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Final Analysis of Constraints to Economic Growth

Republic of Moldova

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Executive Summary

This Study is a primary attempt to accomplish a comprehensive analysis of constraints that impede the economic development of the Republic of Moldova. It analyses a large variety of potential problems related to difficulties in accessing financial resources, issues generated by the geographical position of the country, the situation in the area of human resources supply, the status of infrastructure components, innovation skills as well as to the problems related to macroeconomic risks and investment climate. An important tool used to identify the potential constraints is the comparison of Moldova performance with the achievements attained by other countries, especially by those from the Eastern Europe and the former USSR.

The study comes with the conclusion that inappropriate investment climate and lack of infrastructure represent the binding constraints for economic growth at the moment.

When referring to the banking system of Moldova, the analysis performed shows that the indicators of sector consolidation reached quite a good level. From supply side, the economy has enough money to save and does save, and from intermediation side, there are no particularly grave problems recorded. Still, the positive view is somehow crumpled by some structural problems related to deficiencies of corporate governance, legal framework, the lack of creditworthiness establishment system and immature local financial market. However, the depth of banking system is quite high and real interest rate is not elevated at all, judging by regional standards. Micro crediting and insurance markets, though underdeveloped, grow at fast pace. After having analyzed the whole picture, we can comfortably assume that access to finance is not the binding constraint for economic growth.

As for the natural endowment factors, although there are some concerns and problems identified, it is possible to draw the conclusion that the aforementioned factors currently do not represent a binding constraint, although they definitely have a negative impact on growth. As to location of country that is currently making access to markets more costly, the Report stresses the potential of improved access to the trade markets due to the country proximity to the European Union. Also, the country has got areas and spaces appropriate for human development and for agricultural activities. The climate impact of the labor force is marginal, however, when referring to the effect of climate conditions on agriculture and of water availability on both agriculture and industry, these represent an issue as there are no internal capacities to effectively deal with them by investing in proper irrigation and general water supply.

With respect to human capital, even if the former is often perceived as a major problem, the main conclusion of the Study is that it cannot be regarded as a binding constraint yet. From the availability point of view, the rate of participation of labor force, although referred as “low”, is higher than in most of comparable countries. As to the quality of labor force, even though the premium for skills is somewhat elevated and will, probably, continue to grow, the report has stated that the availability of a large number of holders of tertiary education among the migrants proves that Moldova has got idle skilled human capacity. Similarly, the analysis of unemployment distribution over the educational levels does not support the idea that labor force lacks needed skills. As to the perception and behavior of businesses, poll data indicate that they do not consider qualification of employees as highly insufficient since both cross-country and dynamic comparison of investment in training is quite low. The overall picture however suggests that in medium term the labor force might become a binding constraint once the capital endowment of economy will increase, as it happened in some Baltic and EU countries from the comparison group.

The infrastructure has been receiving a relatively reduced attention in terms of investments, and almost all infrastructure components may be described as strongly deficient. As to the quality of infrastructure, Moldova is among the outsiders from the list of comparable countries. The Analysis points out that telecommunications have got fewer problems than the overall country infrastructure. The electric power distribution and supply grid is maintained since Soviet times, but anyway losses in transportation and distribution of energy are elevated. Still the main concerns refer to inadequate road infrastructure, which seems to be the most affected due to the lack of investments and proper maintenance, and has an impact on both the population and the development of businesses, particularly in the regions. The Analysis concludes that infrastructure is binding constraint to growth as it has high impact on both starting a business and on subsequent operational costs.

Deficiencies in innovations and in abilities to innovate, based on this Study conclusions, does not represent a binding constraint to economic growth. Although the general perception of some economists is exactly opposite, several analysis instruments used within this study demonstrate that Moldova is using innovations both extensively and successfully. For instance, at regional standards, the Moldovan exporters diversify successfully the traded goods; researchers supply a large number of patents, and enterprises report positive innovational outcomes.

The key macroeconomic environment problems, apparently, are inflation and aggravation of the external deficits. We have to emphasize that both the increased inflation in 2006 and the external deficits were caused to larger extent by external shocks rather than by domestic policies. Currently, the economic growth trend has been marked out, and concomitantly, the inflation rate has been declining. As to the trade deficit, in our opinion it is a symptom and not a cause. The deficit is growing since the economic environment variables, such as inflow of remittances and Leu appreciation, allow for it. It is however a source of concern since it increases somehow the vulnerability of country to external shocks, but in our

opinion it is not causing any other particular problems for the growth. In general, the Analysis comes with conclusion that macroeconomic environment is definitely not a binding constraint for economy at the moment.

As to the investment climate, although a huge effort has been recently deployed to ameliorate business environment, the Analysis has identified several major problems and drawbacks. The Study shows that in comparison with other countries, the Republic of Moldova is less attractive for investments, particularly due to tough conditions for authorization of business activities (not the emission of initial licensing), corruption, rigidity of labor relation regulations, trustfulness in judicial system etc. These results come very much in line with private sector perceptions of the level and dynamics of those factors, and do lead us to conclusion that investment climate is a binding constraint to growth in Moldova .

1 Constraints Analysis Methodology

The present study follows the growth diagnostics methodology proposed by Hausmann, Rodrik and Velasco.¹

The main premise for the methodology is that different countries do not necessarily face the same set of problems and, certainly, the relative severity of these problems varies widely. Consequently, one size fits all policies like the set of recommendations collectively known as the Washington consensus will not necessarily spur growth. Therefore, a successful growth strategy has to be contingent on the economic environment at hand and focus on one or two main constraints. Consequently, the present study aims to identify the constraints that are binding Moldova's economic growth, and which should be targeted in the framework of the MCC program and other growth policies.

The approach for the analysis is based on fundamental results of neoclassical growth models, according to which growth is proportional to the private return to assets, net of cost of financing it. In other words, growth follows the ubiquitous Euler equation:

$$\text{Growth} = \sigma[(1 - \tau)\theta - r]$$

where θ is rate of social returns, $(1 - \tau)$ is the rate of appropriability, and r is the cost of capital. The rate of appropriability represents the share of social (economic) returns that are passed to the private sector, i.e. what is left after net after taxes, corruption, regulatory delays, expropriation through changes in laws and the judicial system, etc.

This equation provides the general answer to the question "what constrains growth?" It must be caused by at least one of the three factors: social returns are low, the rate of appropriability is low or the capital is too expensive. However, to have a policy-relevant answer, we need to disaggregate the question even further:

- If it is low returns, is it insufficient investment in complementary factors of production (human capital, technical know-how or infrastructure)?
- If it is poor appropriability, is it due to high taxation, poor property rights and contract enforcement, labor-capital conflicts, or low productivity, incomplete information and other market failures?
- If it is poor finance, are the problems with domestic financial markets or external ones?

¹ Hausmann, Ricardo, Dani Rodrik, and Andrés Velasco, 2005, "Growth Diagnostics," Kennedy School of Government, Harvard University (Cambridge, MA).
<http://ksghome.harvard.edu/~drodrik/barcelonafinalmarch2005.pdf>

We can organize these possible options in a decision tree, which is presented in Annex 1. In conformity with this representation, the present Report will analyze the following potential constraints:

- **Scarcity of factors of production:** physical, natural and human capital, infrastructure.
- **Failures in innovations and competitiveness.** Low productivity (effectiveness with which the factors of production are combined) can be explained by inability to introduce better technologies at producing existing productions or to discover products that are better suited to the country's conditions.
- **Low appropriability of returns (1- τ):**
 - **Macroeconomic risks.** Potential reasons of macroeconomic nature that result in low appropriateness include macroeconomic instability and volatility, tax regime and unfavorable terms of trade shocks.
 - **Investment climate.** This chapter analyzes macroeconomic risks and terms for doing business, e.g. fiscal practices, corruption, property rights and access to justice.

How can one discriminate between potential explanations? The answer can be extracted from the neoclassical production function, in which all factors are complements (this is a safe assumption, given that rich countries are abundant in everything: from physical and human capital to infrastructure and institutions). The return to the scarce factor is pushed up and the return to the other factors is pushed down. For example, if access to capital is a problem, interest rates should be high. If there is a deficit of human capital, the skill premium should be high and unemployment among skilled labor low. If the binding constraint to growth is poor infrastructure, then we should see bottlenecks and concentration of economic activity in areas with good infrastructure.

A useful tool in analyzing the relative importance of constraints is benchmarking: comparing Moldova to a number of countries similar in size, level of economic development, past common history, physical proximity.

In order to ensure relevant comparison, the following countries have been selected:

- „Similar” countries, with common past history and comparable development level: Ukraine, Romania, Albania, Bulgaria, Armenia, Georgia, Kyrgyzstan, Macedonia;
- „Target” countries, with comparable physical size, new members of the European Union, with a development level and economic growth rate higher than Moldova's: Estonia, Latvia, Lithuania and Slovakia.

In certain cases, in order to get a more comprehensive picture, the list of countries selected for comparison was enlarged, in particular by including the Eastern European and some former USSR countries. The Report used comparable data collected by international organizations for the mentioned countries. These data

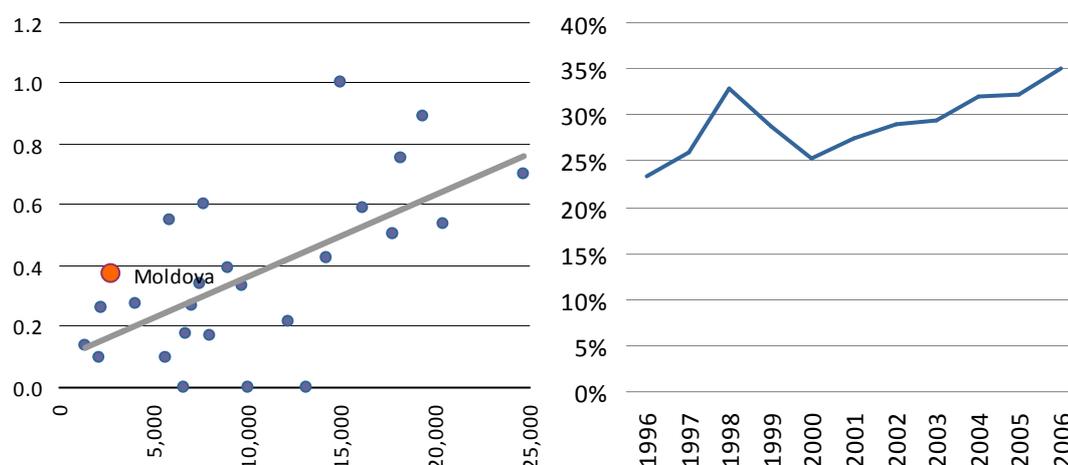
cover got both subjective estimations (perceptions and indexes built up on questionnaire bases) and objective ones (economic parameters and indexes synthesized artificially). Some aspects of this Analysis, with the focus on internal dynamics of indicators, use the data provided by the National Bureau of Statistics and by other institutions from the Republic of Moldova.

