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Fostering growth in CEE countries: a country-tailored approach to growth policy

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Summary

This paper analyses the long term growth experiences of the eastern European accession countries and the effect of various tailored growth policies. We find that there are two overarching growth-enhancing policies that can substantially increase long-term growth: competition and the quality of education. We find empirical evidence that if accession countries from the transition region want to achieve – and sustain – higher growth rates they will need to ensure competition by continuing to remove entry and trade barriers and by strengthening competition agencies. We also find evidence on the positive long-run impact of quality of education on growth, and hence the high return on public investment in education, particularly at the primary and secondary level. The private sector's role in overcoming skill mismatches will benefit from deepening financial intermediation and reducing constraints in access to finance.

Keywords: industrial organisation and macroeconomics; industrial structure and structural change; industrial price indices; manufacturing and service industries; choice of technology

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1. Introduction

Before the onset of the global financial crisis, transition countries, particularly in central and eastern Europe, had embarked on what appeared to be strong and sustainable growth paths. The crisis has brought into question the sustainability of this process, and has heightened the need to develop a new growth agenda across the region. This paper provides a general framework for designing medium-term growth-enhancing policies, while focusing on specific policies relating to competition, education and finance.

Since the late 1980s the prevailing view as to which policies are most conducive to good growth performance has been known as the Washington Consensus. This view asserts that, no matter what a country's geographical location or current level of development, the appropriate policy package to achieve growth is to liberalise trade and competition, privatise state-owned firms and maintain a stable macroeconomic environment. In addition, the Consensus highlights the importance of property rights protection and enforcement of contracts as essential preconditions for entrepreneurship and growth to flourish. More recently, however, this view has been challenged. For example, it has been argued that countries in south-east Asia[1] have grown rapidly over the past 40 years without fully liberalising trade, while China has made huge economic strides without privatising its large state enterprises.

A recent report commissioned by the World Bank, known as the Spence Report,[2] put forward policy recommendations that are more nuanced than the Washington Consensus and take into account the different circumstances faced by countries or regions. It emphasises the common role that education, trade, competition and labour market mobility play in fostering growth across a wide range of countries, and stresses the importance of government commitment to pursuing growth-enhancing policies in the long term.

Policies such as those advocated in the Spence Report are likely to foster long-term growth in the transition countries, although several crucial factors must be kept in mind. The different regions – central Europe and the Baltic states (CEB), south-eastern Europe (SEE) and the Commonwealth of Independent States and Mongolia (CIS+M) – had very different starting points in transition in terms of income, education and infrastructure. They have also differed substantially in the extent to which they have been integrated into the European Union and been able to develop market institutions. Another factor is the level of dependency on natural resources; countries that rely heavily on such resources tend to suffer from high exchange rates that reduce the scope for economic diversification. More importantly, and particularly when they are non-democratic, resource-rich countries also tend to have higher levels of corruption, poorer governance and spending priorities that can adversely affect growth.

Education and competition are also of key importance for growth in transition countries. Aside from being among the main policy areas considered by the Spence Report, there is an extensive empirical literature showing that both education and competition matter for growth, even when taking account of institutions.[3] In

[1] Principally Singapore, Hong Kong, Taipei China and South Korea; see Hausmann, Rodrik and Velasco (2005).
[2] Spence and the Commission on Growth and Development (2008).
[3] See Aghion and Howitt (2006).

particular, the potential growth-enhancing effect of education has been well studied using datasets with large numbers of countries.[4] The growth-enhancing effect of competition has also been emphasised in recent cross-country and cross-sector analysis.[5] These are also areas where substantial progress is needed to catch up with average OECD standards and that are clearly susceptible to changes in policy preferences and design.

Overview of growth in transition countries

Table 1 indicates the pre-crisis growth experience of the three transition subregions, the OECD countries and some selected benchmark countries. Growth in the transition economies was substantially higher than in the eurozone and above the world average rate. This is because they are middle-income countries catching up with the more advanced economies in respect of both capital investment and knowledge acquisition. They grow faster because it is usually easier to imitate existing technologies that have been pioneered elsewhere than to innovate. In addition, capital accumulation involves decreasing returns, so that increasing the stock of capital raises output by more than it does in a country that has not yet accumulated much capital. Growth rates in the CIS+M have been the highest, mainly on account of the rising price of energy over the past decade.

In relative terms, real GDP per capita is highest in CEB, followed by SEE and then the CIS+M resource-rich countries. At the bottom of the scale come the CIS+M non-resource-rich countries. In CEB, per capita GDP is still only 55 per cent of the OECD average. Non-resource-rich CIS countries have a per capita GDP that is 12 per cent of the OECD average. It is also evident that GDP growth has been highest in those countries with the lowest level of GDP, signifying the scope for these economies to catch up.

It should be noted that growth rates in transition economies, including the CIS+M, remain well below the 8-10 per cent range experienced by China and India, and are more in line with the second wave of emerging Asian economies such as Indonesia, Malaysia or Thailand.

[4] For example, Barro and Sala-i-Martin (1995).
[5] See Aghion et al (2005).

Table 1: Level of GDP per capita and average annual growth rates

Country groups	Indicator	1991	1996	2000	2003	2007
CEB	GDP per capita					
	3-year average	-4.1	4.2	4.8	6.8	
	6-year average	0.3	4.4	5.8		
SEE	GDP per capita					
	3-year average	-1.9	4.4	3.7	5.9	
	6-year average	-0.2	4.2	4.8		
CIS, non-resource rich**	GDP per capita					
	3-year average	-16.4	3.2	7.3	8.1	
	6-year average	-8.0	4.5	7.7		
CIS, resource rich***	GDP per capita					
	3-year average	-12.2	3.5	7.8	11.9	
	6-year average	-6.6	5.8	9.9		
Non-OECD****	GDP per capita					
	3-year average	2.8	4.1	3.5	5.5	
	6-year average	3.9	3.8	4.4		
OECD****	GDP per capita					
	3-year average	2.1	3.7	2.0	3.3	
	6-year average	2.8	3.3	2.6		

* *real GDP per capita based on ppp 2005 international $ (Source: WDI 2009)*

** *CIS non-resource rich: Armenia, Belarus, Georgia, Kyrgyz Republic, Moldova, Mongolia, Tajikistan, Ukraine*

*** *CIS resource rich: Azerbaijan, Kazakhstan, Russia, Turkmenistan, Uzbekistan*

**** *excluding transition countries*

Source: World Development Indicators 2009, authors' calculations.

2. Framework for designing growth policies

The starting point for analysing growth at a country level has commonly been to view the flow of domestic output as being generated from a given stock of factors of production, particularly capital and labour and their respective productivity levels. A country with limited capital can grow faster by accumulating more capital, whereas a country that has already accumulated capital does not gain much by increasing its rate of accumulation. Eventually, accumulating more capital will entail more capital depreciation than it can generate in terms of added output.

From neoclassical to new growth theory: A natural starting point is to specify an aggregate production function which describes how domestic output flow is generated from a given stock of production factors, in particular capital. This production typically involves decreasing returns to capital accumulation; that is, one more unit of capital yields less additional output, the more capital has already been accumulated. For example we can write:

$$Y = AK^{\alpha},$$

where Y is output, K is the capital stock, A is a productivity factor which reflects the existing stock of knowledge and the resulting efficiency of capital and labour in producing final output, and $\alpha<1$ so that the production technology exhibits decreasing returns to capital accumulation.

Growth in output can result: (i) from the accumulation of capital K; and (ii) from increases in the productivity factor A, that is, from productivity growth. Neoclassical growth theory emphasises capital accumulation as the main source of growth, thus taking productivity A as fixed. Capital accumulates over time as a result of investment and capital depreciation.

$$\dot{K} = I - \delta K ,$$

where K_{+1} is the capital stock next period, so that $K_{+1} - K$ is the net increase in capital stock per unit of time and δ is the depreciation rate of capital.

Using the fact that investment is equal to aggregate savings in equilibrium, and assuming that people save a constant fraction s of their income, we have:

$$I = sY ,$$

so that the growth rate of capital is given by:

$$g = \frac{K_{+1} - K}{K} = sY / K - \delta = sAK^{\alpha-1} - \delta.$$

In particular, a country with little capital endowment K grows fast by accumulating more capital, whereas a country that has already accumulated capital does not gain much by increasing its rate of capital accumulation: this is because of the decreasing returns to capital accumulation. And because of these decreasing returns, in the long run growth simply stops. This happens when depreciation catches up with savings, that is, when enough capital has been accumulated that $sAK^{\alpha-1} \leq \delta.$

The contribution of new growth theory is to explain sustained long-run growth by endogenising productivity growth, that is, the growth in A. The idea is that productivity growth results from innovations. In particular Schumpeterian growth theory emphasises the role of quality-improving innovations; that is, innovations that increase the productivity A of production factors.

