supply of domestic savings, low investment demand, or a combination of both. Finally, the problems associated with financial intermediaries, such as poorly developed financial infrastructure or lack of competition among private banks, can also confound the access to local finance. Below we examine each of the potential constraints.

International Finance

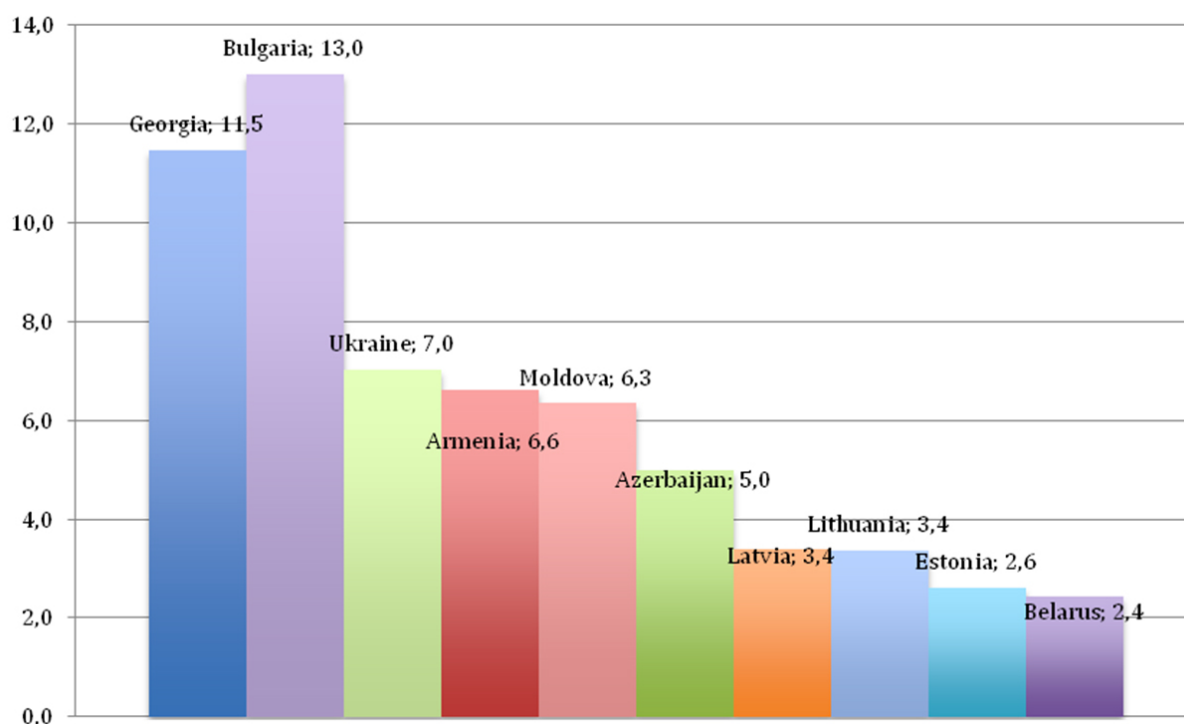
Frequently developing countries face problems accessing international credit markets, either because of adverse international credit markets conditions, or because of country-specific difficulties. The latter is not necessarily a binding constraint. Instead a difficulty to access international credit markets could indicate that macroeconomic or political risk is the underlying binding constraint. Typically difficulties in accessing international credit markets go hand in hand with high external debt levels.

World credit markets have been affected by the global financial crisis of 2008. The Georgian economy though was left relatively unscathed as the rate of foreign direct investment remained high compared to the regional average. For example, the average rate of foreign direct investment as a share of GDP was 10.3 percent in Georgia for the 2003-2010 time period. In contrast, the rate for developing countries in Europe and Central Asia was only 3.6 percent.

Georgia compares favorably to the countries in the wider region when it comes to net private capital inflows, which encompass both net foreign direct investment and

portfolio flows. Figure 6 shows that Georgia has one of the highest average shares of private capital inflows in GDP among the group of Eastern European economies. Looking at annual inflows, in 2010 Georgia's ratio of private capital flows stood at 9.1 percent of GDP down from 17.1 percent in 2006. While the International Monetary Fund (2011) reports that the recovery of FDI flows has been slower than expected, the 2010 ratio of net private capital inflows to GDP in Georgia is among the highest in the group of European and Central Asian developing countries.

Figure 6: Private Capital Flows, % of GDP, Average for 2003-2010 (Source: WDI, 2012)



Georgia may be also benefiting from favorable public finance arrangements, in particular in the aftermath of the 2008 Russian-Georgian war. In 2010 long-term debt comprised 78 percent of total external debt. In addition, 56.5 percent of long-term external debt was public. According to the Georgian Ministry of Finance, the average portfolio weighted interest rate on public debt was quite low at 2 percent at the end of August 2011.

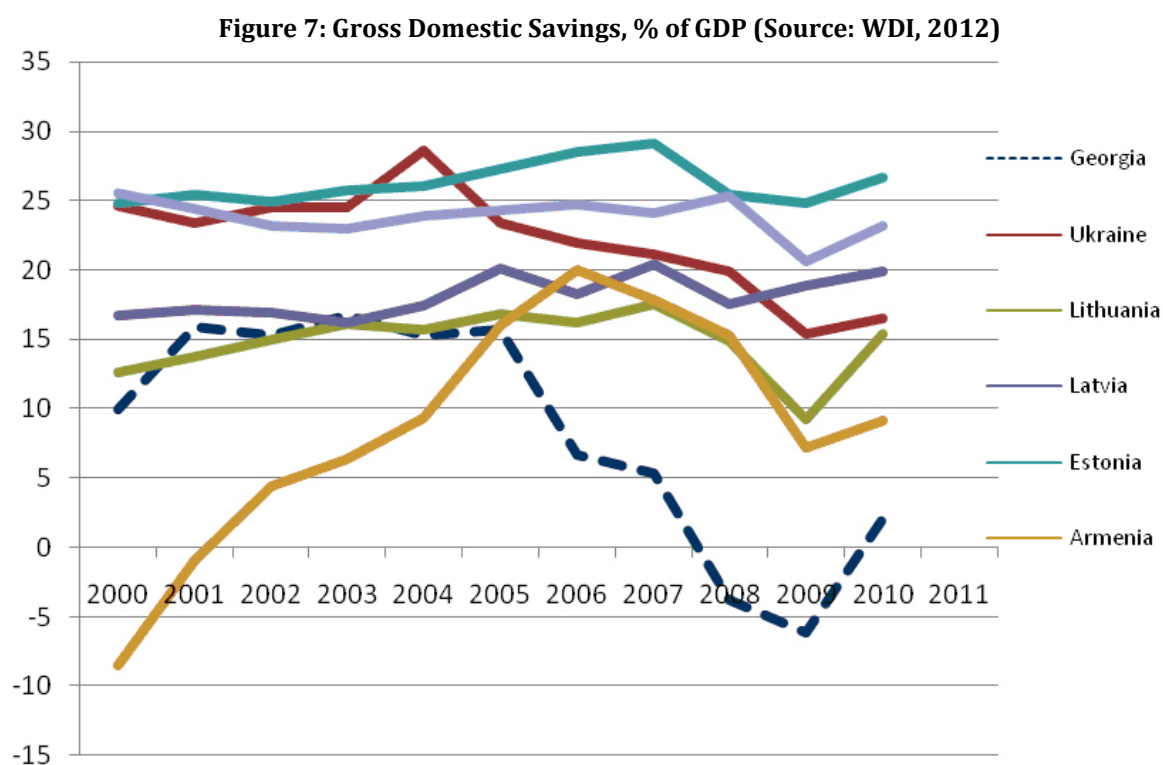
As is reported in World Bank (2012a) Georgia was a new entrant on the international capital markets in 2010, along with Albania, Belarus, Montenegro, Jordan and Vietnam. The new commitments on long-term credit by the private sector come at a relatively high interest rate of 9.9 percent and a relatively short average maturity of 5 years. This compares, for example, to the Ukraine with an average interest rate of 4.9 percent and an average maturity of 7 years on new commitments from private lenders.

Overall, however, we argue that international finance is not a binding constraint for Georgia. While interest rates and maturities are less favorable than for other countries, Georgia itself is able to borrow on international capital market from private lenders. High interest rates and long maturities themselves are indicative of country risk, and have thus to be analyzed in the context of macroeconomic and microeconomic risks.

Domestic Finance

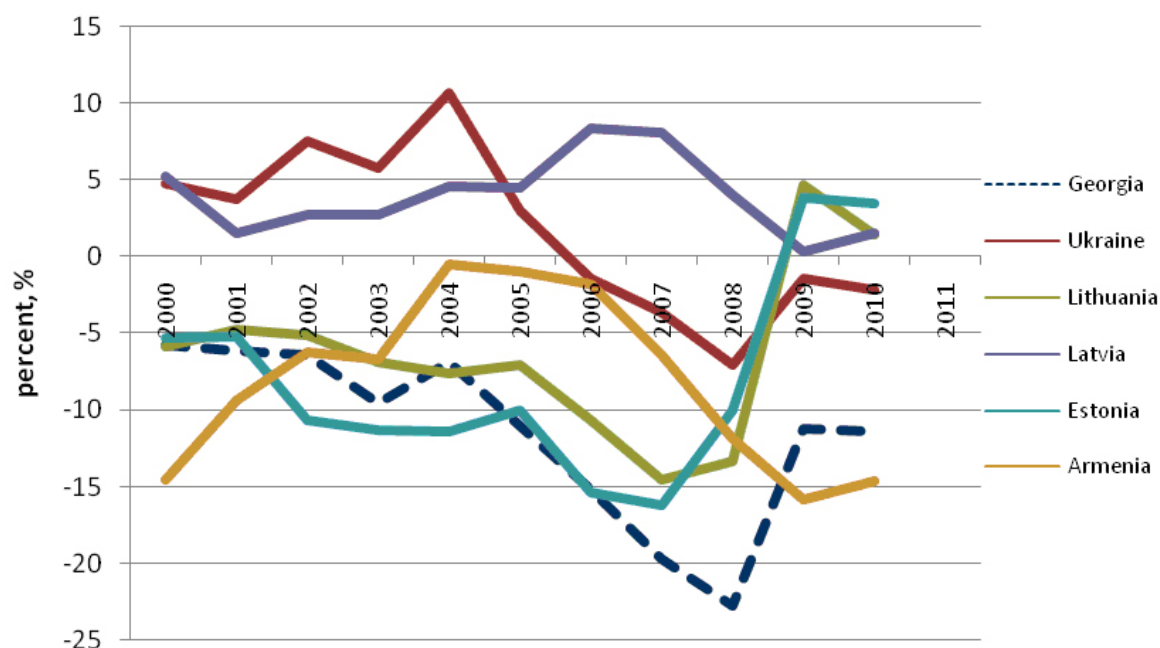
Low Domestic Savings

In a standard Marshallian demand and supply framework low levels of private investment in combination with high interest rates suggest that low levels of investment are caused by a low supply of savings. And indeed – as can be seen in Figure 7 – the domestic savings rate in Georgia is remarkably low compared to other developing European and Central Asian economies. In fact, it is remarkably low even compared to all countries in the world, with only eleven countries having lower domestic saving rates than Georgia in 2010. In 2008 and 2009 the domestic saving rate, which includes both private and public savings, was even negative, bottoming at -6.2 percent of GDP.