2 Financial Sector

2.1 The Banking System Indicators

The banking system in Moldova is relatively well developed. Currently, there are 15 banking and financial institutions acting in the Republic of Moldova, out of which two are banks with foreign capital. The overall number of branches and representations increased from 388 in 1999 to nearly 900 in 2006. The banking sector depth is in continuous enhancement, and is adequate in comparison with other countries from the region (Figure 1). The banking system total assets are estimated at around 23 billion Moldovan Lei (1.75 billion US Dollars) and represent over 50% of the GDP (2006). Within the recent period of economic growth, *the commercial bank credit* increased about six times. Credits issued to the national economy accounted for more than 36% of GDP in 2006.

Figure 1. Depth of financial system (left panel) and banking credits as percentage of GDP (right panel)



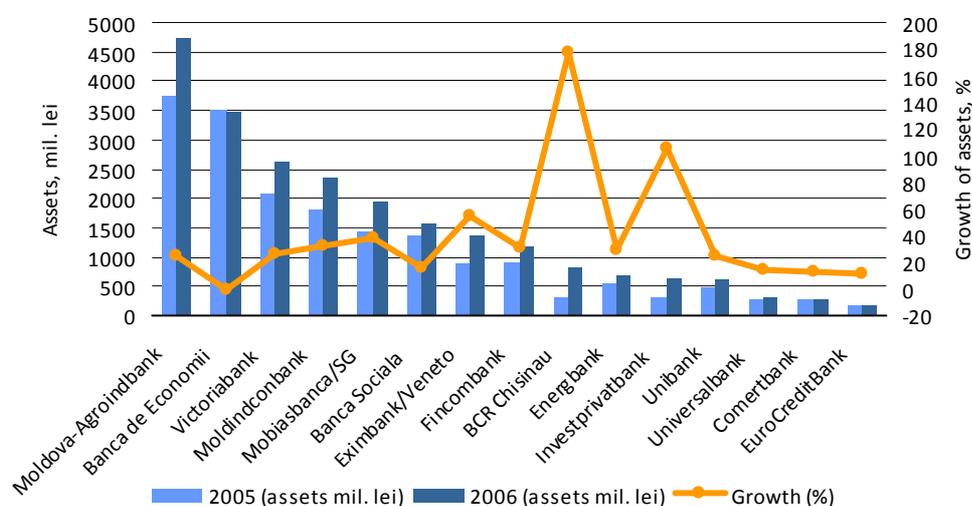
Source: Authors' computations based on the Economist Intelligence Unit data (EIU-Country Data: Annual Time Series), EBRD, NBM monthly and quarterly reports

The first six banks from Moldova hold nearly 75% of the banking system assets (Figure 2) and of total credits provided to the economy. The largest weight of savings, around 55%, belongs to deposits in local currency, while the rest is in foreign currency. The overall bank deposits are estimated at over MDL 15 billion or nearly 33% of GDP (est. 2006). In 2006, the share of foreign investments in banks capital was 62.7%.

The entrance of some foreign banks is expected contribute to the establishment of a broader financial diversification and to more efficient reallocation of resources in the economy. In addition, the appearance of foreign banks could trigger the development of stock markets, investment funds and pension funds as well as

insurance; and these segments are yet at an incipient stage of activity in the Republic of Moldova.

Figure 2. The ranking of Moldovan banks based on the volume of assets



Source: Authors' computations, NBM monthly and quarterly reports; EIU-Country Data

We can comfortably assume that at the moment, the banking system of the Republic of Moldova has reached an equilibrium level. The number of banks remains constant since 2002. Available reports show that the banking sector consolidation indicators are good, and the banking sector legislation is adequate and corresponds to EU Banking Directives (Basel II principles). Yet the overall positive picture is affected to some extent by structural issues connected to legislative framework and deficiencies in banking supervision related to the corporate governance in banks. However, due to recent modifications of the Law on financial institutions, these problems have diminished considerably over the last two years.

The financial non-banking markets (insurance and micro credit) are still underdeveloped. These markets are usually considered as an important factor of economic growth. Together with banks, they ensure access to finance and good functioning of businesses. Capital market is still at the very incipient stage of development while insurance market progress falls behind the growth of banks. Undercapitalization of stock market is due both to specific obstacles faced by enterprises as well as to weaknesses in corporative management. However, it is expected that creation and reinforcement of a new financial market regulation and supervision authority (National Commission for Financial Market, or the Mega Regulator) could trigger faster development of this market. Starting from 2008, the whole financial market will be regulated by only two institutions, namely the National Bank and National Commission for Financial Market.

Micro crediting institutions have recently intensified their activities. The assets of the three such institutions present at the market amounted at USD 60 million at the end of 2006. The cumulative assets of the 33 insurance companies that work in Moldova are even smaller. Those represent only 3.5% of the overall assets of banks in Moldova (USD 1.7 billion at the end of 2006).

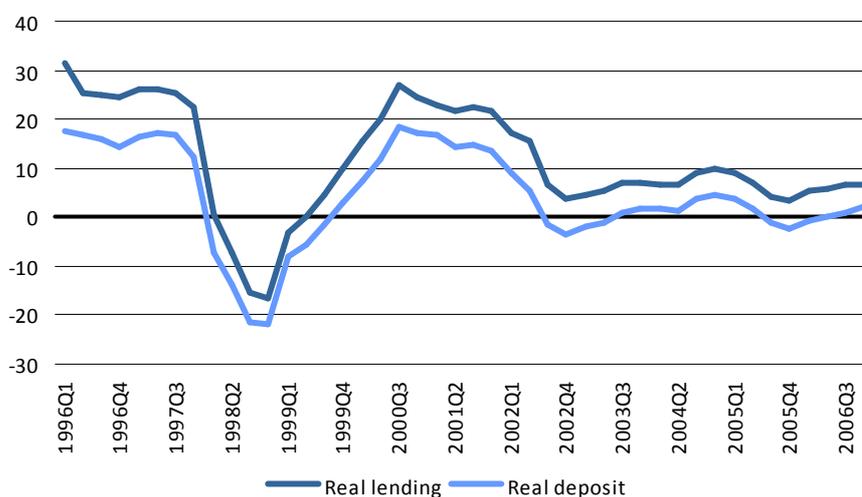
Nevertheless, the intensification of microfinance activities during past two years shows promising perspectives for the future. Microfinance institutions offer loans at an interest rate that is slightly higher than the one charged by banks. However, they offer a much simpler procedure of credit contracting, in contrast of bureaucratized and longer procedures in banks.

2.2 Interest Rates

Along the past 7 years, the loan and deposit real interest rates have displayed downward trends (Figure 3). Thus, the balanced evolution of interest rates would mean constant supply of financial resources to the real sector of economy, which, in turn, would support a uniform gradual growth of the economy without any significant fluctuations.

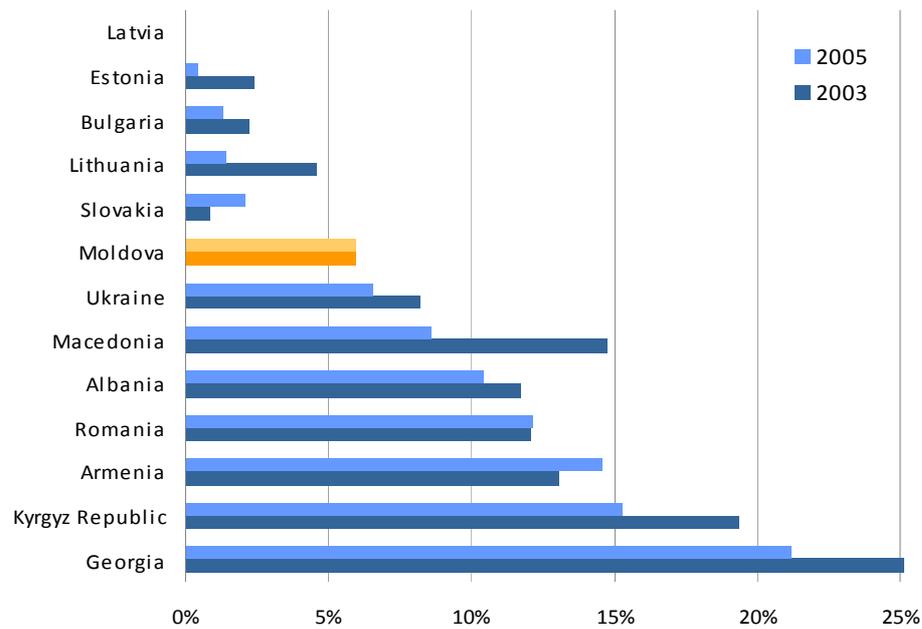
However, economic agents and businessmen consider that the interest rates in the Republic of Moldova are too high. Although, in fact, banks are using main macroeconomic indicators as guidelines to set up the level of interest rates. Inflation forecast, high level of outstanding debts/arrears of economic agents to banks and the large volume of non-performing loans are some of the reasons that makes the banks to increase their interest rates, as a way to maintain some minimal level of profitability and liquidities for financial activity. Moreover, bank loans are usually provided to the economy at interest rates higher than the costs of resources and not lower than the inflation rate.

Figure 3. Evolution of loan and deposit real interest rates, %



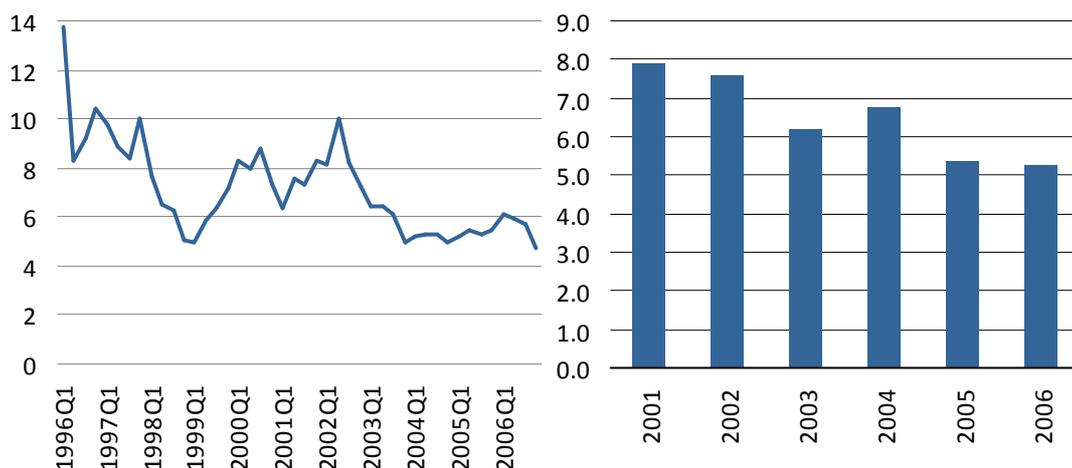
Source: Authors' computations, NBM monthly and quarterly reports; EIU-Country Data

Correcting for inflation, the loan real interest rate is reasonable according to the regional standards (Figure 4). Even the bank margin – the difference between the interest rates for loans advanced and deposits attracted – is not very high; in the second half of 2006 it was about five percentage points.