More recently, new growth theory[6] has linked productivity growth to innovation. Innovation in turn is motivated by the prospect of above-normal returns that successful innovators can realise. The theory suggests that innovation, and therefore productivity growth, should always be fostered by:

- better protection of intellectual property rights to allow successful innovators to benefit from their endeavour
- financial development, as tight credit constraints will limit entrepreneurs' ability to finance new innovative projects
- better education, as this will improve the ability to innovate and/or imitate leading edge technologies
- macroeconomic stability, which allows for a lower, risk-adjusted interest rate that will enable entrepreneurs to invest more in growth-enhancing projects.

Another important feature of innovation is what the Austrian economist Joseph Schumpeter referred to as "creative destruction" – that is, innovations displacing old products or old technologies. Therefore, faster growth typically implies a higher rate of firm turnover, as the process of creative destruction generates the entry of new innovators and the exit of old ones. Indeed, competition is likely to enhance growth because it enables this process of turnover.

Overall spending on research and development (R&D) and the number of patent registrations[7] are good indicators of the level of innovative activity in a country. Transition countries lag well behind the OECD average. Also, while income levels are catching up, this is not yet the case for investment in innovation. In contrast to emerging Asia, where R&D has been rising in recent years, transition countries have not raised their innovative activity.[8]

More formally, Schumpeterian theory begins with a production function specified at the industry level:

$$Y_{it} = A_{it}^{1-\alpha} K_{it}^{\alpha}, \qquad 0 < \alpha < 1$$

where A_{it} is a productivity parameter attached to the most recent technology used in industry i at time t. In this equation, K_{it} represents the flow of a unique intermediate product used in this sector, each unit of which is produced one-for-one by capital. Aggregate output is just the sum of the industry-specific outputs Y_{it} .

[6] For a more detailed discussion, see Aghion and Howitt (2006).
[7] Patent applications are filed with a national patent office for exclusive rights to an invention (product or process) that provides a new way of doing something or offers a new technical solution to a problem.
[8] See EBRD Transition Report 2008: Growth in Transition.

Each intermediate product is produced and sold exclusively by the most recent innovator. A successful innovator in sector improves the technology parameter A_{it} and is thus able to displace the previous innovator as the incumbent intermediate monopolist in that sector, until displaced by the next innovator. Thus the first key implication that distinguishes the Schumpeterian Paradigm from the AK and product-variety models is that faster growth generally implies a higher rate of firm turnover, because this process of creative destruction generates entry of new innovators and exit of former innovators.

Distance to frontier and the choice between innovation and imitation

There are a number of ways in which a country can increase its productivity growth. One is to imitate more advanced technologies that have been invented elsewhere. Another is to make a leading-edge domestic innovation that builds on and extends the limits of international technology standards. A country that is far from the "technological frontier"[9] can make substantial leaps forward in productivity growth each time it imitates leading technologies developed elsewhere. However, a country that lies closer to the technological frontier will need to rely primarily on new innovations, which are more difficult to generate, in order to grow further.

More formally, a frontier innovation leapfrogs the best technology available before the innovation, resulting in a new technology parameter A_i in the innovating sector i, which is some multiple γ of its pre-existing value. An imitation is a technological activity whereby the country or sector catches up to a global technology frontier $\overline{A}_t$ which we typically take to represent the stock of global technological knowledge available to innovators in all sectors of all countries. In the former case the country is making a leading-edge innovation that builds on and improves the leading edge technology in its industry. In the latter case the innovation is just imitating technologies that have been developed elsewhere.

For example, consider a country in which in any sector leading edge innovations take place at the frequency u_n and implementation innovations take place at the frequency u_m. Then the change in the economy's aggregate productivity parameter A_t between time t and time t+1 will be:

$$A_{t+1} - A_t = u_n(\gamma - 1)A_t + u_m(\overline{A}_t - A_t),$$

and hence the growth rate will be:

$$g_t = \frac{A_{t+1} - A_t}{A_t} = u_n(\gamma - 1) + u_m(a_t^{-1} - 1),$$

where:

$$a_t = A_t / \overline{A}_t,$$

[9] The technological frontier is the existing international limit of technological capabilities in a specific sector. In most empirical analysis, current US technology is used to proxy this technological frontier.

is an inverse measure of "distance to the frontier."

In particular we immediately see that a country which lies further behind the world technology frontier (that is, with lower a_t), should grow faster, all things being equal. The reason is that this country makes bigger leaps forward each time it imitates the leading-technology. In other words, it benefits from higher knowledge spillovers from more advanced countries.

We could take as given the critical innovation frequencies u_m and u_n that determine a country's growth path. However, Schumpeterian theory derives these innovation frequencies endogenously from the profit-maximisation problem facing a prospective innovator. In equilibrium, these frequencies will typically depend on institutional characteristics of the economy such as property right protection, the financial system, and government policy; moreover, the equilibrium intensity and mix of innovation will often depend on institutions and policies in a way that varies with the country's distance to the technological frontier a.

But in addition, the above growth equation makes it quite natural to capture Gerschenkron's idea of "appropriate institutions". Suppose indeed that the institutions that favours imitation (that is, that lead to firms emphasising u_m at the expense of u_n) are not the same as those that favour leading-edge innovations (that is, that encourage firms to focus on u_n): then, far from the frontier a country will maximise growth by favouring institutions that facilitate imitation, however as it catches up with the technological frontier, to sustain a high growth rate the country will have to shift from imitation-enhancing institutions to innovation-enhancing institutions as the relative importance of μ_n for growth is also increasing.

Historically, the imitation of existing technologies occurred in Japan and Europe after 1945 and more recently in the economies of the so-called Asian Tigers, such as China, Korea and Taipei China. Imitation has tended to occur where:

- large firms can take advantage of economies of scale
- there is limited labour mobility between firms, so that workers' skills remain largely specific to their firm
- there is limited competition and entry, allowing large firms to survive longer and make long-term investments in capital and labour
- financial systems can provide long-term bank finance.

In contrast, countries that innovate at the technological frontier have tended to require:

- higher labour market mobility, so that innovating firms that enter new markets can more easily find workers who match their needs
- more intense product market competition and low entry barriers
- more focus on tertiary and, particularly, graduate education, with universities that can produce researchers and generate the basic science that firms harness to innovate
- a bigger role for non-bank finance and stock markets that can help select the most promising innovative projects to finance.

The overall effect of competition or entry on growth at country level therefore depends on the proximity of local industries to their respective technological frontiers, and on the technological level of new entrants.

In light of these distinctions and differences, what can be said about where the transition countries lie regarding the technological frontier and how much have they caught up with it since the early 1990s? Although the transition region as a whole is lagging below the frontier by a long way – with a range of 12 to 42 per cent of labour productivity levels in the United States – the gap has been narrowing over the last few years, particularly in the EU member countries (CEB and Bulgaria and Romania). This indicates that there is also considerable variation within the group of transition countries.

3. Policies for growth

Competition and entry

This section focuses on the related issues of competition and market entry and looks at how the framework outlined previously can be translated into more specific policies to encourage growth. It provides some evidence regarding the number of market entrants and competition in the transition countries and then considers the appropriate policy response.

In this section, it will be argued that product market competition enhances innovation, labour productivity and growth.[10] Existing levels of product market competition (as inversely measured by profit margins,[11] for example) are significantly below OECD averages. Policies to encourage product market competition are therefore likely to have positive pay-offs both for old firms, where competition can be a substitute for effective corporate governance, and for new firms, where these policies spur innovation by increasing incremental profits that result from getting ahead of their competitors.

When comparing entry rates in transition countries with the OECD average, it can be seen that entry rates have been increasing since 2002 but are still below OECD levels. This can partly be attributed to barriers in the business environment that deter new entrants. Such barriers range from limits on the availability of credit to levels of taxation and other regulatory impediments.

A recent study has found that credit constraints, particularly in western Europe, tend to act as the main barrier to the entry and post-entry growth of very small firms.[12] This is especially relevant for transition economics, since small firms regularly report access to finance as a major impediment to their business activity and growth potential.[13]

Turning to competition, evidence from the EBRD-World Bank Business Environment and Enterprise Performance Survey (BEEPS), covering over 20,000 firms in 26 transition countries, gives some indication of the extent of competition, focusing on trade and imports. The 2005 survey results show, that competition between imported and domestic products has become more intense over time in CEB and SEE, but less so in the CIS+M. This is due mainly to the recent increasing trade integration of the CEB and SEE region (principally through the EU accession process), but also because of increasing intra-regional trade. With the exception of commodity-induced trade in the resource-rich countries, the CIS+M region shows lower internal and external trade integration.