Not surprisingly, Georgia's trade and current account deficits have been high, indicating that the country is borrowing heavily from abroad to help sustain the current investment rates. For example, the current account deficit of Georgia has reached 22.8 percent of GDP in 2008, but has since recovered to -11.4 percent in 2010. Taking into account experiences of other developing countries around the world - Mexico, Argentina or Brazil - such high rates of current account deficits are unsustainable in the long run. To compare, during the peso crisis of 1994, the current account deficit of Mexico stood at only 7 percent of GDP.

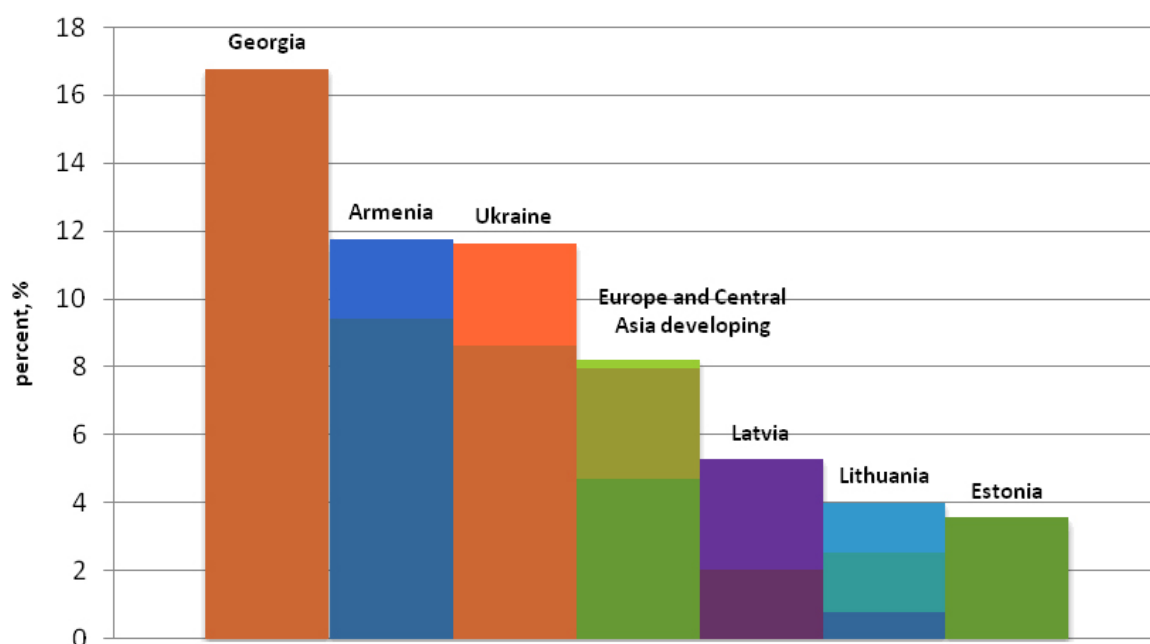
Figure 8: Current Account Balance, % of GDP (Source: WDI, 2012)



While domestic savings rates in Georgia are low they may not be the only binding constraint. In fact, low domestic savings might not be a binding constraint at all. Suppose that a lack of private savings is a binding constraint to economic growth because profitable investment projects are unable to find financing. In this case we would expect to observe relatively high deposit interest rates, driven by bank competition for deposits in order to fund profitable investment projects.

As is shown in Figure 9 the spread between lending and deposit rates in Georgia is among the highest in the region, and above the average for developing countries in Europe and Central Asia. Even compared to all countries the interest rate spread is high - in 2010 Georgia had the twelfth highest interest rate spread in the world.

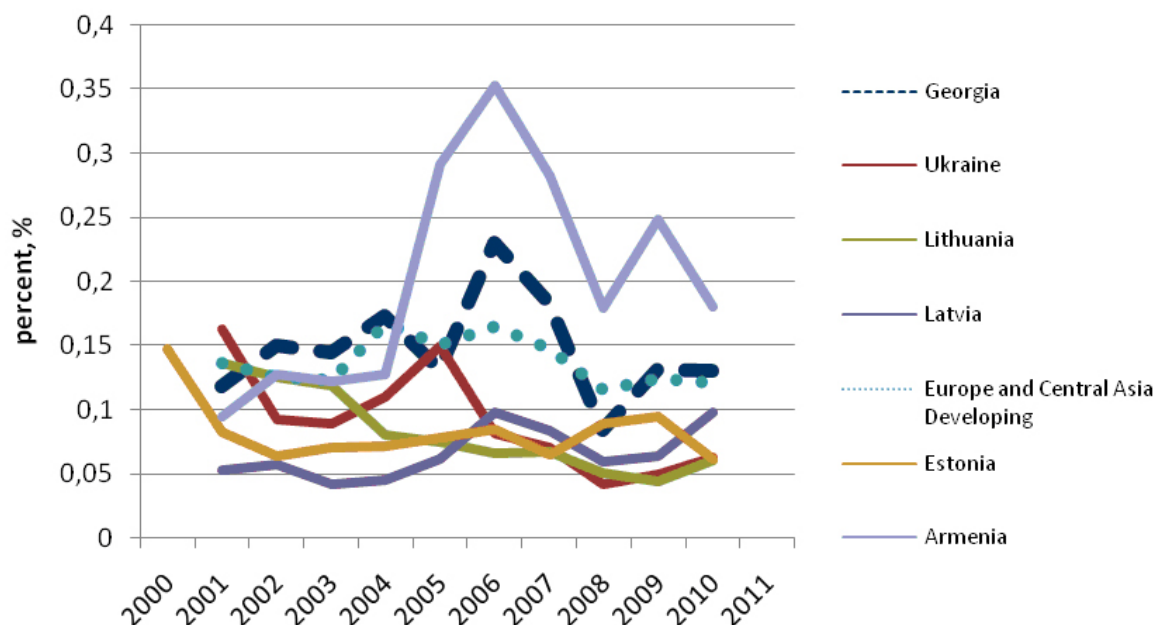
Figure 9: Interest Rate Spread, 2000-2010 (Source: WDI, 2012)



Private banks in Georgia are well capitalized, with the capital to asset ratio averaging about 20 percent, whereas the average for the comparable group of countries is about 13.2 percent.

In addition, the bank capitalization rates and average liquidity (liquidity to asset ratio) indicate that bank lending is not constrained by the availability of funds, domestic or foreign.

Figure 10: Liquid Reserves to Assets Ratio, % (Source: WDI, 2012)



This evidence contradicts the hypothesis that banks, constrained by a shortage of deposits, are competing for loanable funds. Our analysis thus suggests that low savings rates are not a binding constraint to economic growth in Georgia.

Poor Financial Intermediation

Poor financial intermediation, namely the lack of competition in the domestic banking sector, is a potential explanation for high lending-deposit spreads. In this case, the competitive structure of the banking sector rather than the risk profile of borrowers would be the more binding constraint on capital accumulation and thus economic growth. In order to check whether poor financial intermediation is a binding constraint we analyze the market structure of the Georgian banking sector and discuss various measures of competition.

As of June 2010, the banking system in Georgia was comprised of 19 commercial banks, of which 17 were resident banks. With no regulatory restrictions on the entry of foreign capital or foreign ownership, the share of foreign participation in the Georgian banking system was 88.3 percent in equity capital. There were a number of non-bank lending institutions operating in Georgia, among them 18 non-bank depository institutions, 39 microfinance organizations and 16 insurance companies. Despite the relatively high number of bank and non-bank depository institutions, the deposit and loan markets are

largely dominated by TBC Bank and Bank of Georgia, having a combined market share of more than 50 percent. The Herfindahl-Hirschman index as a measure of industry concentration stood at 20.4 percent in 2010 (National Bank of Georgia, 2010).

Gabrichidze (2010) finds that the Herfindahl-Hirschman index for the Georgian banking sector increased between 2005 and 2008, and levelled off and then slightly declined after 2008. This indicates that between 2005 and 2008 the Georgian banking sector became increasingly concentrated, but that this concentration process stopped after 2008. Yet, interpreting these changes in the Herfindahl-Hirschman index as a tendency towards less competition in the deposit and loan markets would be misleading. The existence of economies of scale in the banking sector could for example lead to higher concentration as well as improved efficiency and lower intermediation costs. Claessens and Laeven (2004) find that high industry concentration in the banking sector does not preclude competition as long as markets are contestable and the barriers to entry low.

The competitiveness of the banking sector can further be assessed using measures such as the one proposed by Boon (2008). The Boon indicator measures the response of the firm's market share to changes in marginal costs. A higher marginal cost elasticity of the market share (in absolute value) would indicate a higher degree of competition among firms in the industry. Gabrichidze (2010) finds that in the period prior to the global financial crisis, between 2005 and 2007, the Boon indicator increased, implying a higher degree of competitiveness in the Georgia banking sector. A higher degree of competition within the banking sector despite a higher degree of industry concentration could be explained by the lack of restrictive regulations on the entry of foreign banks and the implied high contestability of the banking sector. For these reasons poor financial intermediation and lack of competition among banks is unlikely to be an explanation of the large interest rate spread in Georgia.

As argued by Hausmann, Ricardo (2008) for Brazil, an alternative explanation of high interest rate spreads is an unusually high reserve ratio requirement. In Georgia the required reserve ratio on domestic and foreign currency liabilities is currently 10 percent. Although this ratio is much higher than the corresponding 1 percent reserve ratio for the Eurozone it is not unusual in the context of other Eastern European economies. For example, it is lower than Croatia's 13.5 percent and similar to Bulgaria's 10 percent. But compared to Croatia or Bulgaria the interest rate spread in Georgia is higher by a factor of 1.9 and 2.5, respectively.