Figure 4. Loan real interest rates: regional aspects.

Source: EIU-Country Data: Annual Time Series, EBRD, 2006

Thus, the bank margin is comparable with the average levels recorded by the CIS countries, the local banks having become more efficient. This fact will be further enhanced by admission of foreign banks. In general, any consequent lowering the interest rates could be achieved exclusively by two routes: a) diminishing the nominal rate – anti-inflationist policies (targeting inflation) and b) diminishing the bank margin – maximization of competitiveness through attracting foreign banks and strengthening the non-banking sector (Figure 5).

Figure 5. Bank margin² and share of non-performing loans, % of total

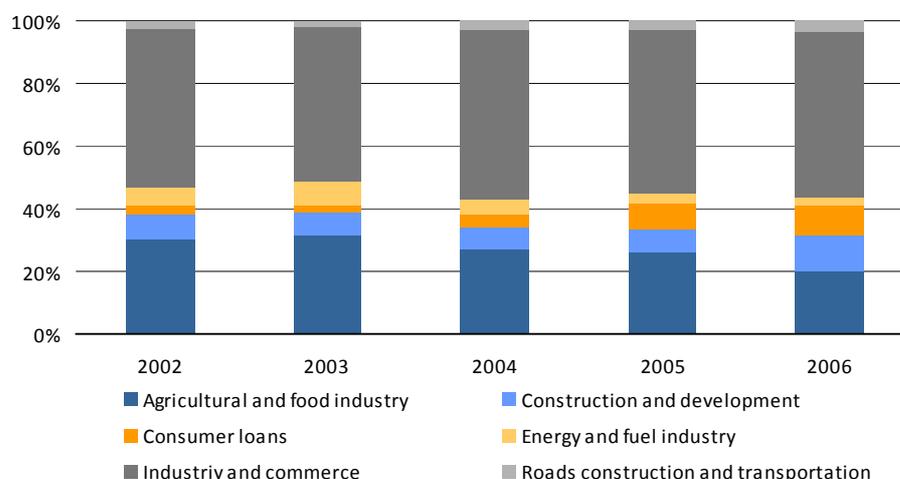
Source: NBM annual and monthly reports, 1996-2006

² Difference between the loan and deposit interest rates

2.3 Lending Dynamics

For several years in row, the banking system has recorded high levels of profits, gains and capitalization, fact that offered sound possibility to provide adequate level of loans to the real sector. For instance, during 2006 the balance of loans contracted increased by 33% (including the consumer loans). If until the year of 2004, there was a reticence remarked among the banks in advancing consumer loans, then the situation has improved substantially. The weight of this type of loans increased from 3.6% to almost 10% in 2006 in the portfolio of bank loans, with reliable growth trends during the next two years of over 12% (Figure 6).

Figure 6. Loan structure, % of total loans advanced to the economy

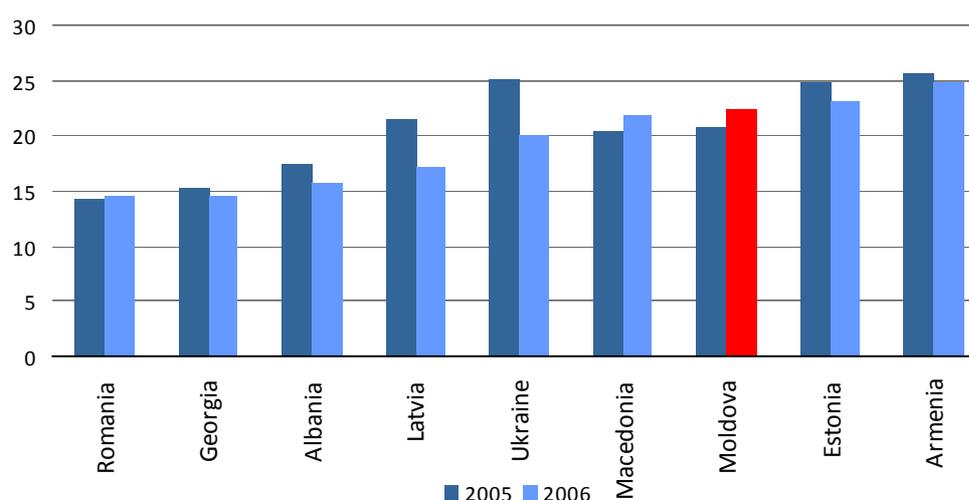


Source: NBM annual and quarterly reports, 2001-2006; <http://www.bnm.org/md/index.html>

At the same time, the population savings have boosted up, one of the reasons being the high amount of money transfers from the Moldovans working abroad (Figure 7). In 2006, the remittances totaled more than USD 855 million, or 27% of GDP. However, the slow pace of structural reforms and the lack of opportunities for re-channeling the remittances impeded the opportunity to use these large capital inflows for productive purposes. This has also determined the appreciation of the Moldovan Leu, stimulating the import consumption, but deteriorating the external competitiveness of domestic products.

In 2006, the small credits offered for extending business (less than MDL 700 thousand) totaled MDL 1.36 billion, which is 24.5% more than in the previous year. Small business development credits represent 10% of all credits in economy. Thus, in contrast with the widely spread opinion that banks prefer crediting only large enterprises, the crediting of small and medium businesses is growing.

The share of longer term credits (more than 2 years) registers similar behavior. Despite the fact that short credits (less than 2 years) still dominate over the long term ones (81.3% from the total), during 2005-2006 they grew up by 71% in comparison with 131% growth for long credits. It can serve as an additional proof that the system is registering good levels of liquidity, capitalization and gains.

Figure 7. Savings rate, growth in %

Source: EIU-Country Data: Annual Time Series, EBRD, 2006

In conclusion, the financial system in general is adequately developed and does not represent a binding constraint to development. Our analysis shows that recent economic growth can be linked with a substantial increase in private sector crediting and with increase in FDI as well. However, the local finance market is not mature yet, and thus the bank loans are the primary and ultimate source of financing for businesses.

The main problems in the access to finance by firms include the following:

- Asymmetry in lending activity, which could be explained by the fact that banks prefer providing loans to large enterprises, while small and medium-sized enterprises, although predominant numerically, do not receive enough loans. However, the available data for the last two years shows considerable improvements.
- Banks temporary preferences that could be explained by their low level of confidence towards the economic evolution (the country macroeconomic conjuncture). So far, the banks still prefer advancing short-term loans, because the bank resources are created to a great extent from short term deposits. Similar to previous point, there are signs of improvement in the temporary preferences of banks.
- Relatively high nominal interest rates. High interest rates mean higher cost of finance and lead to suboptimal investment. High interest rates maintain long-term inflationary expectations, meaning further substitution of investment by consumption. This typical consumption oriented behavior of firms and households increases GDP on short run, but on long run means higher prices and more painful reforms.
- Lack of credit tracking system, fact which complicates the activity of banks and leads to numerous difficult settlement procedures between banks and entrepreneurs. For banks, it also introduces distortions in the process of selection of investment projects worth to be credited. The creation of credit

history bureaus would mean elimination at great extent of risks and further reduction of operational costs.

- Weak non-banking financial market, which is an important way in ensuring access to finances for businesses.

3 Natural Capital

3.1 Natural Capital Factors

The importance of country endowment with natural capital favorable for quick growth and development is a well-acknowledged phenomenon. By natural capital we understand the aspects of economic and non-economic nature, both benefic and detrimental for development, that emerge as a result of specific geographic positioning of the country and environmental circumstances. Such aspects include:

- The country position that conditions the access to the main trade markets, and the country size. The size is also important as it offer the opportunity to exploit agglomeration economies (comparatively to other countries from the region)³;
- Supply with good quality land as potential for agricultural activities and potential for human development;
- Climate conditions, including the water availability and climate-associated diseases.

This Chapter will analyze the country supply with other natural resources because, on the contrary to persistent opinions, their scarcity is not a constraint to economic growth.

3.2 Size and Location

Moldova is both a small and land-locked country and these factors together have a certain negative impact on its development. Moldova is located in the Eastern Europe and landlocked within two large neighboring countries, with 170 km-distance to the closest maritime port. The lack of access to sea has been historically associated with delays in development due to the fact that such a country relies heavily and exclusively on the relations with the neighbors, their infrastructure (roads), the external stability and policy, in order to have access to its trade markets. As a small open economy, Moldova depends on exterior trade at a greater extent than its neighbors or competitors. Thus, the ratio of trade with goods to GDP is 117% (2005) for Moldova, compared to 85% for Ukraine and 69% for Romania.

The difficulties in accessing the trade markets may be captured by the Transportation Cost Index, which represents the ratio of expenses incurred for transportation and insurance to the export price⁴. Faye et al (2004)⁵ estimated this

³ A larger country has got additional opportunities to exploit the benefits that emerge from agglomeration economies.

⁴ In prices INCOTERMS, (CIF-FOB)/FOB

proportion for Moldova at the level of 10%. In relative terms, by using the scale from 0 to 1 (from the unaffected to the most affected), Moldova is ranked pretty high (0.86) among other comparable landlocked countries (**Table 1**), which proves that the geographical position could be a problem. This high classification among economies that have problems in accessing market is also supported by historical evidences of transit restrictions, imposed on Moldovan goods by the neighbor countries on their sole discretion, at the early stages of transition.

Table 1. Relative Transportation Costs Index for the landlocked countries

Country	Afghanistan	Armenia	Turkmenistan	Kyrgyzstan	Moldova	Azerbaijan
Relative ITC	0.38	0.51	0.77	0.81	0.86	0.92

Source: Faye et al (2004).

At the same time, Faye et al (2004) argued that presence of a strong focus of stability and economic growth in close neighborhood to the country (like the EU for Moldova, since 2007) may reduce or even nullify the negative impact of positioning, by offering a developed proper transportation infrastructure and negotiating favorable commercial agreements. The main trade partners of Moldova (EU, SEE and CIS), placed in relative proximity, satisfy 91% of Moldovan exports and 84% of its imports, and the national economy does not rely heavily on certain resources or markets located further. We can draw the conclusion that the geographical position had been and still is, at some degree, an issue, but its role will be definitely diminished along with economic growth and infrastructure development in the neighboring countries, negotiation of commercial and transit agreements, and improvement of export practices.