Focusing on manufacturing industries in the three subregions, SEE and the CIS+M – with the exception of CEB – all other subregions have lower levels of product market competition than the OECD average. The extent of competitive pressure in an industry is indicated by the pricing power that is evident. Pricing power – or industry mark-up – can be measured directly using the Lerner Index. This is measured as the difference between value added and the total wage bill expressed as a share of gross

[10] See Carlin et al. (2004) and Aghion et al. (2002).
[11] The higher the remaining profit margins of a given firm, the higher that firm's market power and thus the lower the overall level of competition in that particular market.
[12] Aghion, Fally and Scarpetta (2007).
[13] EBRD, *Transition Report* 2006.

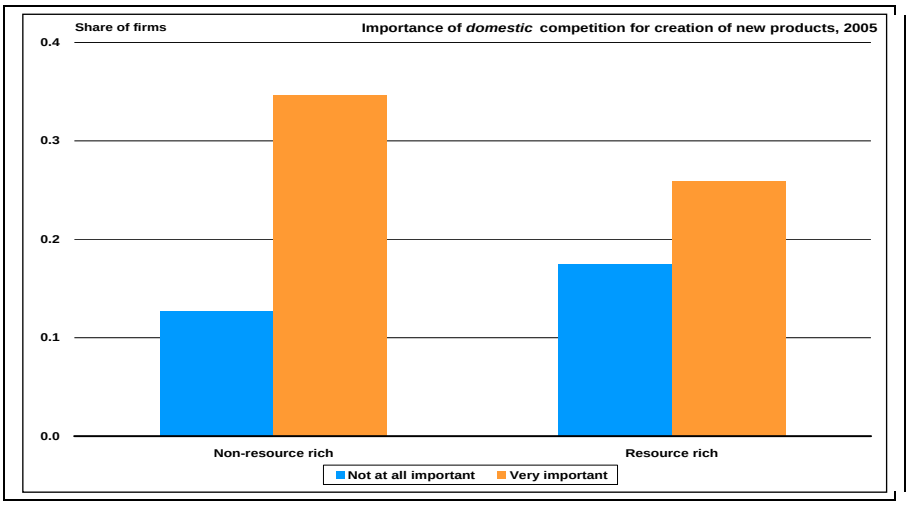
output. Using a large UNIDO (United Nations Industrial Development Organization) cross-country/cross-industry dataset to compare average mark-ups across countries between 1998 and 2007 show that average mark-ups are higher in the transition countries (particularly in SEE and the CIS+M) than their OECD counterparts, indicating that competition is less intense.

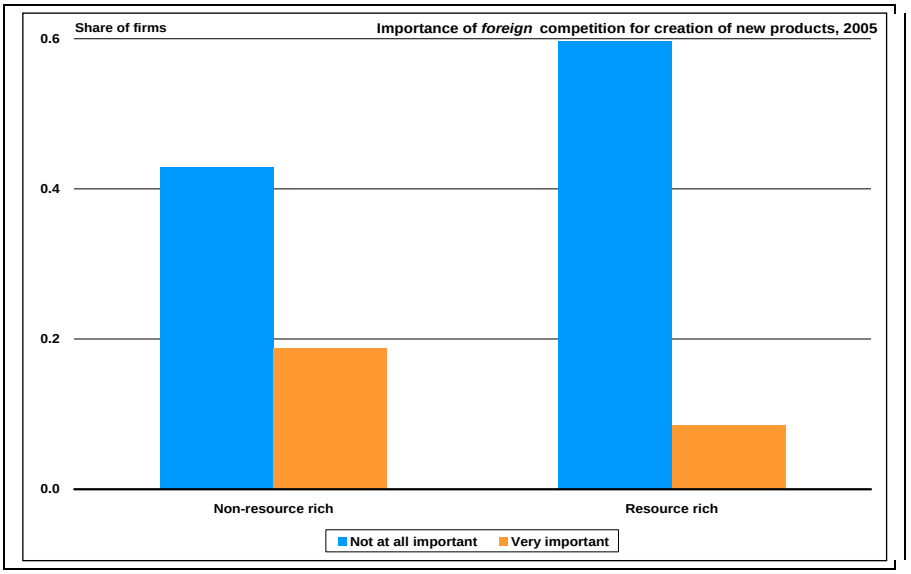
The evolution of mark-ups reveals that they have declined over time throughout the whole region, and that CIS+M and SEE countries generally have higher mark-ups than OECD countries, the world average and CEB. This can be explained by a number of factors, including regulated product markets as well as low levels of diversification away from commodities in the resource-rich CIS+M countries. Mark-ups remain substantially higher in transition countries, particularly in the CIS+M and SEE. Reducing them through increased foreign competition, either by further trade integration or direct entry of foreign firms, will help boost innovation and productivity growth.[14]

Chart 1 uses BEEPS data to assess the impact of competition on product innovation. It shows that both domestic and foreign competition have a larger impact in non-resource-rich countries than in resource-rich countries. It can also be seen that pressure tends to come more from domestic rather than foreign competition. These findings may in turn reflect the fact that: (i) although foreign competitors might be more challenging to local incumbents in terms of technological sophistication, most firms compete mainly with their domestic counterparts (which may also reflect a lack of trade integration and additional barriers to entry for foreign firms); and (ii) firms in resource-rich countries are more likely to benefit from government subsidies that partly shield them from the effects of competition.

[14]It can be argued that increased competition should discourage innovation and growth, as it reduces the rewards that accrue to successful innovators. However, this effect may be dominated by an "escape competition effect", which may encourage firms to innovate precisely in order to escape competition.

Chart 1: Importance of competition for the innovation of new products



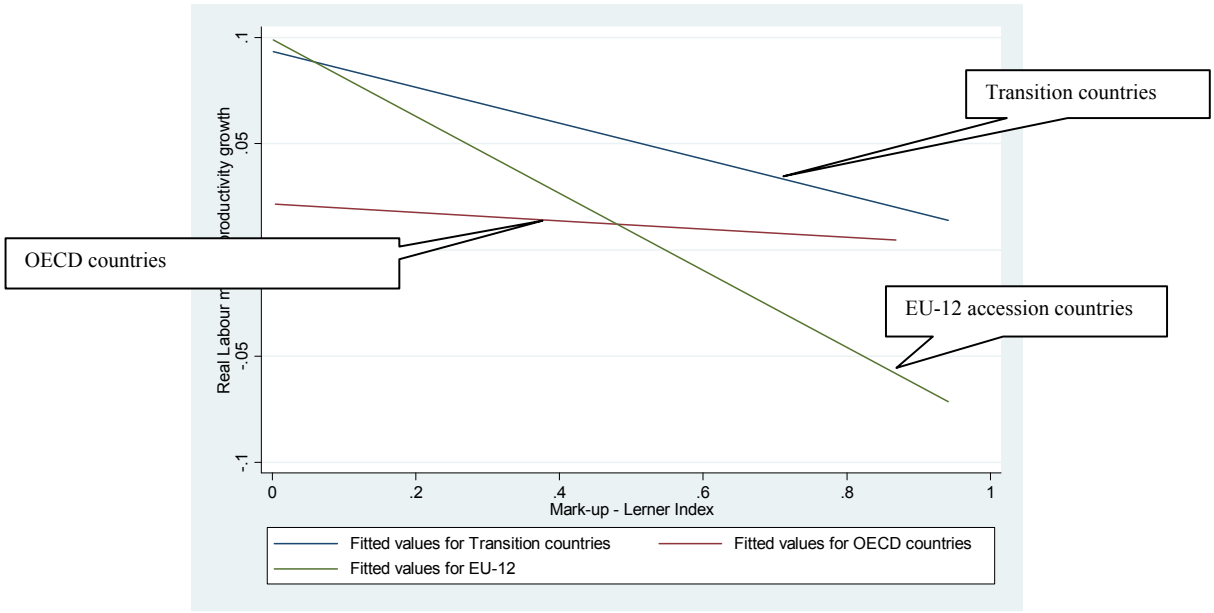


Source: BEEPS, 2005.
Note: The figures show the proportion of firms claiming that domestic or foreign competition is a (i) very important or (ii) not at all important pressure for the creation of new products.