All this suggests that neither a lack of competition among banks nor high reserve ratio requirements can explain the high interest rate spread in Georgia, making it unlikely that poor financial intermediation is a binding constraint.

Credit Risk Perceptions

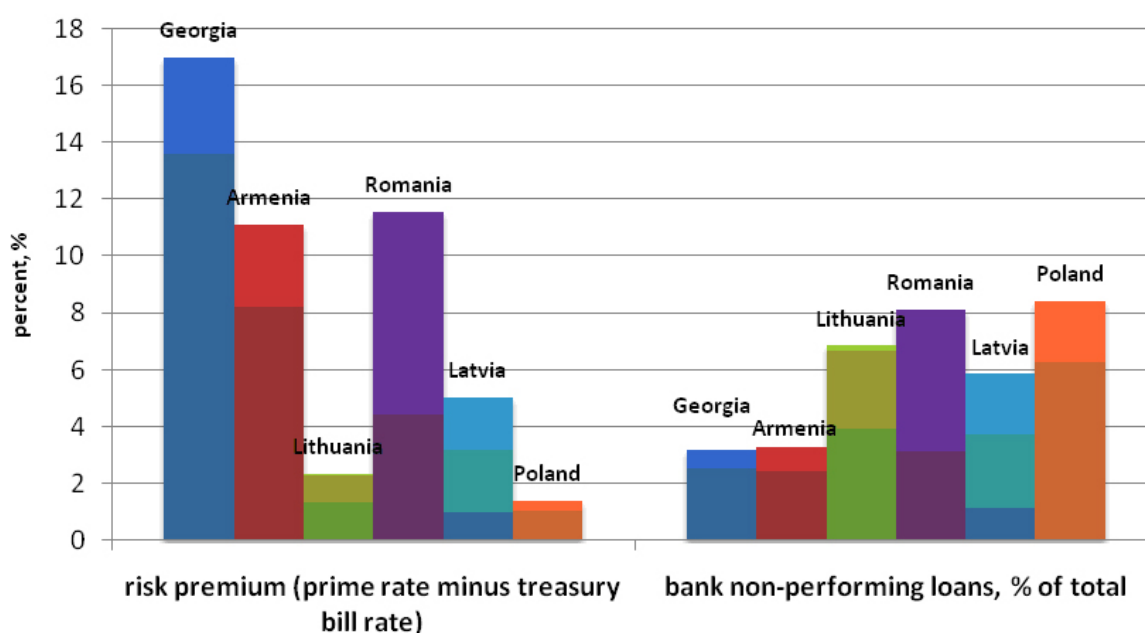
According to the evidence outlined above access to international finance, low domestic savings, or poor financial intermediation are not likely to be binding constraints. On the other side, high lending rates are of concern as they suppress capital accumulation and thus economic growth. In the following chapters we will argue that the underlying causes of high lending rates are weak property rights, and in particular political and institutional instability. High lending rates suggest that existing investment projects in Georgia are highly profitable, and that thus geography, human capital, and infrastructure

are unlikely to be binding constraints. The same applies to information and coordination externalities. The reason is that all of these constraints reduce the actual profitability of investment projects, and thus are not consistent with high lending rates. In contrast both macro and micro risks reduce only the risk-adjusted profitability of investment project, and are thus consistent with high lending rates.

Comparing the risk premium in Georgia with the risk premium in comparable countries offers a first test of this hypothesis. Among the group of comparable countries Georgia has the highest risk premium, measured by the difference between the prime lending rate and the short-term treasury bills rate. At the same time, the percentage of non-performing loans is among the lowest in the comparable group.

Furthermore, according to the 2008 IFC Enterprise Survey for Georgia small firms (5-19 employees) are required to provide collateral to secure a business loan in 93.3 percent of cases, compared to 77.4 percent in other Eastern Europe and Central Asian developing countries. The value of the collateral needed to secure the loan is 237.3 percent of the loan amount, compared to the average of 135.2 percent for similar sized firms in other Eastern Europe and Central Asian developing countries. All this suggests that the underlying cause of high lending rates is a high credit risk, induced by weak property rights and political instability, broadly interpreted.

Figure 11: Risk Premium and Non-Performing Loans, 2004-2010 (Source: WDI, 2012)



Low Returns to Economic Activity

Low levels of private investment and entrepreneurship can also be due to low returns on economic activity. While firms and entrepreneurs might have access to finance, they might not want to pursue any new ventures due to low expected returns. Two different explanations for low returns to economic activity can be offered. Firms and entrepreneurs could be restricted by low social returns or a low appropriability of otherwise high returns. Given Georgia's high lending rates a low appropriability of otherwise high returns – particularly related to macro and micro risks – are the most likely binding constraints. Nevertheless this chapter explores all potentially binding constraints that reduce the returns to economic activity.

Low Social Returns

Geography

Georgia is a small and mountainous country in a conflict-ridden region and potentially these factors have a negative impact on economic development. On the other side, Georgia's location between Europe and Asia and its varied geography have potentially a positive impact, in particular on the transportation and tourism sector. On balance, geography is not likely to be a binding constraint. The reason is that geography as a mostly fixed and time-invariant variable cannot explain changes in growth rates. In particular, Georgia's growth rates in the past decade showed considerable variation while her geography was essentially constant.

Despite this finding this section will discuss how geography potentially constrains a key sector of the Georgian economy, transportation and logistics. It is worth keeping in mind that these constraints are binding only for this (and possibly other) sectors, but are unlikely to be binding for the aggregate economy.

Transportation and logistics is a key sector of the Georgian economy. The sector benefits from Georgia's location between Europe and Asia and is mainly orientated towards the transit and re-export of goods. The sector is less orientated towards domestic trade between the regions of Georgia. Location can be a potential constraint to this sector as a remote location increases the cost of accessing foreign markets. An indicator for the tightness of the location constraint is the ratio of transportation costs to the value of exports. If location is a binding constraint one would expect to observe that Georgia exports goods with a high unit value and with relatively low transportation costs. Table 3 reports the major export commodities of Georgia, which overwhelmingly have low unit values and relatively high transportation costs, suggesting that location is not constraining the transportation and logistics sector.

Table 3: Major exports (Source: Geostat, 2011)

Commodity	Value (in thousand USD)	Share in total (%)
Total Exports	2,189,136	100.0
of which:		
Motor cars	450,297	20.6
Ferro-alloys	254,911	11.6
Mineral or chemical fertilizer, nitrogenous	144,091	6.6
Other nuts, fresh or dried	130,086	5.9
Ferrous waste and scrap	116,812	5.3
Gold unwrought or in semi-manufactured forms	109,890	5.0

This finding is confirmed by looking at the actual ratio of transportation and insurance to the value of exports reported in Table 4, based on Faye et al (2004). Although Georgia tends to export goods with low unit values and relatively high transportation costs the actual share of transportation costs in the value of exports is moderate. In particular, it is considerably lower than the corresponding ratio for Armenia.

Table 4: Cost of Trade (Source: Faye et al., 2004)

Country	Ratio of transportation and insurance to value of exports
Russia	0.00
Ukraine	0.02
Kazakhstan	0.04
Turkey	0.06
Azerbaijan	0.07
Georgia	0.08
South Africa	0.08
Brazil	0.08
Bulgaria	0.11
India	0.13
Armenia	0.29

Georgia's mountainous terrain is another possible constraint to the transportation and logistics sector; mainly impeding domestic trade between regions. While some regions of Georgia have only limited seasonal access to transportation networks, the economic geography of Georgia developed in response to Georgia's physical geography, thus limiting the impact of geographical barriers. If terrain is a binding constraint we would expect to observe regional price dispersion as a consequence of limited interregional trade.

As a possible test of regional price dispersion we take price data collected for the Khachapuri Index (Labadze et al., 2012). This price data is collected monthly and includes prices of basic food items on various markets in Tbilisi, Batumi, Kutaisi and Telavi for the summer months of 2011. The summary statistics of the Khachapuri index price data is compared to the summary statistics of price data for a variety of perishable food items in various US cities (Parsley and Wei, 1996). Table 5 reports the summary

statistics of the data. The mean is computed as the percentage price difference between Tbilisi and either Batumi, Kutaisi or Telavi. The standard deviation is computed over all price differences over the four month period between May and August 2011. The perishable index for Georgia is computed over all food items, with the weights corresponding to the share of the food item in the Khachapuri recipe.

Table 5: Regional Price Dispersion Georgia/USA

	Georgia (Labadze et al., 2012)			USA (Parsley and Wei, 1996)		
	Mean	Standard Deviation	Observations	Mean	Standard Deviation	Observations
Flour	-0.06	0.17	12			
Cheese	0.10	0.07	12			
Egg	-0.03	0.04	12			
Yeast	0.05	0.14	12			
Butter	0.35	0.59	12			
Milk	0.11	0.15	12			
Perishables	0.09	0.29	72	0.15	0.06	705
Non-Perishables				0.13	0.05	470

The results have to be interpreted with extreme caution: the data for the US precedes the data for Georgia by more than ten years; the data for the US includes a large number of observations whereas data for Georgia is restricted to prices of only six food items; and the data for Georgia is sampled in only four cities over only four month in the summer. Comparing the standard deviations of the perishable index suggests that the regions of Georgia are not integrated. While for some items, in particular eggs and cheese regional price dispersion is very low regional price dispersion tends to be high for food items that require further processing of farm output, i.e. butter, milk and yeast.

While the data suggests that regional markets in Georgia are not as integrated as they could be it is unclear what the underlying reasons are. While mountainous terrain might play a role, other candidates are an underdeveloped infrastructure, lack of competition due to small market size or uncompetitive practices by regional or national monopolies. A possible explanation can be found by comparing inter-city price differences with intra-city price differences. These price differences across different markets in the same city can be substantial. In the case of milk and butter the variability of prices across markets in the same city is of the same magnitude as the variability of price across different regions. This suggests that the underlying problem is not geography but rather an uncompetitive structure of the market for dairy products.