3.3 Terrain Endowment

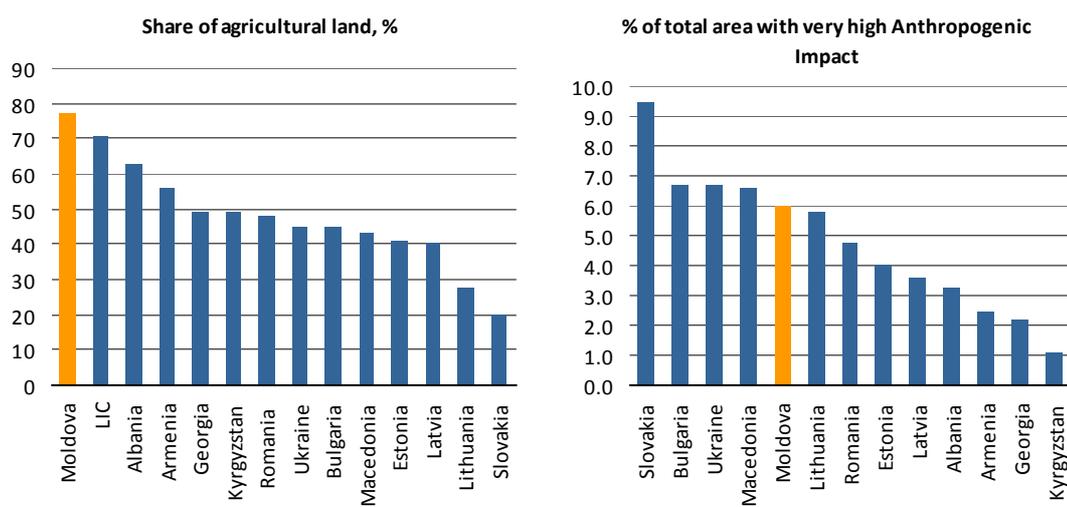
The supply with terrain suitable for development, including the agricultural land, is excellent. Moldova is positioned neither in mountains nor in flood plains, and the arable land represents 77% of its area. The supply with land plots is much better in Moldova than in any other comparable country (Figure 8). Likewise, currently Moldova has no constraints with respect to spaces available for carrying out human activities. Although the current anthropogenic (manmade) impact is higher (6%) than in some comparable countries, it is however well below the world average (8.4%) and far under the values recorded by the developed countries.

The geological and soil conditions have a certain impact on the depreciation pace of physical capital. The regional geological instability leads to frequent earthquakes of average magnitude. Starting with 2000, seven earthquakes of 4 to 6 degrees of magnitude have been recorded, while potentially devastating earthquakes of 7-8 degrees typically take place every 15 years. The incidence of earthquakes imposes some minor additional costs in constructions.

⁵ Faye et al, Journal of Human Development Vol. 5, No. 1, March 2004

Landslides represent a much more spread phenomenon with a more marked effect with 12 to 268 cases recorded annually. Usually, in a single year more than half of administrative and territorial units of the country record landslides. The road network is considered as one of the most affected by landslides and plot movements, combined with numerous cycles of frosting-defrosting processes in the course of relatively mild winter. Still the incidence of landslides cannot be considered as the key constraining factor for road system development, because in Romania, for example, this incidence is even higher.

Figure 8. Supply with Land Plots and the Current Anthropogenic (manmade) Impact.



Source: World Little Green Handbook, World Bank, 2007, and Environmental Sustainability Index 2005

3.4 Climate Conditions and Internal Water Resources

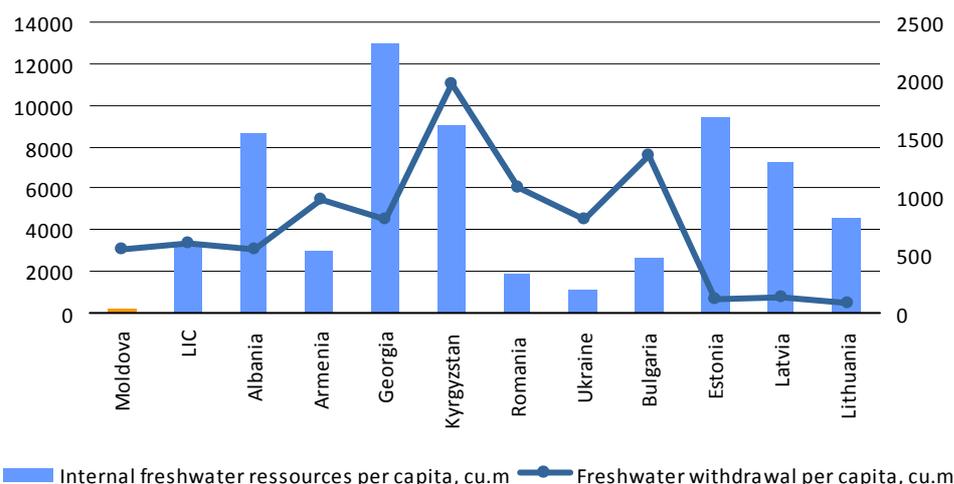
The climate-related risks are enhanced in case of agricultural activities. The annual rainfalls vary from 307 to 800 millimeter (2002-2005) and in most of the cases are suboptimal for the typical products with an increased value-added. Additionally, there is significant volatility in the annual, monthly and regional distribution of the rainfall. Both droughts and excessive rainfalls are frequent. Year by year, the rainfall standard deviation is 60-83% for the typical summer months.

The common agricultural crops are sometimes affected by winter frosts, while high yield crops are damaged utmost by late spring frosts. Invasions of plant pests and diseases over the high productivity crops are pretty frequent, but, in contrast, may be kept under control in case appropriate investments are made in plant protection.

It might be argued that following the logic of constraints analysis, there is no evidence that the climate risks belong to binding constraints since in such situation the private sector would react by making more investments and using the available tools for control and preventions and by extensive irrigation as well. However and especially in report with irrigation, it is worth mentioning that the lack of investments may be attributed also to coordination failures, and not to the fact that droughts do not represent a constraint.

Moldova confronts with high shortage of water resources. As it is portrayed in Figure 9, the internal freshwater capacity⁶ constitutes just 238 cubic meters per capita per annum, in comparison with 1,955 cubic meters in Romania and 1,128 cubic meters in Ukraine. In terms of aquatic resources endowment, Moldova holds the worst position in comparison with all countries from the region. Moreover, there are proofs that the existing capacities are overused; hence, the annual withdrawal of freshwater exceeds 2.5 times the capacity (Figure 9).

Figure 9. Freshwater Capacity and Withdrawal



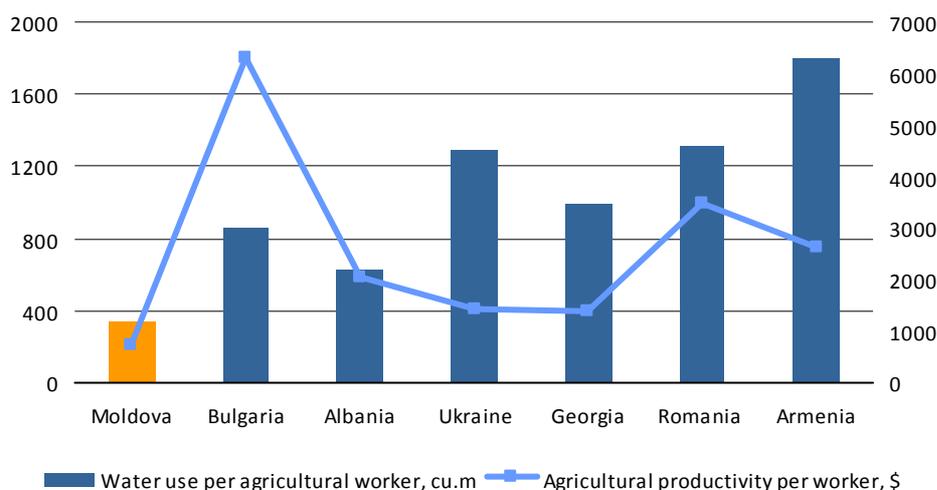
Source: World Development Indicators 2007, World Bank

There are no evidences supporting the affirmation that the overuse of aquatic capacity takes place because of extensive use of water in agriculture. Only 33% out of the total water withdrawn is used for irrigation, which is substantially below the levels recorded by comparable countries (with similar latitude and climate conditions; 57% and 52% in Romania and Ukraine, for example). Furthermore, within 1998-2005, the irrigated area was reduced from 306 to 228 thousand hectares, while the volume of water used for irrigation fell from 264 to 140 tones per hectare.

Along with the rehabilitation of the economy and agriculture in particular, the scarcity of freshwater resources will increase. In the long run, the deficiency of water may become an important constraint to economic growth. For instance, other countries with similar climate conditions use much more water per one agricultural worker as it is shown in Figure 10 (the use of water is shown on the left axis, and the productivity – on the right axis). While the water use is not the only explanatory factor of agricultural productivity, it shall be noted that all countries that record better productivities also employ more water.

⁶ Rainfall, internal reservoirs, lakes, underground water, rivers etc, but except the rivers that are inflowing from other countries (Nistru).

Figure 10. The use of water and agricultural productivity

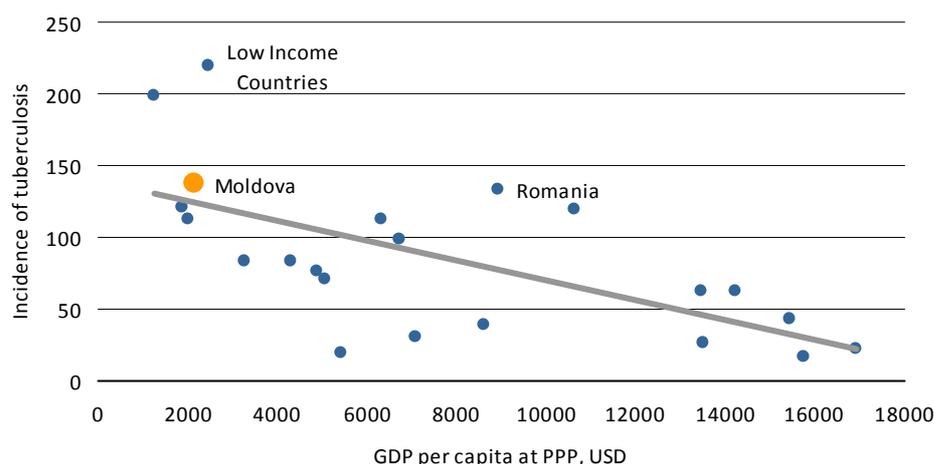


Source: World Development Indicators 2007, World Bank

3.5 Climate-Associated Diseases

In general, the climate conditions in Moldova are not associated with any epidemics of climate-related diseases. The climate of Moldova is temperate continental with warm and dry summers and mild winters. However, the tuberculosis is at some degree a concern, as portrayed in Figure 11. The incidence of tuberculosis is 138 cases per year, ranking between the values recorded in most of the comparable countries (40-70) and in poor countries (220).