Recent evidence[15] indicates that product market competition and entry has a positive and significant effect on productivity growth in emerging market economies, such as India and South Africa. It appears that the same is also true in transition countries; Chart 2 shows that lower competitive pressure is indeed associated with lower productivity growth. The relationship is in fact substantially stronger for the EU accession countries and the group of transition countries as a whole in comparison to the OECD economies (as can be seen by the relative slope of the three lines in the chart). Therefore, even though transition countries are not that close to the world technology frontier, they are close enough for competition to be growth-enhancing.

[15]See Nickell (1996); Blundell et al (1999); Aghion et al (2005).

Chart 2: Labour productivity growth and manufacturing mark-ups



Source: UNIDO and Vienna Institute for International Economic Studies WIIW industry statistics and authors' calculations.
Note: The chart depicts predicted values from regression results of labour productivity growth on the Lerner Index, Lerner Index squared, accounting for year, industry and countries. Regressions were run separately for OECD and EU-accession countries and transition countries.

This analysis confirms that insufficient competition leads to less intense innovation, which in turn slows the speed at which productivity catches up with the technological frontier. Too little product market competition also directly affects labour productivity growth. This is true not only for countries closer to the frontier – such as those in the OECD – but also for transition countries.

In light of this discussion, the obvious question to ask is how transition countries can ensure that sufficient product market competition occurs and that it in turn translates into labour market productivity and, ultimately, into overall economic growth. There is an important role in this respect for effective institutions, such as competition authorities. In a 2007 competition survey, the EBRD measured the efficiency and effectiveness of these institutions: the overall expenditure on competition regulation and enforcement as a share of GDP; and an index that covers the efficiency of enforcement, with a focus on competition authority decisions relating to market dominance. With the exception of spending, the indicators are higher for the CEB countries than for the rest of the transition region. This has been driven partly by the EU accession process of the CEB region and some SEE countries, which has standardised competition legislation and enforcement procedures. SEE lags behind CEB in terms of contract enforcement processes (delays being primarily due to case backlog and an insufficient number of judges), even though overall expenditure is high.

Experience from other emerging countries has shown that independent and transparent competition authorities can exercise a positive influence on product market competition. Rather than narrowly focusing on curbing the dominance of firms

already in the market, competition authorities need to employ a broader approach that keeps entry and exit barriers consistently low and gives incentives to firms to innovate. This means adopting a broad-based approach with deregulation at its core. This will include clear and quick licensing procedures and eliminating as much bureaucratic blockage as possible. For registration requirements, a "one-stop shop" system and/or (ideally) online registration can significantly reduce the number of transactions and the time spent on related processes. An applicant might then submit a single form containing all the information required by various agencies to a single entity. Although some transition countries have moved towards such a system, registration requirements in the CIS+M are still cumbersome. There are also large differences across SEE countries in the indicators that measure institutional conditions for product market competition.[16]

Another important element in ensuring ease of entry and subsequent product market competition is the cost of construction licences and, more generally, property rights, registration and collateralisation. Again, there are large differences across countries. For example, registering a property takes between three days in Lithuania and 331 days in Bosnia and Herzegovina (the OECD average being 28 days), while costs vary from 0.1 per cent of the property value in Georgia to 11 per cent in Hungary.[17]

In addition to their traditional role of investigating anti-competitive practices by firms, competition authorities also have important functions in holding to account, and if necessary filing cases against, local and regional government bodies whenever they restrict competition. Therefore, the case-by-case investigation of violations of competition law needs to be accompanied by competition advocacy, thereby helping to cultivate entrepreneurial activity and providing functional support to new firms.

Education

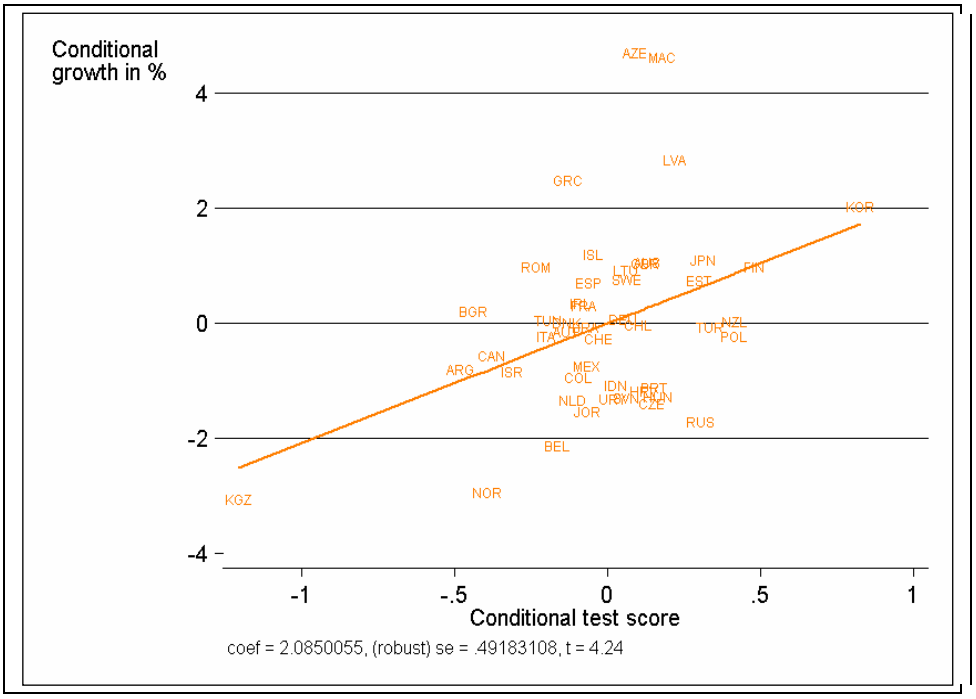
Using a large number of countries and data points for the period 1960-1992, research has shown that education enhances growth.[18] A higher level of education enhances innovation, as a more educated population is better equipped to contribute. In addition, a higher average level of education is crucial for the successful imitation and faster adaptation of existing modern technologies.

Most existing studies on education and growth measure education in terms of spending (the fraction of aggregate GDP devoted to education) or in terms of attainment (the proportion of the working age population that has achieved particular qualifications). More recent research has been extended to include measures of the quality of education.[19]

Using internationally comparable test scores to measure the quality of students' cognitive skills, a positive and significant correlation between long-term growth and the quality of education for a large sample of countries has been identified (see Chart 3).

[16] See the World Bank *Doing Business* survey (2008).
[17] See the World Bank *Doing Business* survey (2008).
[18] Benhabib and Spiegel (1994), drawing on seminal work by Nelson and Phelps (1966).
[19] See Hanuschek and Kimko (2000), Hanushek and Woessmann (forthcoming).

Chart 3: Real GDP per capita growth and average PISA[20] 2006 test scores



Source: World Development Indicators 2008 (World Bank 2008), OECD (2007), authors' own calculations (regression results).

Notes: PISA 2006 average country scores in reading, mathematics and science (in 100s). The graph shows the effect of an increase of 100 PISA points on long-term growth in per capita GDP (1998-2006), controlling for real GDP per capita in 1998, enrolment rates in higher education (1991), degree of openness to trade and regional differences.
Countries shown on the chart are: ARG-Argentina, AUS-Australia, AUT-Austria, AZE-Azerbaijan, BEL-Belgium, BGR-Bulgaria, BRA-Brazil, CAN-Canada, CHE-Switzerland, CHL-Chile, COL-Colombia, CZE-Czech Republic, DEU-Germany, DNK- Denmark, ESP-Spain, EST-Estonia, FIN-Finland, FRA-France, GBR-United Kingdom, GRC-Greece, HKG-Hong Kong, HRV-Croatia, HUN-Hungary, IDN-Indonesia, IRL-Ireland, ISL-Iceland, ISR-Israel, ITA-Italy, JOR-Jordan, JPN-Japan, KGZ-Kyrgyz Republic, KOR-Republic of Korea, LTU-Lithuania, LUX-Luxembourg, LVA-Latvia, MAC-Macao, MEX-Mexico, NLD-Netherlands, NOR-Norway, NZL-New Zealand, POL-Poland, PRT-Portugal, QAT-Qatar, ROM-Romania, RUS-Russia, SVK-Slovak Republic, SVN-Slovenia, SWE-Sweden, THA-Thailand, TUN-Tunisia, TUR-Turkey, URY-Uruguay.