Human Capital

Human capital is one factor in the production function and could be a potential binding constraint to economic growth. If firms and entrepreneurs are constrained by lack of human capital we should observe that workers with skills or higher education are paid higher wages and face lower unemployment rates. We should also observe that firms

invest resources into training of their employees. According to a survey of the World Economic Forum (2011) an “inadequately educated workforce” is a frequent complaint of local businesses. This could indicate that lack of human capital is indeed a binding constraint to economic growth in Georgia. Alternatively, as the business survey can only survey existing firms it could also indicate that lack of human capital is only a binding constraint for those firms that exist and have thus overcome the true binding constraints to economic growth.

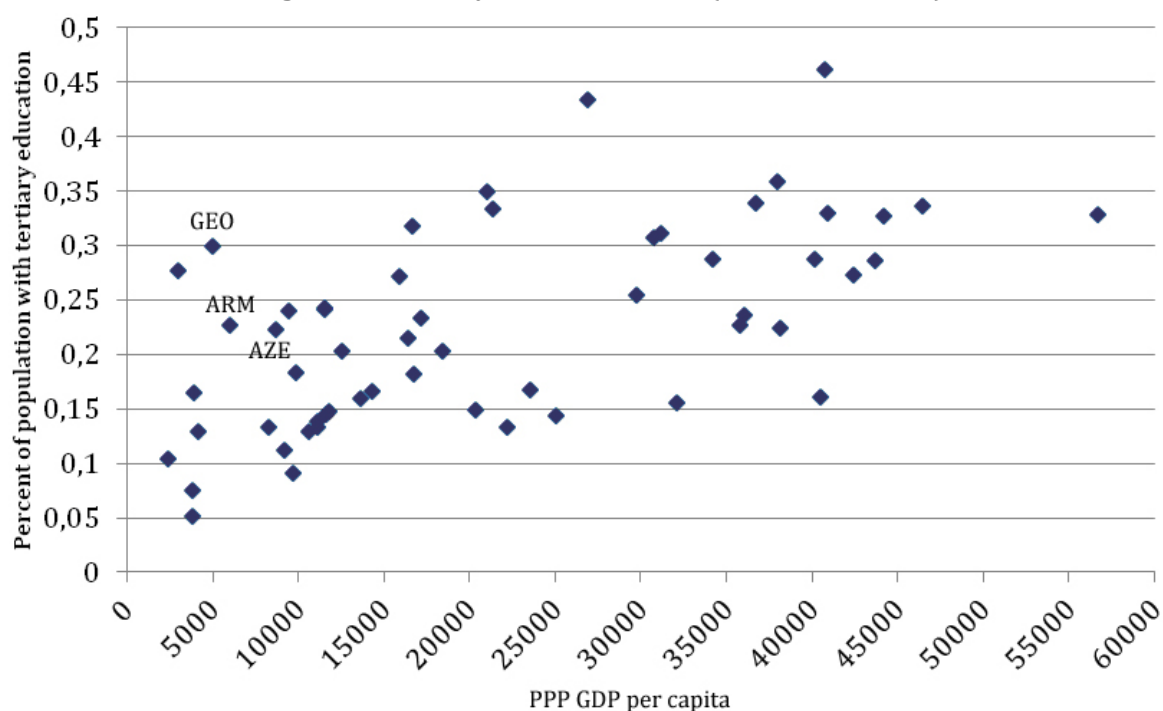
Human capital is hard to define precisely and is hard to measure in quantitative form. A standard measure of human capital is educational attainment, in itself hard to measure precisely. Educational attainment can be proxied by the education levels of the population. According to ILO statistics for 2007 in Georgia the vast majority of the economically active population has received secondary education or better. More than 40 percent of the economically active population have received some post-secondary education, and almost 30 percent have received tertiary education.

Table 6: Population by Education Level (Source: ILO, 2007)

Level	Definition according to ISCD-97	Share of economically active population
X	No schooling	0.00 %
0	Pre-primary education	0.00 %
1	Primary education	2.18 %
2	Lower secondary education	7.29 %
3	Upper secondary education	38.68 %
4	Post-secondary non-tertiary education	21.71 %
5	Tertiary Education	29.95 %

These numbers are high compared to other countries, even without controlling for Georgia's low GDP per capita. The percentage of the economically active population with tertiary education is comparable to many OECD countries, and is above the level of countries with a similar GDP per capita. It is even above the level of other transition economies which have or had very similar education systems. This suggests that the high level of education reported for Georgia is not an artefact in the data due to varying definitions of education levels in different countries.

Figure 12: Tertiary Education Levels (Source: ILO, 2007)



At the same time the unemployment data reported in Table 7 shows that workers with a higher level of education are more likely to be unemployed than those with lower level of education. From the data it appears that the Georgian workforce is overeducated, suggesting that human capital is not a binding constraint.

Table 7: Unemployment by Education (Source: Rutkowski, 2011)

	Unemployment rate, 15-64 years (in % for 2010)	Unemployment rate, 20-29 years (in % for 2010)
Primary	12.9	21.9
Vocational	13.4	30.4
Secondary general	17.1	32.8
Secondary technical	16.7	41.6
Tertiary	22.2	32.4

Despite this evidence the existing Growth Diagnostics study by the Government of Georgia/Millennium Challenge Corporation (2011) concludes that human capital is a binding constraint. The study's argument is based on the idea that education is mismeasured as the data does not account for the quality of education. This argument is supported with the results of various surveys of firm executives and other stakeholders about the quality of the Georgian education system.

Indeed, given the difficulties of defining and measuring human capital, one could argue that the high reported level of education is masking a low quality of this education. Unfortunately and similar to human capital itself the quality of education is hard to define and measure. The Government of Georgia/Millennium Challenge Corporation relies on various surveys among executives by the World Economic Forum (2011) and their own surveys among firms and other stakeholders in Georgia. These surveys reveal

that firms and stakeholders assess the quality provided by the Georgian education system as low, and see the low quality of education as a binding constraint to economic growth. In principle this is a valid – though possibly subjective – approach to assess the quality of an education system. The latter – asking firms and other stakeholders about what they perceive as a binding constraint – is not likely to be valid as it introduces a self-selection bias. In order to identify binding constraints to economic growth one should not rely on evaluations by existing firms, given that these are the firms that have or might have overcome the true binding constraint to economic growth.

The various surveys of the World Economic Forum (2011) rank Georgia's education system consistently in the bottom third of 139 countries. This outcome is taken at face value by the Government of Georgia/Millennium Challenge Corporation study. In what follows we will argue that for the purposes of a growth diagnostics study the findings of the World Economic forum are worthless: a growth diagnostics study should to the extent possible not rely on surveys of existing firms, given the possible self-selection bias. More importantly, the findings of the World Economic Forum itself appear to be subjective and random and are inconsistent with other, less subjective evidence.

The World Economic Forum evaluates the quality of national education systems by surveying executives and asking for their opinions on various aspects of the education system. This approach – relying on opinions rather than on statistics – has several advantages, but can also be criticized for its potential subjectivity and limited comparability across different countries. If the World Economic Forum rankings are taken as what they are – surveys of opinions – they are of limited use. But if these rankings are taken as an indicator of the quality of different education systems the findings are surprising and arguably implausible. It is the latter that matters, given that the Government of Georgia/Millennium Challenge Corporation study takes the World Economic Forum rankings as indicator of the quality of the Georgian education system.

Closest to being an indicator for the quality of education systems is the ranking of responses to the question “How well does the educational system in your country meet the needs of a competitive economy?”. In this ranking Georgia is ranked 119 out of 139 countries. While this is worse than, for example, Tajikistan or Malawi it is comparable to Mexico or Greece. The same ranking finds for example that Luxemburg is ranked worse than Kenya or that Qatar is ranked better than Denmark. To evaluate whether these rankings can be taken as a ranking of the quality of education systems we compare the World Economic Forum ranking of opinions of executives on the quality of mathematics and science education with the results of the Trends in International Mathematics and Science study (TIMSS).

The Trends in International Mathematics and Science study is an international comparative study of the mathematics and science knowledge of fourth and eighth grade students in different countries. It is similar in setup to the Programme for International Student Assessment (PISA) and is one of the few studies that give an objective and internationally comparable measure of the quality of outcomes of different education systems. Table 8 compares the ranking of the World Economic Forum with the results of the Trends in International Mathematics and Science study for selected countries. As can be seen the ranking of the World Economic Forum bears little relation to actual outcomes in mathematics and science. A particular striking comparison is for Qatar.

While the World Economic Forum ranks Qatar fourth among 139 countries, the TIMSS study ranks Qatar last for mathematics and second-last for science among 47 countries.

Table 8: Quality of Education Systems

	Ranking, Quality of Math and Science Education, (Source: World Economic Forum, 2011)	Average Math Scores, Grade Eight (Source: Mullis, 2008a)	Average Science Scores, Grade Eight (Source: Mullis, 2008b)
Singapore	1	593	567
Qatar	4	307	319
Lebanon	7	449	414
Czech Republic	25	504	539
Japan	28	570	554
Hungary	30	517	539
Ukraine	42	462	485
Saudi-Arabia	49	329	403
United States	52	508	520
Jordan	53	427	482
Russia	54	512	530
Armenia	74	499	488
Kuwait	89	354	418
Turkey	99	432	454
Georgia	104	410	421
Egypt	125	391	408

This comparison suggests that the World Economic Forum rankings should be used very cautiously, unless of course, they are just taken as what they are, rankings of opinions of executives. Furthermore, as we argued earlier the World Economic Forum rankings and any other opinion survey are also not suitable for identifying binding constraints, given the potential self-selection bias.

In contrast, the Trends in International Mathematics and Science study can be used to evaluate the quality of the Georgian education system, with several important caveats. This study narrowly focuses on results in mathematics and science education in the fourth and eighth grades. It does not include higher or vocational education which arguably matters more to firms. Furthermore, given the significant changes in the Georgian education system since the demise of the Soviet Union these results can only be taken as a one year snapshot. Nevertheless the results indicate that the current quality delivered by the Georgian school system is low in international comparison. Georgia is doing significantly worse than other countries of the former Soviet Union, in particular Armenia, Russia and Lithuania. On the other side Georgia compares favorably to some other, more developed countries as for example Turkey or Colombia.

With this rather limited evidence it is hard to determine whether the high level of education is masking a low quality. But even if it does it does not automatically imply that human capital is a binding constraint. A binding constraint could be identified by

looking for signs that firms and entrepreneurs try to overcome the binding constraint. If human capital or more specifically the low quality of human capital is a binding constraint we would expect to observe that Georgian firms are investing into staff training, or are trying to hire qualified workers on the international labor market.