Figure 11. Income and the Incidence of Tuberculosis, per 100,000 inhabitants



Source: World Development Indicators 2007, World Bank, author's calculations

In the regression⁷ of incidence of tuberculosis over the development level (captured by GDP per capita), the record of Moldova is situated over the regression

⁷ Based on the hypothesis that the principal factors of TB are related to climate, malnutrition and underdeveloped healthcare system. The last two factors are indirectly captured by the economic development level.

line, suggesting that the performance achieved by Moldova in fighting tuberculosis is much smaller than it was expected from a country with such an income level. Also, the incidence of TB is practically identical in Moldova, Ukraine and Romania, despite the substantial discrepancies in economic development, which, in fact, reveals that in case of Moldova, the climate effect over TB is much stronger than the effect of other factors. However, we cannot consider TB as a binding constraint, because its global impact over the labor force is marginal; moreover, the labor force itself is not a constraint at the moment, as it has been discussed in this Report.

In conclusion to this Chapter, **we cannot consider the natural factors as binding constraints at the moment, although there are some concerns and problems.** The access to trade markets will further improve due to the recently-achieved proximity to the EU; the supply with land plots and spaces for human development is pretty good, and the climate effect over the labor force is marginal. At the same time, the climate conditions and the soil status lead to rapid depreciation of the road infrastructure, while the sustainable supply with water belongs to potential future problems.

4 Human Capital

4.1 Assessing the Human Capital Endowment

Human capital represents a complementary factor of the production function and this complementarity offers the possibility to estimate whether it represents a binding constraint to economic growth.

In case the supply with human capital is relatively constrained in comparison with other complementary factors of the function of production (capital, infrastructure etc.), we shall notice the following economic phenomena:

- High differentiation of wages depending on skills and knowledge (*high rate of returns on additional education, or high premium for qualification*). The educated qualified employees will have much higher wages than those with no qualification.
- Substantially distorted distribution of unemployment, depending on the level of education. The unemployment rate among the holders of higher education would be very low.
- Substantial efforts of enterprises aimed at providing continuous training to their employees, because businesses require much higher qualification than the one offered by the labor market.

4.2 Returns to Education

The estimations of returns to education in Moldova, calculated by different methods, range from average to somewhat elevated.

The theory predicts that in case of scarce human capital, we will notice large premiums paid to highly skilled employees. In practices of econometric studies, skills are captured by the level of education and the impact of education on wages is measured through the so-called Mincer regressions:

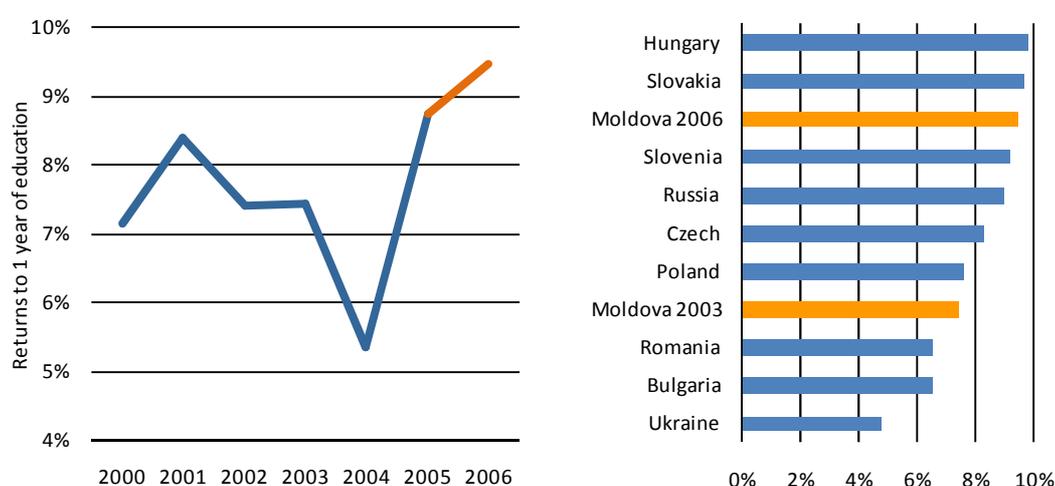
$$\text{Ln wage} = B_0 + B_1 \cdot \text{educ} + B_2 \cdot \text{exp} + B_3 \cdot \text{exp}^2 + e$$

Where Ln Wage is the natural logarithm of the wage per hour, educ is education, and exp is work experience. The coefficient B_1 represents the percentage increase in wage per hour for each additional year of education (*rate of returns on one additional year of education*). It is well-known that Mincer ordinary least squares (OLS) regressions produce results that are biased on several grounds: skill heterogeneity, self-selection into the working population, etc. To address these issues, one needs to use instrumental variable regressions or a natural experiment. However, since good instrumental variables and natural experiments are hard to

come across, most studies use standard Mincer regressions. A partial justification for this fact is that studies that use more sophisticated techniques produce results that are not that different from those of OLS regressions. In addition, it is unlikely that biases vary widely from year to year, which increases the reliability of conclusions based on *changes* in the skill premium.

The results of the Mincer regression⁸ are presented in Figure 12. The Graph from the left shows the evolution of the rate of returns to education (additional premium for each additional year of education) from 7.2% in 2000 to 9.5% in 2006.⁹

Figure 12. Rate of returns to one year of education: evolution in Moldova (left panel) and its comparison with other countries (right panel, all countries 2003, data for Moldova - 2003 and 2006)



Source: For Moldova: Authors' computations using the data CBGC 2000-2006. For other countries: Fleisher, Belton M; Sabirianova Peter, Klara; Wang, Xiaojun. 2005. "Returns to Skills and the Speed of Reforms: Evidence from Central and Eastern Europe, China, and Russia", *Journal of Comparative Economics*, 33(2) pp. 351-70

There are two explanations to this increase of premium. First of all, in case holders of higher education would represent a large proportion in the migrated labor force, then migration would have led to scarcity of qualified labor, and to a high premium for qualification afterwards. Concomitantly, the CBS-AXA Report on migration and remittances in 2006 shows that the weight of people with higher education among migrants is lower than in the domestic labor force - 18% and 21%, accordingly.¹⁰ The second explanation is that over the past years other complementary factors of the function of production became more abundant and based on that the marginal labor productivity increased, thus, allowing larger payments for qualified labor.

⁸ The baseline data of the Households Budgets Research for 2000-2006 have been used, NBS.

⁹ It is worth mentioning that the results for 2006 are not comparable in full with the rest of the period due to the change of the sampling method used by the NBS. The results for 2004 are also doubtful, perhaps, due to the data quality.

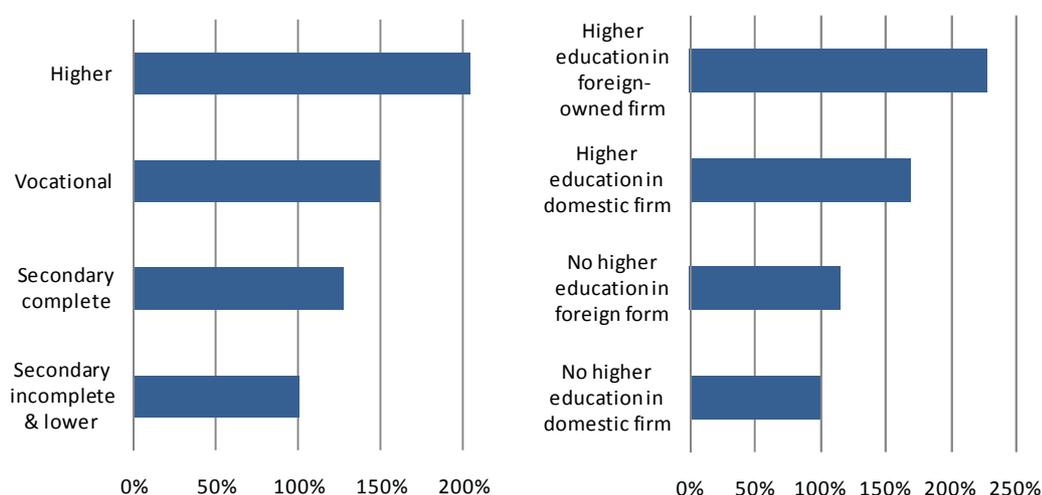
¹⁰ The results selected from the CBS-AXA 2006 survey are available at http://www.iom.md/materials/migrants_day2006_en.pdf.

The right panel compares the rate of returns to education in Moldova (2003 and 2006) to the rate in other countries from the region (the data for other countries are for 2002-2003). In 2003, the premium for qualification was comparatively small, but it increased slightly in 2006. In case we assume that the skill premium has not been improved in other countries, then Moldova is among the regional leaders. At the same time, it is quite possible that this premium also increased in other countries due to reasons similar to Moldova – brain-drain and gradual increase of supply with physical capital. Further we can assume that the rate of returns to one additional year of education in Moldova is at the average regional level.

The results derived from the data of Household Budget Survey may be checked with the regression results using the data from the Labor Force Survey (BNS) from 2006. The rate of returns to one year of education in 2006 was evaluated at the level of 13.4%, which is much higher than the results derived from the CBGC. The regression results are presented in Table 1 from Annex 2.

Another possibility to measure the education is to use the levels of education (secondary, secondary vocational, higher etc.). The regression results based on this method are presented in Table 2 from Annex 2. Thus, a university diploma is associated with a wage that is twice as large as the one established for incomplete secondary education (left panel, Figure 13), and the specialty secondary education is paid 50% more than the incomplete secondary education.

Figure 13. Economic returns to education by the level of education (incomplete secondary education=100%)



Source: Authors' computations using the data of the Labor Force Survey from 2006

Some international companies mention that they encounter certain problems in employing local skilled labor force. These affirmations could be tested by having introduced additional interactions in the Mincer regression. The results are shown in Table 3 from Annex 2 and presented graphically in the right panel from Figure 13. In a domestic company, an employee with higher education benefits from a wage by 70% larger than an employee without higher education. In case of a foreign firm, this discrepancy is much higher - 129%.

The premium for skills alone, pretty high though, is not sufficient to affirm that the human capital is a binding constraint. The main conclusion is that the premium for skills is large and is growing. In the same time, the availability of a large number of holders of higher education among the migrants may indicate that Moldova has got idle human capacity, and that the registered increase of premium for skills does not mean yet that the human capital has become a binding constraint. However, some evidences display the fact that enterprises with foreign capital offer higher scale of wages for a series of abilities/specialties considered as critical, which means that qualifications and work skills required by foreign firms is scarcer on the domestic labor market than those demanded by Moldovan companies.

4.3 Distribution of unemployment

Analysis of unemployment distribution over the educational levels suggests that human capital is not a binding constraint.

Another way to assess whether the human capital is a binding constraint is to analyze the unemployment rate versus the level of education. Should the critical skills and knowledge be scarce then the unemployment rate among the holders of such skills and education would be extremely low.