The same research (using information for 50 countries over the period 1960-2000) finds that countries with better test scores have significantly higher annual growth rates in GDP per capita. More specifically, an increase in test results by 100 points[21] is associated with an increase in annual growth rates of 1.3 to 2 percentage points. Furthermore, a reform that would improve students' outcomes by 50 points over a

[20] The PISA (Programme for International Student Assessment) study was carried out by the OECD in 2000, 2003 and 2006. It is one of the few sources of international comparative data on education across regions (including a number of transition countries), measuring educational quality by testing the mathematics, science and reading skills of a sample of 15-year-old students. The PISA surveys make a particular effort to assess students' skills in application and synthesis of concepts – the generic skills that are most relevant to the needs of the global economy. See Mertaugh and Hanushek (2005), "Education and training", in Barr (ed.), "Labor markets and social policy in central and Eastern Europe: the accession and beyond", Ch. 7, World Bank.
[21] This is equivalent to one standard deviation in the PISA results for OECD countries.

period of 20 years would, on average, increase GDP by around 5 per cent and over a period of 75 years by 36 per cent.[22]

Other complementary research has also analysed the relationship between growth and the composition of education spending.[23] Results show that the closer a country's or region's productivity is to the technological frontier, the more growth-enhancing it becomes to invest in higher education, and particularly in postgraduate education and research. The further a country or region is from the frontier, the more growth-enhancing it is to invest in primary, secondary and undergraduate education, which is more likely to make a difference in terms of the country's ability to imitate existing technologies.[24]

However, the complexity of the relationships and the differences among the transition countries calls for a careful, country-based interpretation of these results before drawing strong policy recommendations. Suggesting that transition economies focus on primary and secondary education simply because they are not near to the frontier would be problematic. For example, without a good tertiary education sector, India would not have been able to develop its dynamic service sector. Conversely, while the transition economies can increase their growth potential by investing more in quality of primary and secondary education, this should not be at the expense of undergraduate or maybe even postgraduate education.[25]

Turning to the actual evolution of education spending and quality in the transition countries, Table 2 gives expenditure and enrolment rates across the different groups of transition economies as well as the OECD over the period 1999-2006.[26]

[22] Hanushek and Woessmann (forthcoming). The long-term effects are based on simulations.
[23] See Aghion et al (2008).
[24] What is true between countries is also true between regions within a country. For example, it has been shown that an additional US$ 1,000 per person in research education spending raises a US state's productivity growth rate by 0.27 per cent if the state is at the frontier, whereas it raises it by only 0.09 per cent if the state is far from the frontier; see Aghion et al (2005) and Vandenbussche et al (2006).
[25] See also the World Bank (2000, 2005 and 2007),
[26] Gross enrolment ratio is the ratio of total enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education shown.

Table 2: Expenditure per student at different education levels and gross enrolment rates

Expenditure per student at different education levels (as % of per capita GDP) and gross enrolment rates

		Primary education		Secondary education		Tertiary education	
Country groups	Period / Indicator	1999-2002	2003-2006	1999-2002	2003-2006	1999-2002	2003-2006
CEB	Expenditure per student (% of per capita GDP)	17.4	19.2	21.9	22.9	27.8	24.9
	Gross enrolment rates	*101.5*	*99.5*	*95.4*	*98.3*	*47.4*	*58.9*
SEE	Expenditure per student (% of per capita GDP)	13.0	16.4	17.5	18.7	31.3	26.6
	Gross enrolment rates	*100.2*	*99.7*	*83.2*	*87.4*	*28.3*	*33.8*
CIS, non-resource rich*	Expenditure per student (% of per capita GDP)	10.1	13.0	12.9	17.4	29.9	26.5
	Gross enrolment rates	*102.2*	*98.8*	*82.6*	*87.0*	*35.3*	*41.0*
CIS, resource rich**	Expenditure per student (% of per capita GDP)	8.2	8.2	14.7	9.9	14.6	10.0
	Gross enrolment rates	*100.6*	*104.5*	*86.5*	*90.9*	*22.7*	*34.6*
OECD***	Expenditure per student (% of per capita GDP)	18.7	19.7	24.1	25.0	35.8	34.8
	Gross enrolment rates	*103.2*	*102.9*	*109.8*	*107.6*	*54.1*	*61.6*
Selected countries							
Finland	Expenditure per student (% of per capita GDP)	17.6	18.5	25.9	29.4	38.8	37.2
	Gross enrolment rates	*100.7*	*101.0*	*124.2*	*118.7*	*83.6*	*88.3*
France	Expenditure per student (% of per capita GDP)	17.4	17.6	28.2	28.9	29.1	32.2
	Gross enrolment rates	*106.2*	*106.1*	*109.5*	*110.4*	*53.0*	*55.1*
United States	Expenditure per student (% of per capita GDP)	19.9	21.6	23.6	25.1	28.0	25.3
	Gross enrollment rates	*100.3*	*98.8*	*94.0*	*93.9*	*73.1*	*81.8*

Source: Word Development Indicators 2008 (World Bank)

* *CIS non-resource ri Armenia, Belarus, Georgia, Kyrgyz Republic, Moldova, Mongolia, Tajikistan, Ukraine*

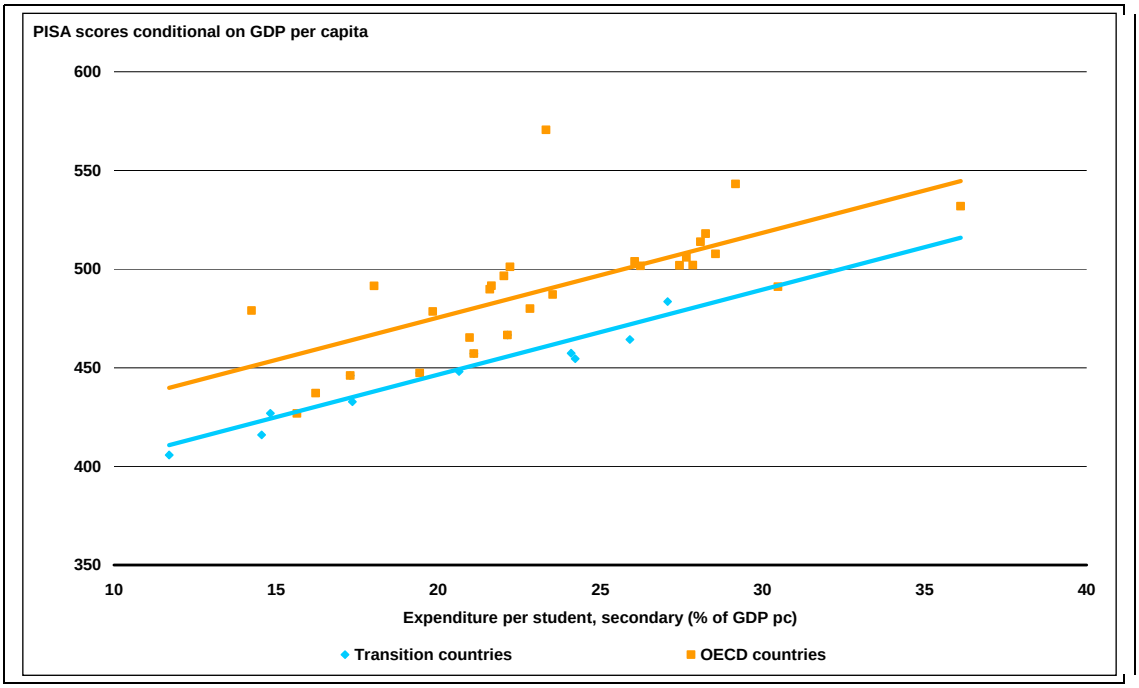
** *CIS resource rich: Azerbaijan, Kazakhstan, Russian Federation, Turkmenistan, Uzbekistan*

The table shows that the proportion of expenditure on tertiary education has decreased over the past decade in all transition regions, but has remained virtually constant for OECD countries. Transition countries spend less per student than the OECD average, and also have lower enrolment rates. Expenditure per student in primary and secondary education (percentage of per capita GDP) has mostly remained the same or increased over the same period, although CIS+M resource-rich countries reduced spending on each student between 2003 and 2006. There are also large differences across the transition subregions: resource-rich countries devote the least expenditure to tertiary and primary education, and they have also much lower enrolment rates at tertiary level than non-resource-rich countries. This implies that countries with sharply rising resource flows have as yet failed to use those new resources to raise funding for education, and therefore risk missing an opportunity to address shortcomings in their educational systems.

Whatever the level of spending as a share of national income, a key question is whether these expenditures and student enrolment numbers actually achieve the intended educational outcomes. One indicator that is comparable over a large set of transition and non-transition countries is the PISA test score that measures reading, science and mathematics achievement in a standardised fashion. Chart 4 links PISA

test scores to education spending, and shows a positive and significant relationship, in particular for transition countries. Therefore, when taking account of income levels, increasing educational expenditure in the transition countries does appear to be associated with improved quality of education.