The Government of Georgia/Millennium Challenge Corporation study claims that Georgian firms are investing heavily into staff training and that this is evidence for that the low quality of human capital is a binding constraint in Georgia. But this claim is not holding up to scrutiny. The Government of Georgia/Millennium Challenge Corporation study cites a ranking of the World Economic Forum, which ranks opinions of executives on the question “To what extent do companies in your country invest in training and employee development?”. Georgia is ranked 108 out of 139 countries, what in itself indicates that Georgian invest very little into staff training. The Government of Georgia/Millennium Challenge Corporation study draws a different conclusion, as it compares Georgia’s ranking to just five benchmark countries – Albania, Armenia, Macedonia, Moldova, and the Ukraine. As Table 9 shows this finding is sensitive to the set of benchmark countries chosen, even if one restricts oneself to other transition economies as benchmark countries.

The other issue is with the World Economic Forum ranking itself. Comparing the ranking to the results of a World Bank survey among firms about their internal training programs shows that the two bear little relation. For example, Indonesia is ranked highly by the World Economic Forum, but has the lowest percentage of firms offering training programs according to the World Bank. Vice versa Bosnia and Herzegovina is ranked at the bottom by the World Economic Forum, but is near the top according to the World Bank survey.

Table 9: Extent of Staff Training

	Ranking of staff training (Source: World Economic Forum, 2011)	Firms offering formal training (in % of firms), (Source: World Bank, 2008, * 2009)
Sweden	1	
Indonesia	36	4.7*
Rwanda	38	
Estonia	48	69.3*
Albania	55	
Azerbaijan	68	10.5*
Turkey	85	28.8
Russia	90	52.2*
Georgia	108	14.5
Ukraine	109	24.8
Armenia	116	30.4*
Moldova	117	33.1*
Macedonia	119	19.0*
Bosnia and Herzegovina	136	66.5*

Regardless of whether one trusts the World Economic Forum ranking or the World Bank survey, in both rankings Georgian firms appear to invest little into the training of their

staff. One possible interpretation is that human capital is not a binding constraint and that Georgian firms view the qualification of their workers as adequate. The other interpretation is that Georgian firms see their worker's qualification as inadequate but are not willing to invest because they are facing a different binding constraint, not related to human capital. For example, in a country with weak property rights or political instability firms might be reluctant to invest into staff training. In this case the binding constraint is not human capital, but rather lack of property rights or political stability.

Another reason why human capital is not likely to be a binding constraint in Georgia is Georgia's liberal immigration policy. If firms see human capital as a binding constraint they could overcome this constraint by hiring qualified staff on the international labor market. In most countries immigration policy would raise barriers that would make this hiring strategy costly. Considerably less so in Georgia, where the absence of large-scale immigration of qualified workers implies that human capital is not likely to be a binding constraint.⁴

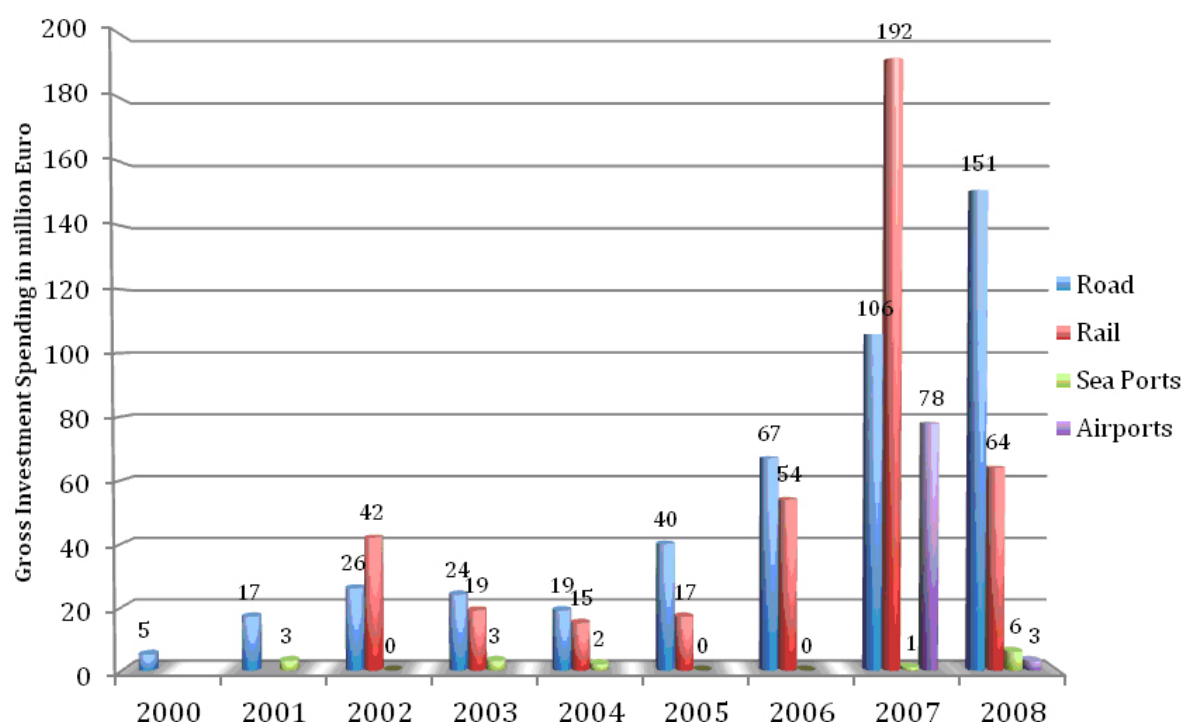
From the available evidence there is no support for the claim that human capital is a binding constraint. In fact, most of the evidence refutes this claim. This differs from the Government of Georgia/Millennium Challenge Corporation study in its assessment of human capital as a potential binding constraint. Nevertheless investment into Georgia's education system can still be justified given that the outcomes of any investment into education are long-term in nature. While it is impossible to predict whether human capital will be a binding constraint in the future it is likely to be one if Georgia continues to develop while not investing into education.

Infrastructure

After the demise of the Soviet Union Georgia's infrastructure quickly deteriorated. The turn-around came with the Rose Revolution, with higher investment into infrastructure and reforms designed to improve infrastructure efficiency. Table 10 reports investment into transportation infrastructure and shows that investment focused on road and railway infrastructure. While data for 2009 or later is not yet available, it is to be expected that investment has increased with projects such as the East-West highway, the Samtskhe-Javakheti road, the Zugdidi-Mestia road, and other infrastructure projects.

⁴ Unfortunately, in the absence of data on immigration inflows this remains at the level of anecdotal evidence.

Table 10: Transportation Infrastructure Investment (Source: OECD, 2011)



The majority of investment in the 2000 to 2007 time period focused on improving and maintaining existing transportation infrastructure as neither the length of the railway network or the road network increased. According to Geostat (2011), the length of the operational railway network marginally decreased from 1,586 km in 1990 to 1,565 km in 2009. The length of the operational road network decreased from 21,599 km in 1990 to 20,329 km in 2007.

In what follows we will argue that transportation infrastructure is unlikely to be a binding constraint. The first reason is that the marked increase in infrastructure investment around 2007 coincides with a fall in GDP growth rate from around 9 to 12 percent in 2005-07 to 2 to 7 percent in 2008-11, excluding the negative growth of 2009. By the logic of binding constraints an increase in transportation infrastructure investment should result in an increase of GDP growth, something that evidently did not happen. It should also be pointed out that some of the fastest growing sectors of the Georgian economy, tourism and transportation, depend critically on transportation infrastructure. If transportation infrastructure is a binding constraint it is unlikely that two sectors intensive in transportation infrastructure are among the fastest growing.

The second reason is that if transportation infrastructure would be a binding constraint we would observe congestion, something for which there is little evidence. Between 1990 and 2009 the length of the Georgian transportation network stayed roughly constant. The extent of deterioration of the infrastructure is much harder to gauge, but is potentially substantial. Nevertheless, comparing usage in 1990 with 2009 suggests that transportation infrastructure is underutilized. In particular, rail freight fell by more than 70 percent whereas road freight fell by more than 80 percent between 1990 and 2009. Even taking into account the deterioration of the transportation infrastructure it is unlikely that 2009 transportation is overburdened by freight and passenger volumes that are a fraction of 1990 volumes.

Table 11: Utilization of Transportation Infrastructure (Source: Geostat, 2011)

	1990	1995	2000	2005	2007	2008	2009
Freight carried (in thsd. tons):							
Railroad	76,860.9	4,656.4	11,496.1	18,986.7	22,230.0	21,181.2	17,104.0
Road	167,070.0	8,690.0	18,500.0	26,959.3	27,561.3	27,864.4	28,170.9
Air	17.0	2.1	1.3	1.6	1.1	0.7	0.4
Passenger carried (mln. persons)							
Railroad	14.8	3.1	2.3	3.6	3.9	3.4	3.1
Bus	735.2	116.2	235.0	263.1	293.5	301.4	309.5
Air	2.7	0.3	0.1	0.3	0.2	0.2	0.2
Number of Motor vehicles (thds.)							
Trucks	84.9	90.6	50.0		51.5	57.7	54.4
Passenger cars	481.9	360.6	247.9		416.3	466.9	500.9

Electricity supply is another component of infrastructure that is potentially a binding constraint. In the case of Georgia this seems to be unlikely given that Georgia transformed from being a net importer of electricity to a net exporter. In particular, from 2003 to 2010 availability of electricity increased from 7 to 8 hours per day to 24 hours, and domestic power generation from 6.9 TWh to 10.0 TWh (World Bank, 2012b). Given this progress it seems unlikely that electricity supply is still a binding constraint in Georgia.