Another possibility to capture the insufficiency of critical skills on the labor market is to compare the unemployment rates versus the level of education for the employees aged 15 and 34 year only. Here the rationale consists in the fact that these persons have got more relevant education (acquired after the initiation of the transition period), and in general are more flexible and mobile. If the human capital represents a binding constraint, then the distribution of unemployment among the holders of different levels of education, aged from 15 to 34 years, would be even more distorted – we will notice absolutely low unemployment among the holders of advanced education from this group.

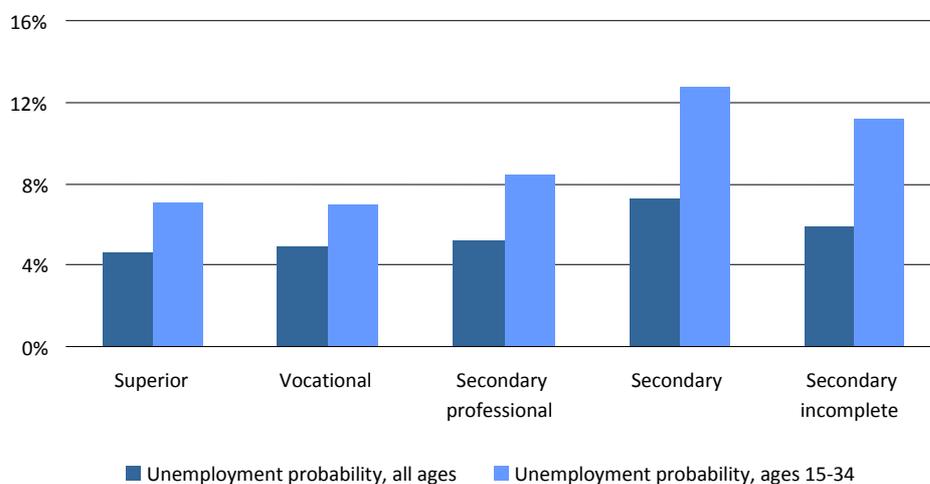
Figure 14 presents the unemployment rates versus the level of education (all age groups and the group of 15-34 years old). One immediate remark is that the unemployment level among the holders of higher education is slightly lower (4.7%) than the national average (5.6%), but not extremely lower. Furthermore, the overall distribution of the unemployment rate is pretty uniform, without any substantial variations.

As regard to persons aged 15-34 years, the unemployment rate among the holders of higher education is smaller than the average for this age group (7.1% versus 9.3%), however, this difference is rather insignificant. In general, unemployment rate among young is higher than the general one. A possible explanation could be relatively tight labor market regulation, existence of which is supported by available overviews of investment climate as discussed later in the report.

It should be noted here that unemployment figures used for analysis is with high degree of probability skewed in favor of unemployed persons with less education,

since owners of high education have much less incentives to register as unemployed.

Figure 14. Unemployment rate by levels of education



Source: Authors' computations, NBS 2005 data

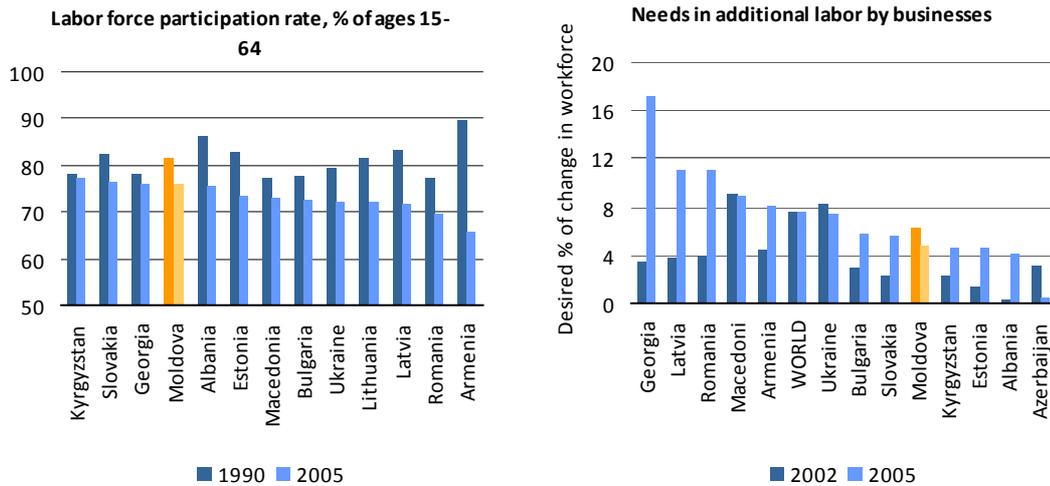
Thus, the unemployment rate distribution by levels of education does not show acute scarcity of critical skills demanded by the labor market. Moreover, an important remark (and counter-intuitive) is a higher unemployment rate among the holders of recent advanced education, which reveals potentially certain problems related to the quality of advanced education and the relevance of education agenda/curriculum for the market economy needs.

4.4 Enterprises Perception

All available evidence of businesses perception uniformly suggests that enterprises from Moldova need no additional labor resources. The level of economy's endowment with labor force is portrayed in Figure 15. The labor force participation rate (left panel) is at the regional average level, and does not depict any potential problems. The right panel shows the estimation, by businesses, of the needs for additional labor force in comparison with other countries from the region; this estimation is pretty low, and, distinctly from other countries, has got a downward trend compared to 2002. These evidences suggest the idea that enterprises are not constrained by the availability (or volume) of labor resources.

Enterprises in general do not think that labor force quality is an issue. The labor force quality or skills is a complementary factor to the volume of work used. The opinion concerning the existence of labor force skills-related major problems is widely spread; however, Figure 16 demonstrates that only 11% of Moldovan employers mention the labor force quality as an important or binding constraint, which is at average in comparison with other countries from the region.

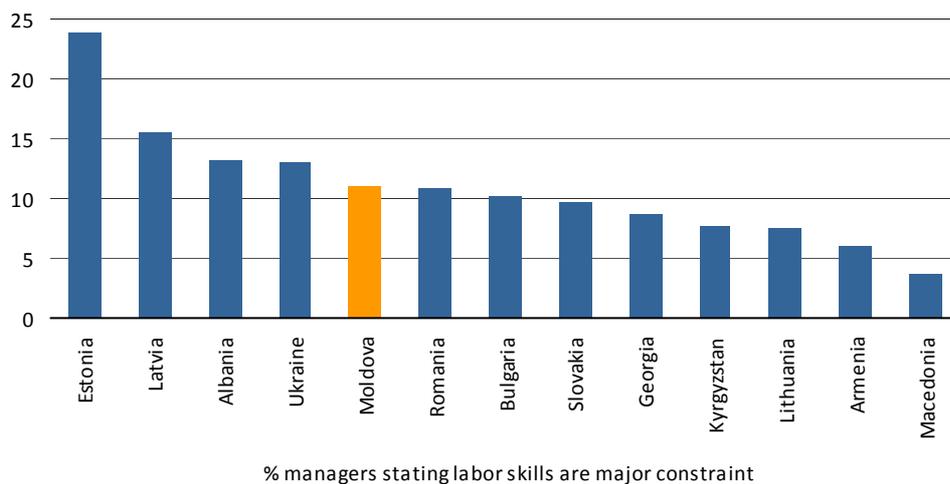
Figure 15. Provision with labor force



Source: Enterprise Survey Index 2005, World Development Indicators 2007, World Bank

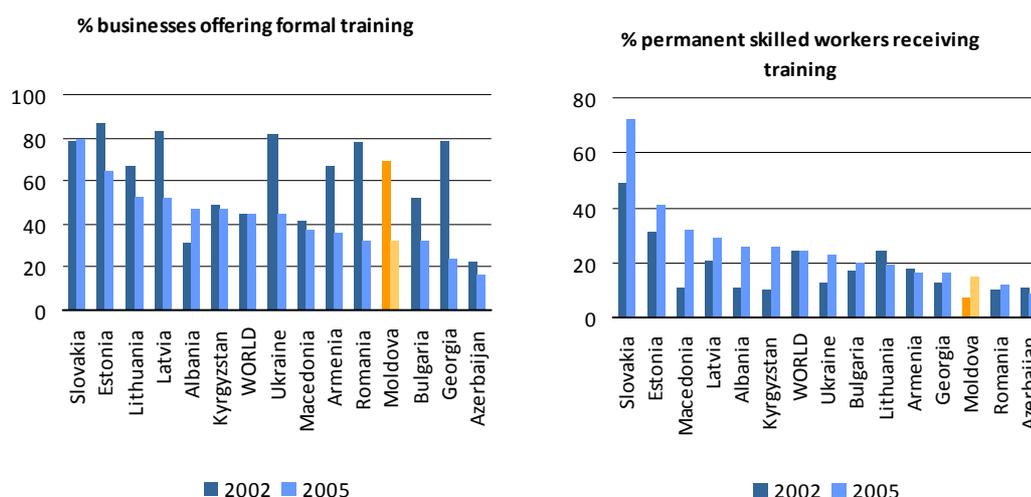
As a result, the enterprises do not invest in labor force education/training. In case enterprises need more skillful labor force than it is available on the market a widely used way to resolve this constraint is to provide on-the-job formal training. The standard economic practice suggests that those enterprises that realize the need to make these investments, but for some reason they decide not to do it, they lose from competitiveness and are gradually eliminated by other enterprises that record higher marginal labor productivity as a result of better skills of their employees.

Figure 16. Perception of labor force quality by enterprises



Source: World Development Indicators 2007, World Bank

In case enterprises do not consider the labor force skills as a major issue, they do not invest massively in education and training of labor force, as it is shown in Figure 17.

Figure 17. Labor force education and continuous training at enterprises

Source: Enterprise Survey Index 2005, World Bank

These graphs denote the fact that comparatively with other countries, businesses, in general, do not need more skillful labor force than the one offered by the labor market. Only up to 20% of permanent skilled employees received on-the-job training recently.