Chart 4: Expenditure per student in secondary education and PISA outcomes



Source: World Development Indicators 2008 (World Bank 2008), OECD (2007), authors' own calculations.
Note: PISA 2006 average country scores in reading, mathematics and science. Graph depicts predicted PISA 2006 results based on a regression of PISA 2006 results on mean expenditure on student (percentage of GDP per capita) 1998-2005 and mean real GDP per capita 1998-2005.

Nevertheless, the quality of education for all transition economies remains still well below the OECD average and has even decreased in Russia. Furthermore, there are significant differences across the transition region. While student performance in CEB countries in 2006 was close to the OECD average, the average test scores were relatively low in SEE and lowest in the CIS+M countries. However, when compared with countries with similar GDP per capita levels, transition countries perform generally better than their peers.[27] Some countries, such as Latvia and Poland, achieved substantial improvements in students' performance between 2000 and 2006.

The full scope for improvement in cognitive skills in the transition countries becomes evident when results are not only compared with those in the OECD, but also with top-scoring comparator countries such as Finland. Looking at the mean test scores of the PISA tests in mathematics, science and reading skills for the top performers among different groups of countries, Finland's students achieved the highest score on the science scale with 563.3 points (that is, roughly 50 points above the OECD average). The top performer among the transition countries was Estonia, with average

[27] See EBRD *Transition Report* 2008: Growth in Transition.

student test scores of 514.6 and 531.4 points for mathematics and science, respectively. Russia was the leading country in the CIS+M and Central Asia, although the performance of the Russian students in mathematics and science were below the OECD average. The scoring gaps between Russia and the overall PISA leaders range from 73.7 points for mathematics up to 116.1 points on the reading scale, while the corresponding differences with the best-performing transition countries (Estonia) are smaller but still amount to 38.9 and 67.7 points. The considerable gap between the transition and top-performing countries indicates the potential for improving educational quality and, ultimately, the growth potential of the transition region.

The significant differences in test scores reveal the high potential for future improvements in the quality of cognitive skills in the transition countries. This in turn would have a strong impact on long-term economic growth. Russia, for example, could achieve higher long-term annual GDP growth rates of between 0.065 and 1 percentage point, merely by catching up with the top PISA performers among the transition countries.

In terms of policy, the transition countries need to invest more overall in education, but in a way that links that investment to quality improvement. While maintaining their focus on primary and secondary education, they also need to invest more in higher (particularly undergraduate) education. Without such investment, countries will not be able to effectively imitate technological innovations produced elsewhere. Alongside this challenge, better monitoring and evaluation systems would increase the effectiveness of investment in education. Further participation in school-based, national and international assessments such as PISA will also help policy-makers by clarifying their countries' relative educational performance.[28]

Although Chart 4 indicates that higher expenditure per student tends to be associated with better student performance, the aggregate results mask considerable differences between countries. Studies analysing the effect of school inputs and resources – typically teacher-to-student-ratios, class sizes, textbook provision, teacher training and experience, monitoring of schools, school facilities and administration – provide mixed evidence on successful strategies aimed to improve educational outcomes that would apply to all countries. Overall, however, there needs to be better use and targeting of educational investment, improvements in teacher quality, increased accountability to parents, students and national educational authorities, and adherence to standards. Transparency through public participation and feedback mechanisms is important for delivering and regulating the educational sector effectively. In the transition countries, there has been a notable lack of such consultation. One way to promote accountability in the education system is through decentralisation and improvements in local school management practices.

Another issue of concern to policy-makers relates to equal and good access to education. A student's background seems to be a predominant factor in educational performance in transition countries, and much more so than schooling resources or institutional settings.[29] Aside from promoting inequality, this result highlights the need for policy reforms to help secure funding and improve access to education (including pre-primary education) for children from less well-off families. Furthermore, poorer regions need to be assisted with financial transfers from central government. The sustainability of, and equity in, the financing of education can be

[28] See also World Bank (2006).
[29] See Ammermueller, Heijke and Woessmann (2005).

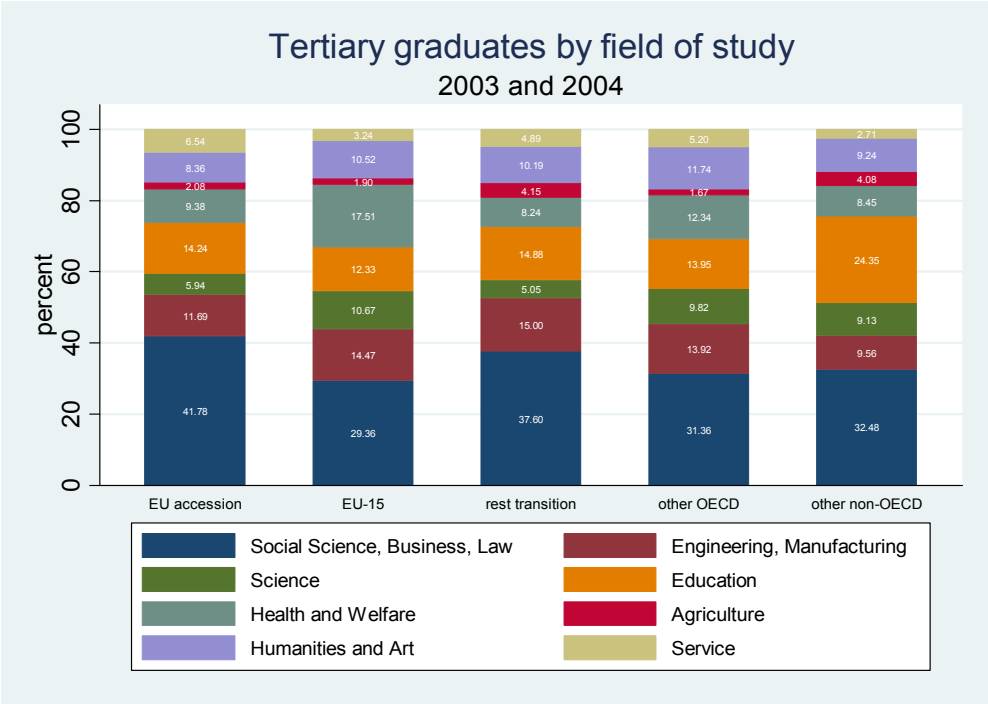
improved through the use of funding formulae based on expenditures per student. This can help combat poverty by targeting public educational resources on the poor.[30]

The PISA results show that students in transition countries lag around 17 points behind the OCED average (and 65 points behind the top performers) in terms of problem-solving skills and applying knowledge in new areas. Changes in the schooling curriculum at primary and secondary level and in vocational education are therefore needed to enhance critical thinking and provide children with more general and relevant skills. In this context, the curriculum for secondary education plays a crucial role, since it has a dual purpose of linking directly to the labour market as well as preparing students for tertiary education.[31] Chart 5 suggests that the transition countries have a higher proportion of social science graduates at tertiary level than the OECD average and some selected comparator countries (such as Sweden). In terms of vocational training, transition countries have a legacy of a very narrowly defined curriculum and they need to broaden and update it to increase the relevance of vocational training programmes. Involving private businesses more in designing training programmes will be important.

The wider problem of skills mismatch in the labour market remains an important issue that needs to be addressed by policy. The EBRD's Life in Transition Survey (LITS), carried out in 2006, found that one-third of all employees did not work in jobs corresponding to their educational attainment.[32] This mismatch was most prevalent in the CIS+M. The problem is not unique to transition countries, but it highlights the need to invest in more lifelong learning and retraining to help workers and firms continually upgrade their skills. Providing tax incentives for workers and firms to take up training opportunities has generally proved more fruitful than attempts to set up publicly managed training programmes.

[30] See World Bank (2000).
[31] See World Bank (2006).
[32] See EBRD (2007) *Transition Report*, 2007. The survey also found that around half of respondents favoured additional government investment in education as one of their top priorities.

Chart 5: Tertiary graduates by field of study (in per cent of total graduates)



Source: UNESCO Institute for Statistics.

Note: Defined as the number of students graduating in a particular field expressed as a percentage of the total number of graduates of tertiary education.