Low Appropriability

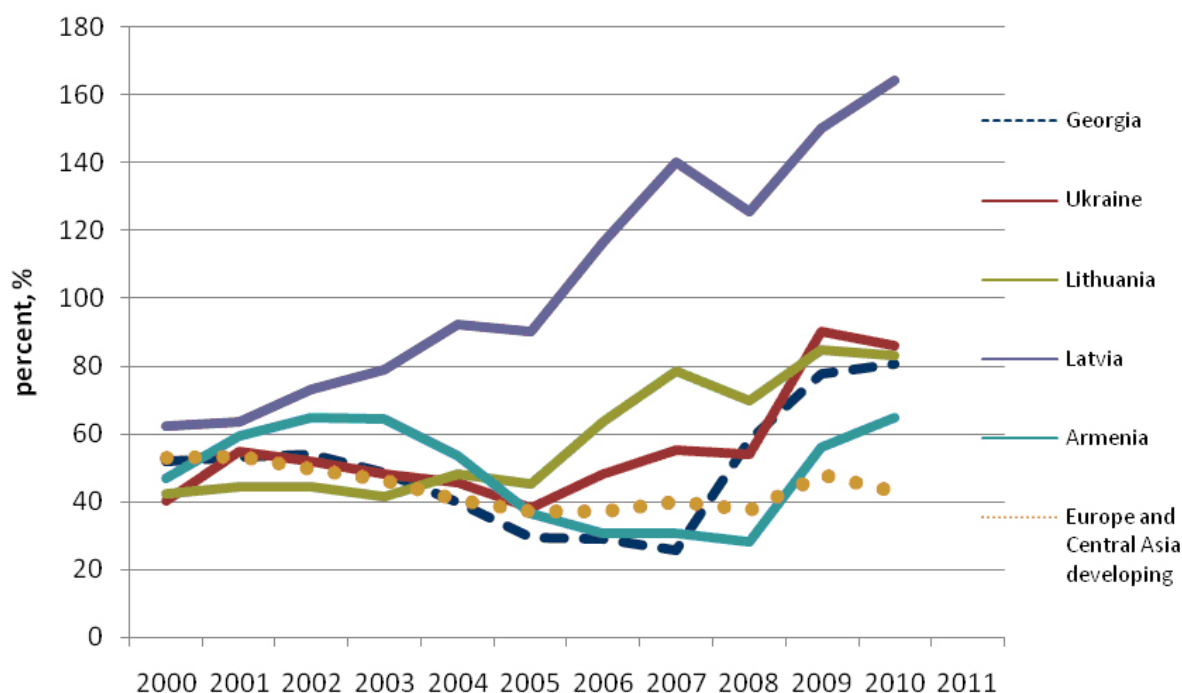
This chapter explores the various reasons for why firms and entrepreneurs could be unable to appropriate the return on their investment, in turn reducing their willingness to invest and thus reducing economic growth. With high lending rates it is unlikely that the returns itself are low. What is consistent with high lending rate and a high risk premium is that the risk-adjusted returns are low. Of the constraints in the low appropriability node risks associated with weak property rights, political instability, and a volatile macroeconomic environment are the most likely candidate binding constraints. Market failures such as information and coordination externalities and corruption, bureaucracy and high taxes are less likely to be binding constraints as they mainly affect the actual profitability of an investment and not its riskiness.

Macro Risks: Financial, Monetary and Fiscal Instability

In Georgia macroeconomics risks, such as a high budget deficit, high sovereign debt levels, short debt maturity, or high inflation rates have been greatly reduced in recent

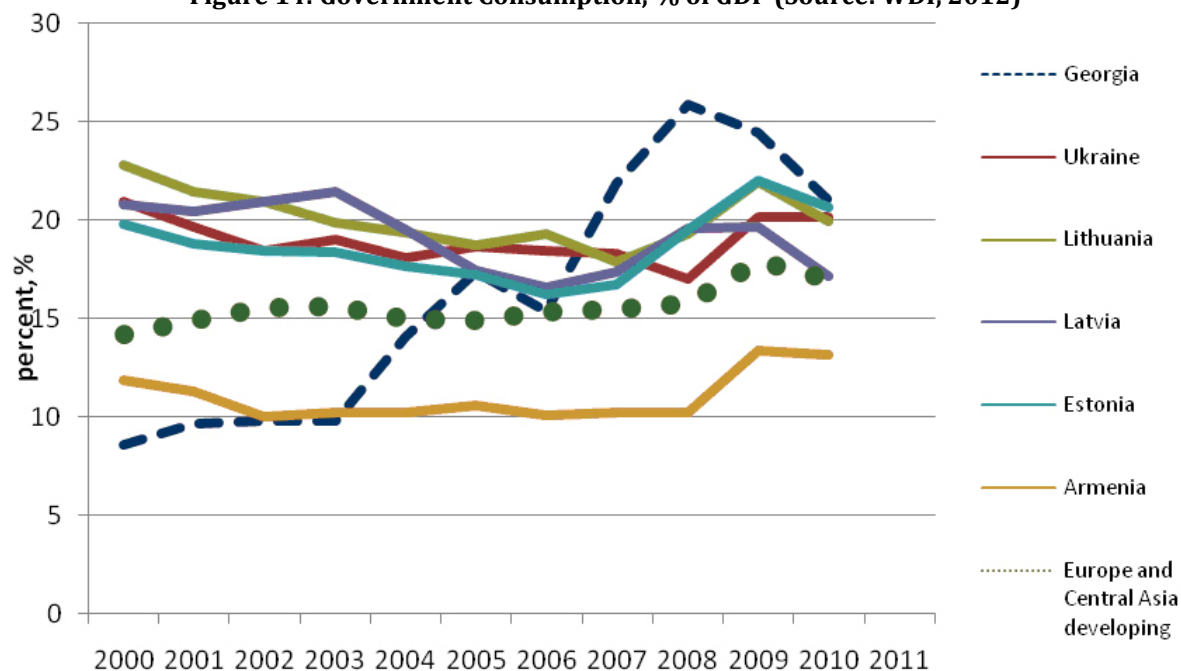
years. The stock of external debt as a share of GNI is high at 80 percent in 2010. This level of debt, however, is still comparable to the levels of other Eastern European countries such as the Ukraine, Latvia or Lithuania. Moreover, the share of short-term debt in the total external debt stock is relatively low in Georgia. At around 10 percent in recent years it compares favorably to the 18.3 percent average of other European and Central Asian developing economies.

Figure 13: External Debt Stock, % of GNI (Source: WDI, 2012)



The share of government consumption in GDP for Georgia is high, but the trajectory has improved considerably since 2008. In 2010 the rate of government consumption in Georgia was reduced to 20.6 percent of GDP. This rate is comparable to other European transition economies, although still above the average of 17 percent for European and Central Asian developing countries. Nevertheless, the fact that Georgia's growth rate fell when the fiscal balance started to improve suggests that the macroeconomic risk associated with fiscal imbalances is unlikely to be a binding constraint.

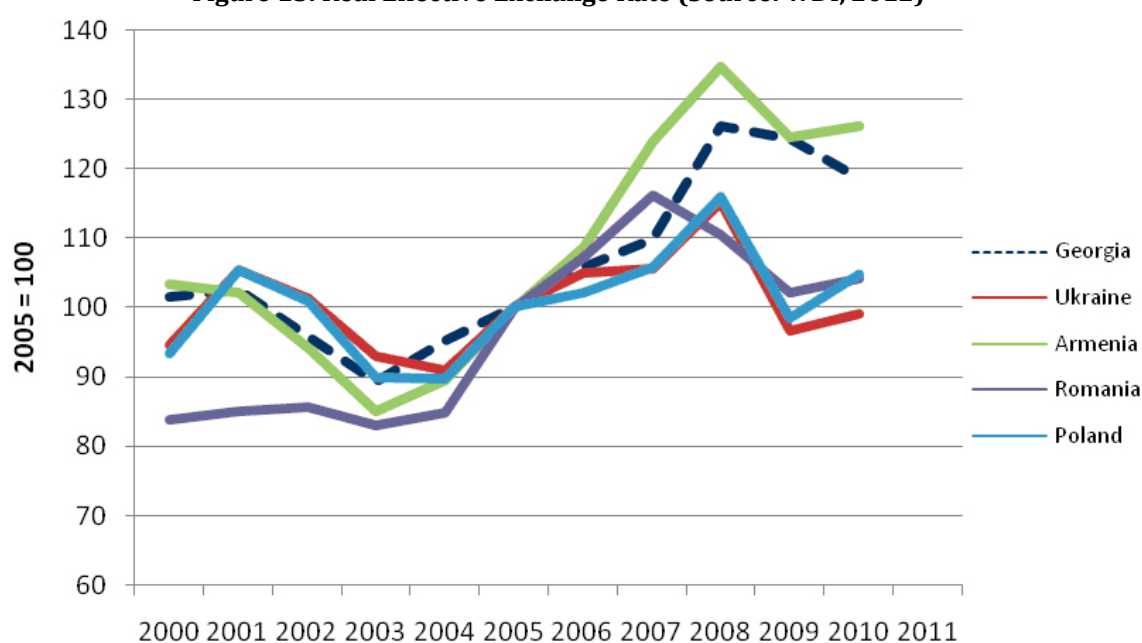
Figure 14: Government Consumption, % of GDP (Source: WDI, 2012)



Inflation rates have been stable, averaging around 7.2 percent since 2004. The country experienced a mild deflation in 2009. Moreover, episodes of high inflation are mainly driven by external factors, in particular rising world market prices for fuel and food.

The real effective exchange rate, that is, the real price of local currency in terms of a basket of foreign currencies, has been trending upward since 2003, and slowing down slightly in 2008 to 2010. The trend is likely indicative of an overvaluation of local currency stemming from the inflows of foreign capital. Overvaluation can dampen the profits of export-oriented firms, making it more difficult for them to obtain financing.

Figure 15: Real Effective Exchange Rate (Source: WDI, 2012)



Dollarization which induces a currency mismatch is another potential macro risk. Deposit dollarization rates are still very high in Georgia. Based on the data from 2010 Tchaidze and Tvalodze (2011) find that more than 70 percent of all deposits are denominated in foreign currencies, down from close to 90 percent in 2000.

According to Otar Nadaraia, the deputy-head of GFSA (Georgian Financial Supervisory Agency) the credit induced currency risk (CICR) is a serious challenge for the domestic banking sector. Since many businesses receive the bulk of their revenues in local currency banks face the risk associated with the borrower's currency mismatch, even if loans are denominated in the foreign currency. The missing market for hedging foreign currency risk can in part explain the high risk premiums on lending in Georgia.

The underlying cause of dollarization is harder to determine. Dollarization is usually explained by macroeconomic and political risk, inducing households to switch from local to foreign currency. Aslanidi (2008) argues that exchange rate risk is the best predictor of foreign currency holdings. Exchange rate risk in turn is influenced by macroeconomic and to a lesser extent by political risks, suggesting that high levels of dollarization are indicative of either macro or micro risk being the underlying binding constraint.

With the macroeconomic environment having steadily improved while growth rates stagnated it is unlikely that macro risks are the binding constraint. Furthermore, if macroeconomic risk were the binding constraint, dollarization would have remained at the high level of the early 2000s instead of having steadily decreased. Thus micro risks appear to be more important in the determination of the high lending rates and the risk-premium.