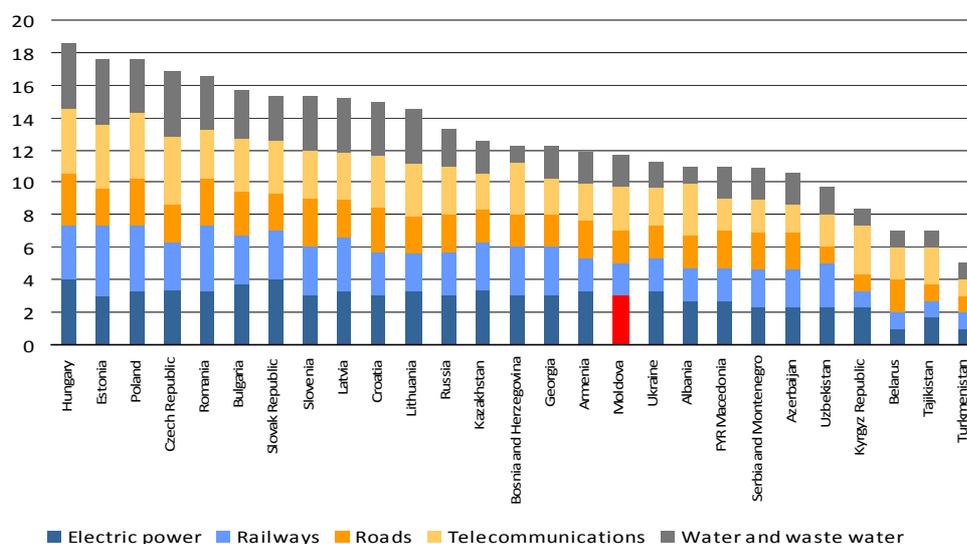
As a general conclusion of the chapter comes that the Moldovan economy does not perceive the availability and current skillfulness of the human capital as a binding constraint to growth and development. It is worth mentioning that this perception is contaminated to some extent by subjectivism. However, businesses perception is supported in full by the unemployment breakdown analysis results and in part by the analysis of high premiums granted for skills, presented previously. Overall, the series of accumulated proofs enable us to affirm that (in present, at least) the human capital is not a binding constraint to growth and development.

5 Infrastructure

5.1 General overview

Since the time the Republic of Moldova gained independence, its infrastructure, except for telecommunications, has not benefited from great attention and investments; and could be shortly described as “inadequate”. This definition is particularly true for the road infrastructure and to some extent true for the water supply and electric power infrastructures. Although, in comparison with the European and former USSR countries, Moldova is not the main outlier, however, the general assessment of the infrastructure quality places the country among worst performers as to the infrastructure quality (Figure 18). The last is assessed based on infrastructure indicators of the EBRD¹¹ on a scale from 1 to 4.3 with reference to electric power, railways, roads, telecommunications and water supply and sewerage services.

Figure 18. Infrastructure quality



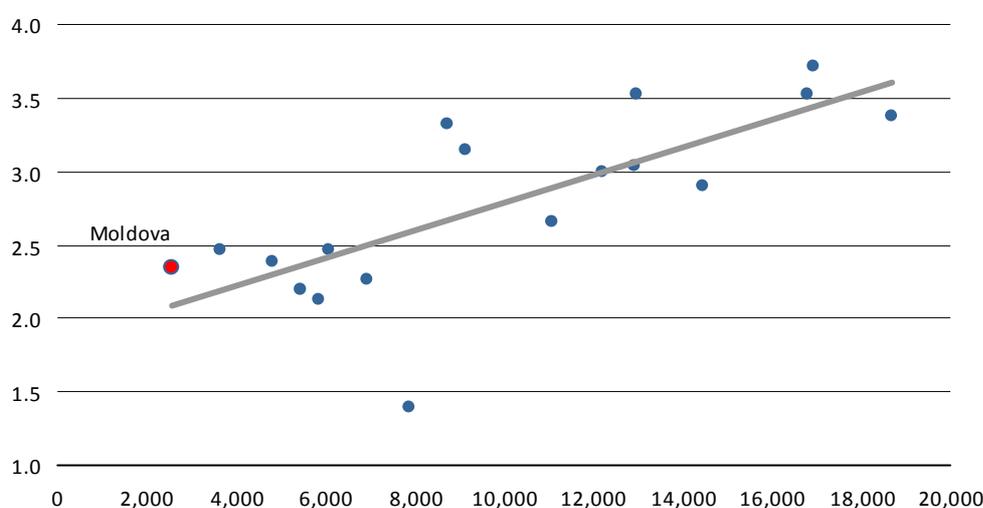
Source: EBRD, *Transition Reports 2003 – 2007, Infrastructure transition indicators*

Taking into account the fact that more developed countries have got generally more developed infrastructure, and the quality of the latter relies to some extent on the country GDP level, it is important to consider the infrastructure status versus the country income. In this context, a regression based on the level of GDP would suggest that the Moldovan infrastructure in general is adequate to the

¹¹ The EBRD indicators evaluate the status of considered infrastructures in the light of existence of independent regulatory institutions, the Government interference in their activity, the adequate tariff policy, private sector involvement, organizational structures, activity planning and resources provision etc. A detailed description of the EBRD infrastructure indicators is available in the Transition report 2006, EBRD.

current country GDP because the country position is over the regression line (Figure 19).

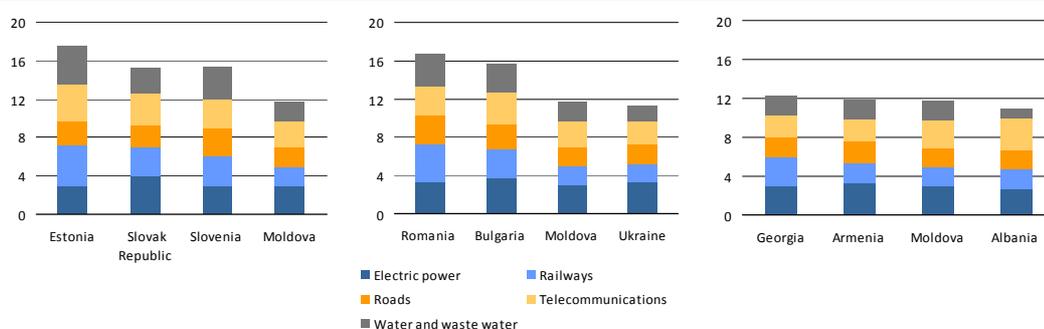
Figure 19. Infrastructure general quality versus GDP per capita, PPP, USD¹²



Source: EBRD, *Transition Reports 2003 – 2007, Infrastructure transition indicators*

However, at a closer look in comparison with the target-countries, with countries with similar income level, and with those from close proximity (**Figure 20**), confirms the conclusion about the reduced quality of the Moldovan infrastructure.

Figure 20. Infrastructure quality in comparison with the categories of selected countries (target-countries, neighbor countries, countries with comparable income)



Source: EBRD, *Transition Reports 2003 – 2007, Infrastructure transition indicators*

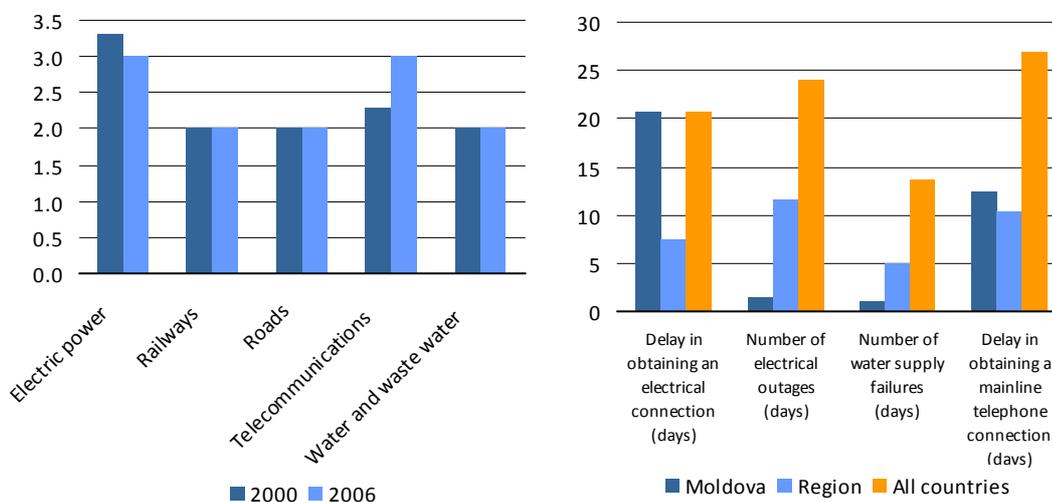
Based on EBRD analysis (2000), the Moldovan electric power and telecommunication infrastructures are in better conditions than the railways, roads and water supply infrastructures (Figure 21). In fact, compared to 2000, the situation in the power engineering area in 2006 worsened a little bit, while the quality of telecommunications infrastructure improved substantially.

In this context, it is noteworthy that in another survey, conducted by the World Bank on constraints to enterprise development, the Moldovan companies do not complain about safe electric power and water supply services. Problems emerge in

¹² In order to get a more representative picture, some additional countries from the Eastern Europe and CIS (Azerbaijan, Bosnia Herzegovina, Croatia, Czech Republic, Belarus, Hungary, Poland and Russia) have been included along with the countries of reference (Albania, Armenia, Georgia, Kyrgyzstan, Macedonia, Estonia, Latvia, Lithuania, Romania, Bulgaria and Ukraine).

obtaining connection to electric power grid or telecommunication network (Figure 21).

Figure 21. Quality of infrastructure components¹³ in 2000 and 2006 according to EBRD evaluation (left panel) and constraints pointed out by businesses¹⁴ (right panel)



Source: EBRD, *Transition Reports 2003 – 2007, Infrastructure transition indicators*; World Bank, *Enterprise Survey, 2005*

5.2 Telecommunications Infrastructure

In contrast with some other components of infrastructure, telecommunications are more or less adequately developed.

In providing a general description of the telecommunications infrastructure, it is worth mentioning that it comprises today more than 1,000,000 of installed fixed-line telephone stations, or a penetration rate of over 290 stations per 1,000 inhabitants. Out of the total number of fixed-line stations, the digital ones represent 65%. One of the conditions that contributed to the telecommunication sector development is the substantial increase of the number of personal computers bought by the Moldovans. According to some estimates¹⁵, annually in Moldova over 50,000 new computers are installed and around 1% of families have got a computer. The most recent available data¹⁶ show that at present in Moldova there are over 25 active Internet service providers of fixed-line telephony. The penetration rate for accessing the Internet is about 20%, while that of mobile telephone system reached the penetration level of 41.31% in May 2007 with 1.42 million users.

¹³ The infrastructure components are evaluated here by using a 1 to 4.3 scale according to the EBRD methodology.

¹⁴ The considered indicators are related to time of delay for getting a connection to the electric power network in days; the number of days of electrical outages; the number of days of water supply failures; and the delay (days) for getting a mainline telephone connection.

¹⁵ These estimates are based on a study carried out by MIEPO in the sector of information services.

¹⁶ Data obtained from the ANRTI.