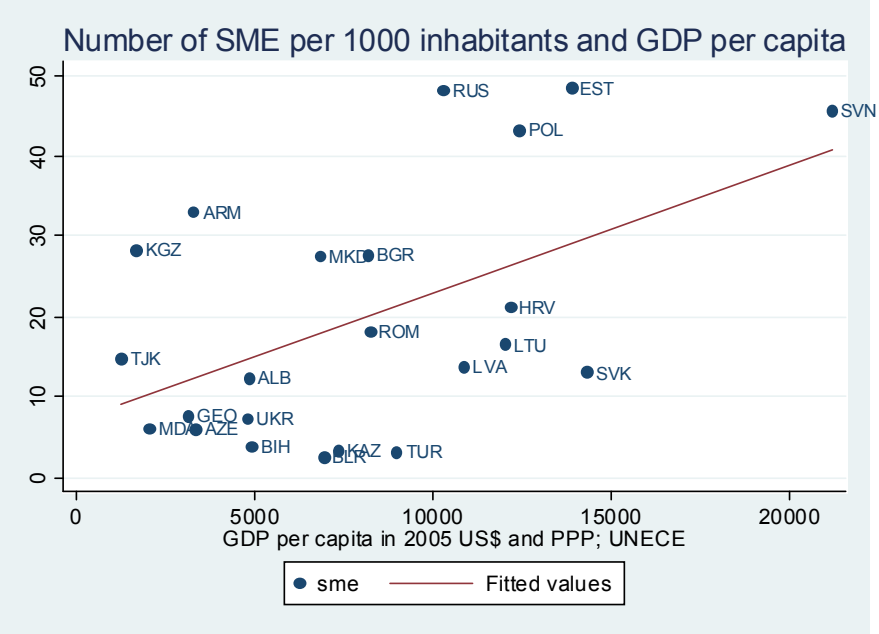
Financial constraints

Recent literature surveyed by Levine (2004) points to a positive effect of financial development on growth. The underlying idea is that firms face credit constraints due to asymmetric information between financiers and firms or enforcement problems (borrowers may take the money and run, unless properly monitored). The lower these credit constraints, the easier it is for innovating firms to finance their projects and thereby move knowledge forward. Thus Levine (2004) shows cross-country panel regressions of growth on two measures of financial development: namely, the ratio of bank credit to GDP and the degree of stock market capitalisation, which are positively and significantly related with growth in the long run.

While labour market rigidities are often presented as the main impediment to firms' entry, mobility and post-entry growth, as it turns out, financial constraints are at least as important. A recent study by Aghion, Fally and Scarpetta (2006) shows in fact that credit constraints act as a main barrier to the entry and post-entry growth of very small firms, whereas labour market regulations inhibit the entry of larger firms. This is particularly crucial for transition economies since small firms in transition countries report access to finance regularly as a major impediment to their business activity[33] and growth potential and the growth of small firms is also significantly positively related to overall growth in transition countries (see Chart 6 below).

[33]See BEEPS data.

Chart 6: SME density and GDP growth

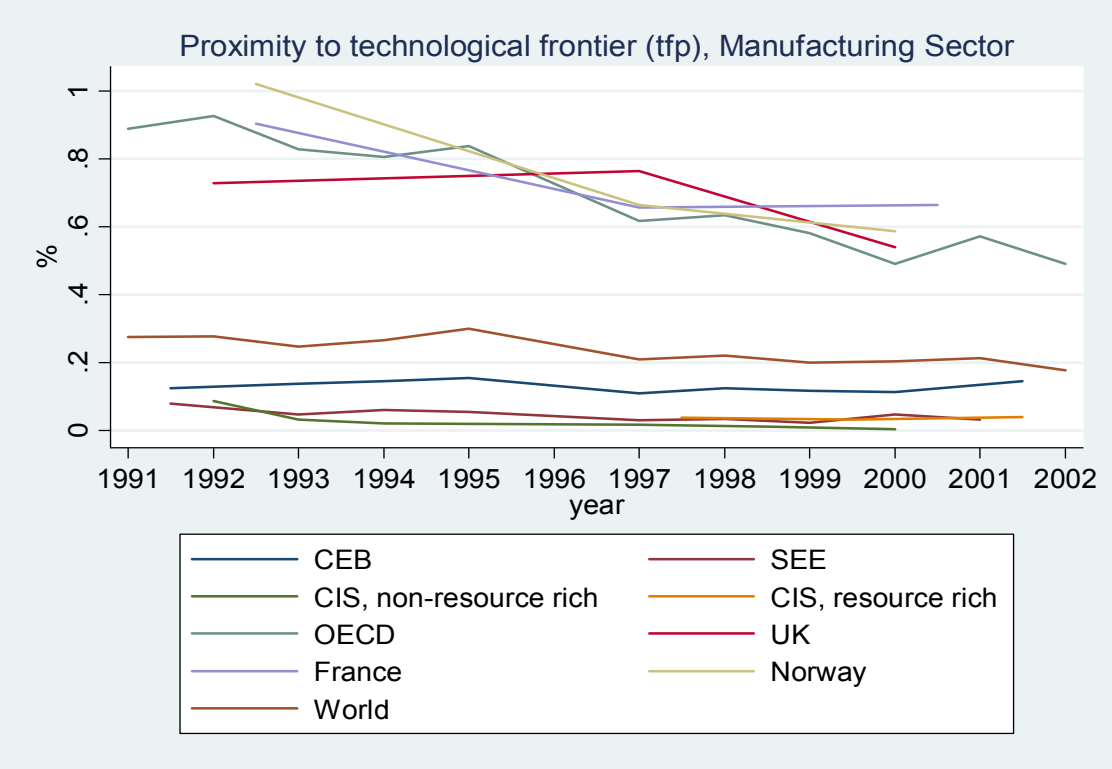


Source: BEEPS, 2005.

More recently, Aghion and Akgicit (2008) use cross-country/cross-industry panel data to show that the closer a local industry is from its world technology frontier, the more growth of that industry benefits from higher stock market development in the country, whereas growth in industries that are further below the frontier benefits more from the availability of bank credit. The idea again is that growth in more advanced countries relies more on frontier innovations. But innovations in turn are riskier than imitation activities and they also involve firms with typically less tangible capital that could be used as collateral in case of repayment default. Equity financing then compensates the financier for this added risk, typically by letting them get a higher share of returns, even when these are high.

Chart 7 shows the distance to the technological frontier (measured as the distance in TFP as a share of US TFP) for the transition regions, the OECD and world averages and a subset of OECD benchmark countries. The distance to the frontier in manufacturing is still rather large for all transition regions but while some OECD countries such as France and the UK lose competitiveness to the US over time, the transition countries' distance remains constant.

Chart 7: TFP frontier for the manufacturing sector



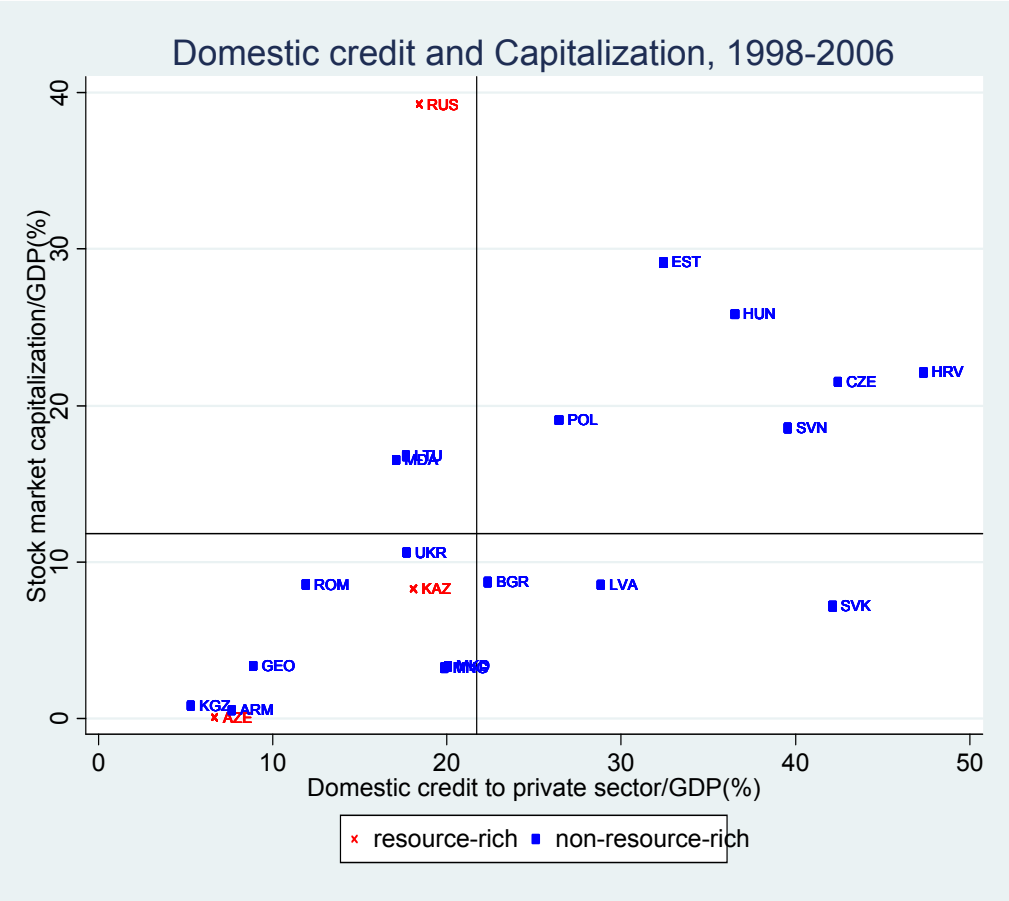
Source: Authors' calculations using World Development Indicators, 2008.