Micro Risks: Corruption, Bureaucracy and Taxes

While corruption, bureaucracy and high taxes are prime candidates for being a binding constraint in many countries it is unlikely that they are in Georgia. Before the Rose Revolution corruption was endemic, the bureaucracy inefficient and official tax rates were high. Reforms implemented since 2003 led to an impressive turn-around, with Georgia rapidly rising in the corruption perception index of Transparency International and the Doing Business ranking of the World Bank. Table 12 reports various indices, showing the results of the radical reforms enacted after 2003.

Table 12: Micro Risks (Source: Transparency, 2012; World Bank, 2012)

	2002	2004	2006	2008	2010	2011	2012
Corruption Perception, Relative Ranking	85/102	133/145	99/163	67/180	68/178	64/182	
Corruption Perception, Score 1-10	2.4	2.0	2.8	3.9	3.8	4.1	
Starting a Business, Time (days)		25	21	11	3	3	2
Starting a business, Cost (% of income per capita)		22.9	13.7	9.5	3.7	5.0	4.3
Enforcing Contracts, Time (days)		375	375	285	285	285	285
Enforcing Contracts, (% of claim)		41.2	41.2	29.9	29.9	29.9	29.9
Paying Taxes, Payments (numbers per year)			46	30	18	18	4
Paying Taxes, Total Tax Rate (% of profits)			57.0	38.6	15.3	15.3	16.5

The rankings themselves should be interpreted with caution as they might not capture the full picture. This is in particular true for variables that cannot be observed directly, or that might be manipulated by governments in order to improve the ranking.⁵ Nevertheless, even if these rankings are not taken at face value there is no doubt that Georgia made real progress in reducing corruption, reforming the bureaucracy and lowering taxes. Given this progress it is unlikely that corruption, bureaucracy, and taxes are still binding constraints for the Georgian economy.

Micro Risks: Property Rights and Political Stability

In most international rankings Georgia fares well due to the reforms enacted after the Rose Revolution. Exceptions are indices that attempt to measure property rights protection and political stability, broadly interpreted. In what follows property rights and political stability do not only encompass laws designed to guarantee and protect property rights, but also the ability and willingness of the government to evenly enforce and to respect these laws; the stability of the government itself; the stability of

⁵ See Høyland, Moene, and Willumsen (2012) for a critical discussion of international index rankings, and their susceptibility to manipulation.

institutions, and the absence of potential internal or external conflicts. It is worth emphasizing that property rights protection has a broad interpretation, and goes far beyond a simplistic interpretation as protection against outright expropriation.

Table 13 reports various international rankings, both the aggregated indices and their sub indices, if relevant. Some of these (sub) indices rely on opinion surveys. In particular, several sub indices of the International Property Rights Index are based on surveys among executives by the World Economic Forum. While this makes the ranking susceptible to a self-selection bias one could argue that when it comes to property rights and political stability perceptions do matter. Even in countries with weak property rights and significant political instability neither property rights nor the political system are contested on a regular basis. This makes it difficult for firms and entrepreneurs to evaluate the true odds, and gives an important role to perceptions.

Table 13: Property Rights Protection

	Score	Ranking
International Property Rights Index (Source: IPRI, 2012):	0 to 10	130 countries
Legal and Political Environment	4.4	74
Judicial Independence	4.5	84
Rule of Law	4.6	68
Control of Corruption	4.7	61
Political Stability	3.6	97
Physical Property Rights	6.1	63
Protection of Physical Property Rights	4.6	111
Registering Property	10.0	1
Access to Loans	3.8	70
Intellectual Property Rights	2.3	129
Protection of Intellectual Property Rights	3.9	99
Patent Protection		
Copyright Piracy	0.7	108s
Index of Economic Freedom (Source: The Heritage Foundation, 2012):	0 to 100	179 countries
Property Rights	40	75
Failed States Index (Source: The Fund for Peace, 2011)	0 to 120	177 countries
Aggregated sub indices	86.4	130
Political Stability Index (Source: Economist Intelligence Unit, 2010)	0 to 10	165 countries
Aggregated sub indices	5.2	92

Even ignoring perceptions there are other reasons to believe that property rights are weakly developed in Georgia. While the International Property Rights Index ranks Georgia at the extreme end other indices that are based on statistical data or evaluations of external experts come to similar conclusions. Less formally, case studies for Gonio, Mestia and other touristic zones by four non-governmental organizations⁶ raise suspicion that property rights are in some cases not respected. It is unclear whether this is because it is in occasional cases in the government's interest or because of glitches in the official registration of property. While the veracity and the general implications of these reports are hard to evaluate, these reports matter for perceptions.⁷

Vice versa political and more importantly institutional stability in Georgia is reduced by the dominance of opposition parties with unclear political programs and opaque leaderships, a high level of inequality, and the possibility of external conflicts involving Georgia or her neighbors. Of particular concern is the risk of reform reversal. Following Campos and Horváth (2012) reform reversals are frequent, and following Merlevede (2003) have a significant negative effect on economic growth.

Weak property rights and political instability have several effects. Firms and entrepreneurs are less likely to invest, and if they invest will focus on the short-term. Bank and other financial institutions providing loans to firm and entrepreneurs are likewise less likely to lend. Following Bae and Goyal (2009) and Qian and Strahan (2007) banks will charge higher real lending rates, are more likely to require collaterals, and will shorten the maturity of the loan. Although we lack data on loan maturities a high real lending rate and significant collateral requirements are what is observed in Georgia.

All this and the absence of any other plausible explanation suggest for high perceived credit risk suggest that weak property rights and political instability are the binding constraints to economic growth in Georgia.

Market Failures: Information and Coordination Externalities

Market failures potentially reduce the ability of firms and entrepreneurs to reap the returns on their investments. Two market failures are of particular relevance to economic growth: information externalities and coordination externalities. As with all positive externalities, information and coordination externalities imply underinvestment into the externality-generating activity, and give a role to the government.

Information externalities (Hausmann and Rodrik, 2003) arise when any investment into new activities by a firm or entrepreneur generates information on the profitability of this activity. This information is available to other firms and entrepreneurs who might decide to also enter the new activity based on information that the activity is profitable.

⁶ See Association Green Alternative, Georgian Young Lawyer's Association, Transparency International Georgia, and the Georgian Regional Media Association (2011a, 2011b, 2012).

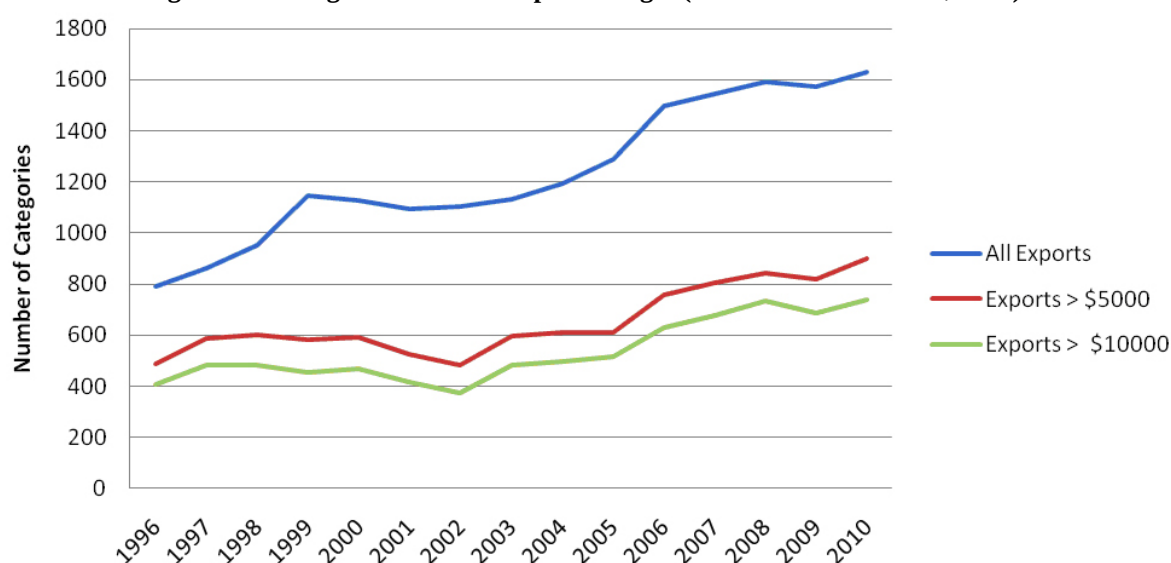
⁷ At the same time, Transparency Georgia is also quoted with "[...] the government has tended to respect property rights as it promotes large infrastructure projects, such as the Batumi-Tbilisi railway modernization project", <http://www.eurasianet.org/node/65275>.

But this of course will reduce the profits of the pioneering firm or entrepreneur. This positive externality thus diminishes incentives to invest into new activities. Coordination externalities (Rodrik, 2007) arise when investments exhibit economies of scale and when their profitability depends on simultaneous investment into related activities that supply crucial inputs. An individual firm or entrepreneur thus has no incentive to invest unless other firms or entrepreneurs are also willing to simultaneously invest into related activities.

Neither information nor coordination externalities are likely to be binding constraints. Without government intervention, both externalities imply low profitability, inconsistent with high lending rates. Nevertheless in what follows we will explore these two possibly binding constraints. Both information and coordination externalities would manifest themselves in low levels of innovation. Innovation here should not be interpreted as inventing new technologies and products, but rather as starting new, non-traditional activities. These new activities have potentially a higher productivity than old, traditional activities and can thus contribute to economic growth.

Following this definition of innovation the level of innovation in Georgia appears to be moderately high. Between 2000 and 2010 the number of categories in which Georgia exported increased by more than 60 percent, measured at the six digit level. With the exception of 2008, since 2007 Georgia increased the number of export categories by 7 to 8 percent per year, and recorded an even more impressive 23.7 percent growth in 2006. This result holds irrespective of whether all exports or only exports above a \$5,000 or a \$10,000 threshold are considered. The extent of increasing diversification favorably compares to other transition economies. It is well above the corresponding growth rates for larger and more diversified transition economies, and well above the corresponding growth rates of similarly sized and diversified transition economies. For example, between 2000 and 2010 the Ukraine exported in only 16 percent more categories whereas Armenia exported in only 30 percent more categories – compared to the corresponding growth rate of 60 percent for Georgia.

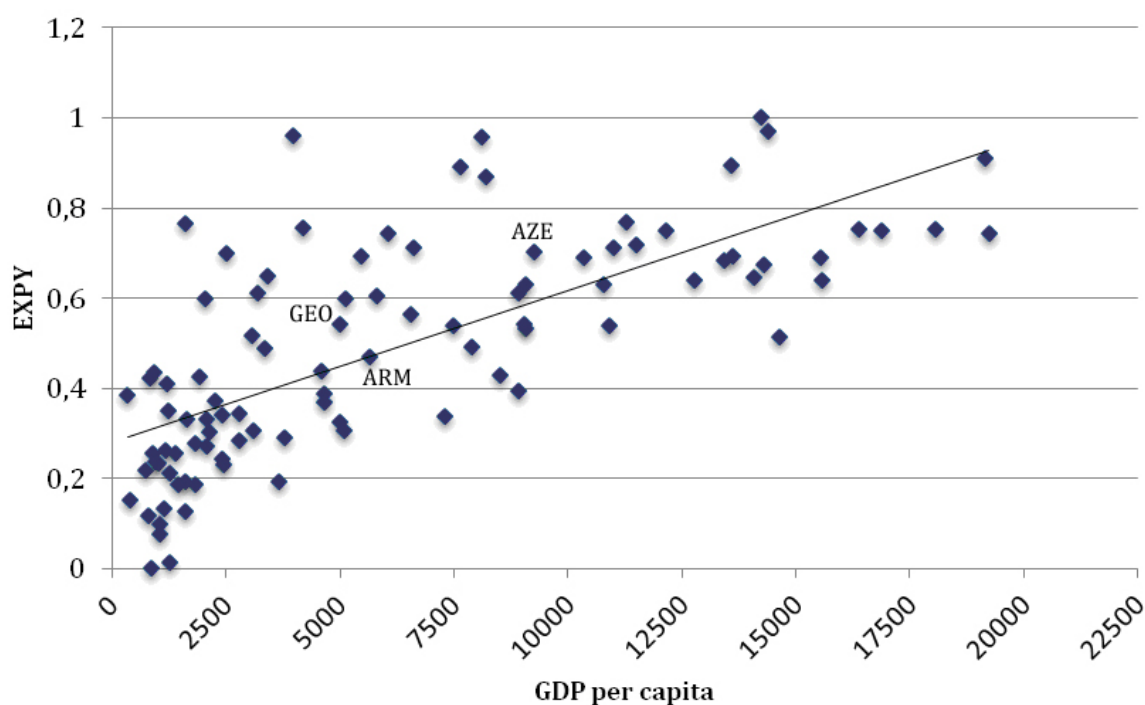
Figure 16: Georgia's Extensive Export Margin (Source: UN Comtrade, 2012)



These exports are also moderately sophisticated, as measured by the EXPY index. Proposed by Hausmann, Hwang and Rodrik (2007), the EXPY index measures the

sophistication of a country's exports by comparing these exports to the typical exports of rich countries. The index is scaled to be between 0 and 1, with 1 indicating high export sophistication, that is, an export basket very similar to the most advanced countries. Figure 17 reports the EXPY index as computed by Felipe, Kumar and Abdon (2010) for non high-income countries, and compares the index to the income level. Georgia fares relatively well, having an export sophistication that is moderately higher than for countries with similar income levels.

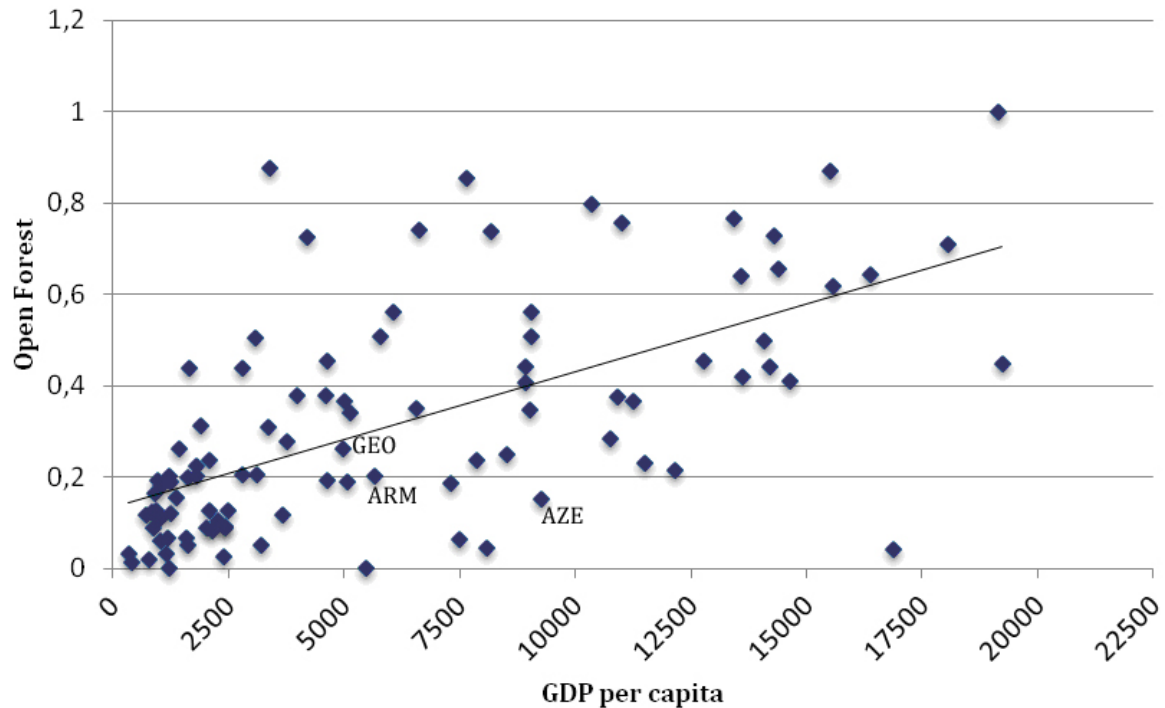
Figure 17: EXPY Index of Export Sophistication (Source: Felipe, Kumar and Abdon, 2010)



The sophistication of current exports gives an indication of the capabilities of an economy, and its potential to innovate and to diversify into new industries. At the same time an economy's capacity to innovate and to diversify into new industries depends on its position in the product space. A country's capacity to innovate crucially depends on whether the country's existing industries are close to other, currently non-existing industries in the product space. For example, a country currently producing petrochemicals will have a higher potential to move into the production of fertilizers than a country producing machine tools.

As a measure of a country's position in the product space Hausmann and Klinger (2006) proposed the Open Forest index. The Open Forest index measures how far away a country is from potential industries, given the country's current industries. Figure 18 reports the Open Forest index as computed by Felipe, Kumar and Abdon (2010) for non high-income countries, and compares the index to the income level. Georgia is slightly below the level to be expected given Georgia's income level.

Figure 18: Open Forest Index (Source: Felipe, Kumar and Abdon, 2010)



The finding of moderately high levels of innovation indicates that neither information nor coordination externalities are binding constraints. If information and coordination externalities would be binding constraints to economic growth we would observe little to no innovation and experimentation with new industries. This evidently is not happening as Georgia can be favorably compared to other transition economies.

Furthermore, given Georgia's well diversified and sophisticated industrial structure in Soviet times, information externalities are likely to be less severe than in countries that at no point in their history had experienced a diversified and sophisticated industrial structure. It can also be argued that the moderately high level of innovation is surprising given the high lending rates and their underlying cause, weak property rights and political instability. If anything, weak property rights, political instability and high lending rates reduce the incentive to be the pioneer and to invest into new, non traditional activities.

Likewise, coordination externalities are also unlikely to be a binding constraint. Following the logic of the argument above it is more likely that any possibly observed inability to simultaneously invest into related activities to a large part stems from weak property rights, political instability and high lending rates. Furthermore, moderately high levels of export sophistication and a moderately unfavorable location in the production space suggest that movement to new activities is not severely restricted. Rather, these two findings suggest that Georgia is reasonably well-positioned to innovate and to diversify her industrial structure.

While all this suggests that neither information nor coordination externalities are binding constraints to economic growth, a case can still be made for an activist industrial policy. Outlining a sensible industrial policy is beyond the scope of this paper, but it should be noted that any good industrial policy for Georgia should take into account that the binding constraints are likely to be weak property rights and political instability. For

example, resting the authority over industrial policy with an independent and professional institution instead of the government itself could potentially increase institutional stability and thus relax a binding constraint.

Conclusions

In this growth diagnostics study we found that weak property rights and political instability are binding constraints to economic growth in Georgia. Weak property rights here encompass not only the existence of laws designed to guarantee and protect property rights, but also whether the government has the capacity and the willingness to respect and to enforce these laws. Political instability encompasses whether the government and more importantly institutions are stable, and unthreatened by potential internal or external conflicts.

While this broad interpretation allows us to identify weak property rights and political instability as binding constraints it also means that it is unclear to what extent the different components of property rights and political instability relate to the binding constraint. We suspect that all of them are important to some extent, but that long-run institutional stability ultimately is the main concern. Unfortunately there are no easy to implement policies or reforms that guarantee a quick improvement of property rights and political stability. In fact it is not even under the full control of the current Georgian government, as it significantly depends on other organizations, in particular opposition parties and other countries in the wider region. It is thus worth emphasizing that the results of this study should not be interpreted from the view point of party politics.

The results of this study suggest a few key priorities for the political actors, both in the government and the opposition. The Doing Business ranking of the World Bank suggests that the existing laws concerned with property rights are sufficient. On the other side, a strengthening of the independence and capacity of the judiciary and other institutions involved in protecting property rights is needed. This in particular includes not only the public sector, but also media and other involved organizations. We also suggest a strengthening of democratic processes with an eye on ensuring that any potential transition of power will be peaceful and will not harm existing institutions and the legal environment.

While policies and reforms strengthening property rights and political stability should be a key priority it in no way implies that other constraints should be neglected. First, we only found evidence but have not proven that weak property rights and political instability are the binding constraints. Second, while today weak property rights and political instability are likely to be the binding constraint this can change over time. Of particular concern thus should be any other constraint that cannot be addressed immediately, but only in the long-term. First and foremost this applies to human capital and to a lesser extent to infrastructure.

Nevertheless, as neither human capital nor infrastructure appear to be binding today any investment into the two is not likely to raise growth rates in the short-term. This is only likely to happen if the binding constraints are addressed. Thus any reform addressing property rights or political stability should have priority.

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