This suggests that transition economies which are less advanced than OECD countries should rely more on bank finance than OECD countries. The evolution of the ratios of private credit to GDP and the levels of stock market capitalisation for the OECD and transition countries over the past decade underline that transition countries are significantly below the OECD average and they also lie below China.

However, unlike competition policy or trade liberalisation, financial development is a gradual process. It can be speeded up by the setting-up of good banking regulations, the elimination of non-performing loans, and by opening up domestic economies to foreign banks and direct investment. In fact, the increase in the share of foreign banks over the past decade has contributed to the decrease in the percentage of non-performing loans in the banking system. This is not surprising: new foreign banks that take over local banks, impose stricter prudential regulations while also improving the efficiency of the overall banking system.

Lastly, in the previous section, we argued that the relative importance of banks and stock markets should depend on the country's level of development, with more advanced countries relying more on stock markets to finance their investments. Now Chart 8 shows that Russia shows an excessive importance of stock market finance relative to bank finance.

Chart 8: Domestic credit and stock market capitalisation



Source: National Central Banks

Financing reform

Promoting and enforcing competition generally makes larger demands on political will and reform capacity than on government budgets. However, entrenching educational reforms that make for long-term sustainable growth is more financially taxing. While the private sector has its part to play in overcoming the skills mismatch, governments are crucial in ensuring access to, and the quality of, formal education.

For many governments in the transition countries, the scope for increasing spending on education is limited by their overall debt levels, as well as current budget deficits and their capacity to tax their citizens. And the ongoing financial crisis is obviously an aggravating factor in this respect. However, compared with their counterparts in the advanced market economies, many transition countries are relatively well placed in terms of their capacity to sustain debt and ability to repay it. For example, in CEB (with the exception of Hungary) all transition economies had debt-to-GDP levels pre-crises (2007) that are below the 60 per cent benchmark imposed by the EU Maastricht Treaty for joining the economic and monetary union. Furthermore, most transition countries have run relatively small budget deficits, while over 40 per cent of them have actually run budget surpluses. On the downside, inflation is significantly higher in transition countries than in most OECD countries. Moreover, tax revenues as a share of GDP generally remain substantially lower than in OECD countries.

The last point – the ability to tax – deserves more careful consideration. A closer look on the results from the BEEPS surveys 1999 to 2005 helps to shed some light on the overall low tax revenue figures in the transition countries. Over time, the development regarding the tax compliance seems to go in the right direction. The estimated percentage of firms underreporting sales for tax reasons (reporting less than 60 per cent) went down from 30 per cent in 1999, to 23 per cent in 2002 and 12 per cent in 2005. However, even in 2005 only two-thirds of all firms report between 90 and 100 per cent of total sales ("complete reporting").

Table 3: Tax reporting across the transition region

Year	1999		2002		2005	
	% of firms					
Estimated share of sales reported to the tax authorities	CEB+2	All other transition countries	CEB+2	All other transition countries	CEB+2	All other transition countries
100%	33.64	31.43	56.55	52.28	62.61	67.34
90-100%	13.77	12.55	5.94	2.45	4.30	2.19
80-90%	10.47	12.21	8.85	6.14	8.17	5.16
70-80%	8.24	7.74	10.49	8.65	11.55	7.30
60-70%	5.52	5.07	5.99	6.53	4.59	5.10
50-60%	6.92	10.88	2.46	4.20	2.55	2.79
25-50	6.51	9.50	7.88	12.43	5.39	8.06
<=25%	14.92	10.62	1.84	7.32	0.83	2.05
Total	100	100	100	100	100	100

Source: BEEPS 1999, 2002, 2005.

Note: Based on the BEEPS survey question: "What percentage of the sales of a typical firm in your area of activity would you estimate is reported to the tax authorities, bearing in mind difficulties with complying with taxes and other regulations?" (BEEPS 1999). Although the exact wording of this question has been slightly modified over time, the answers are comparable.

Furthermore, there are considerable differences in tax compliance depending on firm size. The survey results from 2005 reveal that truthful sales reporting seems to be much more established in large enterprises (three-quarters of all firms report full compliance) than in small firms, where presumably only 60 per cent report their sales fully.

On balance one implication is that there may be room for countries to run counter-cyclical fiscal policies[34] and continue investing during an economic downturn such as what the world is currently experiencing. As with spending on R&D, experience suggests that pro-cyclical spending on education should be avoided. For the non-resource-rich transition countries in particular, counter-cyclical spending would best take the form of debt finance. Moreover, there is undoubted scope to change the composition of spending, with a greater share being allocated to education on the grounds that it enhances growth.

[34] Counter-cyclical in this context means continuing investments independent of the economic cycle; that is, committing a similar amount of resource to education in both boom and in downturn times. Pro-cyclical investments are aligned with the overall economic cycle, increasing in boom periods and decreasing in economic downturns.

The situation facing the resource-rich countries of the CIS+M is rather different. Potential exists to finance growth-enhancing reforms, even at the current levels of tax revenue and enforcement. One approach may be through greater "earmarking" of revenues for particular policy areas, particularly when resources have been accumulated in stabilisation funds (as in Azerbaijan, Kazakhstan and Russia). Such accumulated revenues have been used for general budget support rather than for specific purposes, but a case can be made for targeting them at policy areas, such as education, that are expected to have positive consequences for long-term growth. Indeed, the previous section showed that as resource prices increased – the actual share of spending on education has tended to fall in resource-rich countries – an undesirable outcome given the already relatively low levels of expenditure. Better targeting of resources in a medium-term financing framework might help rectify this.

While governments have a major role to play in ensuring quality and access to formal education, the private sector is also crucial in helping to match formal skills to labour market requirements. This can be done through internships, informal on-the-job training or university scholarship funding. Such firm- and/or industry-specific investment promotes skills that increase both labour productivity and labour mobility and therefore has positive direct spillovers to the whole economy.

However, to invest in training and skills enhancement, firms need to be able to access medium-term credit. There is widespread evidence that, despite changes in bank ownership and the growth in non-bank finance, firms in the transition region still find it difficult to access the formal credit markets. For firms that are relatively far from the technological frontier, better availability of bank credit will be crucial. For firms closer to the frontier, innovation will be riskier than imitation and such firms will typically have less tangible capital that could be used as collateral in case of repayment default. Equity financing can compensate the financier for this added risk, typically by letting them get a higher share of returns.

Conclusion

This paper has reviewed the growth experiences of the transition countries. It has argued that general and non sector-specific government intervention can substantially increase long term growth prospects in these countries. While specific sectors might additionally benefit from specific policy measures, this paper emphasises the overarching growth-enhancing policies.[35] We have focused on two areas where policy can be particularly effective, namely competition and the quality of education. Thus if transition countries are to achieve – and sustain – higher growth rates in the long run, they will need to ensure competition by continuing to remove entry and trade barriers and by strengthening – and, in some cases, setting up competition agencies. This is particularly true for CIS and the resource-rich countries. Second, the transition countries as a group need to invest more in the quality of primary and secondary education, which in turn implies that they must also invest more in tertiary, especially undergraduate, education so as to improve teacher quality and the evaluation and monitoring of the overall education system. Again, somewhat paradoxically, it is the resource-rich CIS countries that suffer most from insufficient investment in education and in problems with the quality of the educational services that are provided. Lastly, the paper argued that they may be scope for macroeconomic policies that boost

[35]For a sector-specific analysis of innovation policy see for example Boheim, Reinstaller, and Unterlass (2008).

spending on these key areas. For education, in particular, the private sector's role in overcoming skill mismatch will benefit from deepening financial intermediation and reducing constraints in access to finance.

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