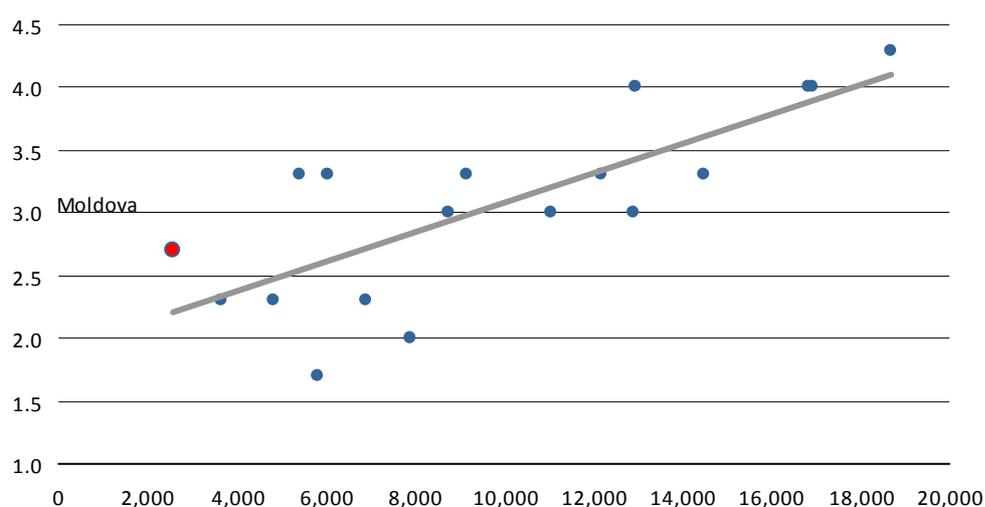
Currently, the legislation in the field of telecommunications establishes the requirements towards the operator's activity, technical conditions, licensing conditions and other aspects for rendering telecommunication services. The legislation also stipulates that the Ministry of Information Technology Development is the public authority that implements the Government policy in the field of information technology services, including the telecommunication services, and determines their development strategy. Concomitantly, the National Regulatory Agency for Telecommunications and Information Technologies (ANRTI) is the authority that regulates activities in the field of information technology services. Thus, the Ministry of Information Technology Development focuses on issues related to general management of information technology services, from the other side, ANRTI, which is considered as an independent body to regulate the information technology area, is responsible for the compliance of participants to the information technology service market with the legislative requirements, including those related to licensing.

Altogether, the total volume of sector revenues as percentage of GDP is around 11% (2006), which includes proceeds from services of fixed-line telephony both traditional and through the IP infrastructure, services of mobile telephony GSM and CDMA, pre-paid services of international conversations through the IP network, access to the Internet through dial-up and wide band in ADSL standard and by cable, and other information technology services as well. By the total volume of the information technology market, over 51% belong to services of fixed-line telephony, approximately 37% - to mobile telephony, 4% - to Internet and data conveyance services and the other 7% are split among cable and air TV, radio and other information technology services.

The largest participant to the market of IT services, especially to those related to services of fixed-line telephony, is the enterprise Moldtelecom – a state owned provider of telecommunication services. Moreover, starting with 2004, the telecommunication market has been liberalized in full, and the Internet service providers started to build up their own IP infrastructures to offer services of fixed-line telephony. However, the market share of alternative providers is estimated at 0.05% only.

A totally different situation may be remarked in the field of mobile telephony. The development of this sector was started by the launch of a private service of mobile telephony in 1997. At present there are two operators/providers of mobile telephony of GSM standard, the third license has been granted to a company with Russian capital, which is planning to launch its service within the next several months. In addition to them, in March 2007 Moldtelecom launched its service of mobile telephony of CDMA standard that is available across the country.

Taking into account the aforementioned and the regression over GDP (Figure 22), it is possible to conclude that the telecommunication sector in Moldova is developed adequately, which is less true for "wireless" technologies for data conveyance the latter being still underdeveloped; for instance, such services as WiFi and WiMax are insufficiently available even in Chisinau – the country Capital.

Figure 22. Quality of the Telecommunication Infrastructure versus PPP GDP per capita, USD

Source: EBRD, *Transition Reports 2003 – 2007, Infrastructure transition indicators*

5.3 Water Supply Infrastructure

The water supply infrastructure, in its turn, is usually referred as being of poor quality and reduced safety of water supply and sewerage services. In those places where such services are available, the Moldovan companies complain less than those from the regions (Figure 21 from above). Around 80% of urban inhabitants are connected to centralized networks of water supply and 63% - to water sewerage systems. In the rural area and small towns the coverage with water supply services is approximately 60% and about 35% - with water sewerage services¹⁷. The regression of quality of water supply infrastructure plotted against country's GDP suggests that for its level of development, the country has a relatively good water supply network (Figure 23). However, this estimation alone cannot provide an overall picture of the endowment with water supply infrastructure since the "quality" refers only to the places where water supply exists.

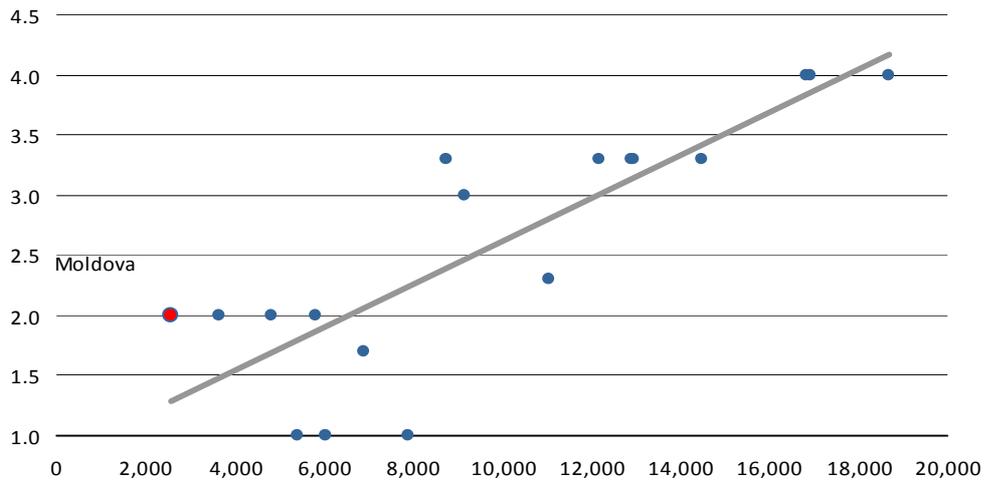
We have to mention that the water sewerage networks and those of residual water treatment have a limited capacity and have been deteriorated after a long period of weak or even lack of maintenance works. The quality of water supplied to consumers is of poor quality in general, and the service is considered as intermittent¹⁸.

The Agency for Constructions and Territorial Development (ACTD) is the central authority responsible for developing and promoting the state policy in the field of water supply and water waste management. As for villages and small towns, the water supply and sewerage networks are operated by semi-autonomous institutions (Apă Canal), which are accountable to the local public administration bodies.

¹⁷ Data obtained from the Agency of Constructions and Territorial Development.

¹⁸ An assessment of the actual state of Public Water Supply and Sewage Sector was conducted as part of the Strategy of Water Supply and Sewage in Communities of the Republic of Moldova.

Figure 23. Quality of the Water Supply Infrastructure versus PPP GDP per capita, USD



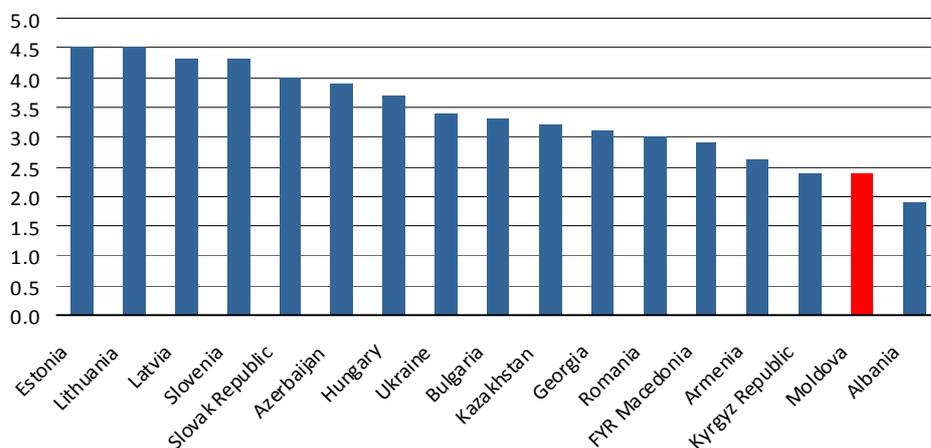
Source: EBRD, Transition Reports 2003 – 2007, Infrastructure transition indicators

In general, investments in stations for residual water treatment are far behind the needs because initially the target was to rehabilitate the water supply existing systems in order to make the water production and consumption more efficient. Other key-issues of this sector to be emphasized are related to reduced capacities of Apă Canal institutions to collected proceeds sufficient to cover adequately the operational and maintenance costs, without mentioning investments, procedures for establishing excessively politicized tariffs and regulatory issues.

5.4 Ground Transport Infrastructure

Among all components of the infrastructure of the Republic of Moldova, the ground transport infrastructure is, probably, the component that currently needs the greatest attention. According to the classification developed by the World Economic Forum, in terms of quality of the ground transport infrastructure, Moldova has been placed almost at the end, exceeding Albania only (Figure 24).

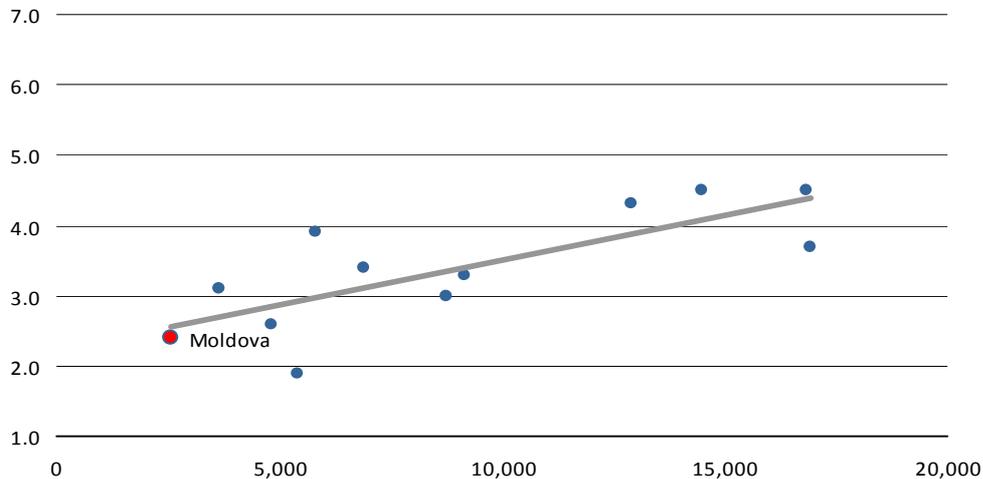
Figure 24. Classification of the ground transport infrastructure quality, Scale 1 (inadequate) – 7 (adequate)



Source: World Economic Forum, WEF Rating, 2006

The regression versus GDP (Figure 25) supports the statement that the ground transport infrastructure is inadequate, since Moldova is positioned under the regression average line.

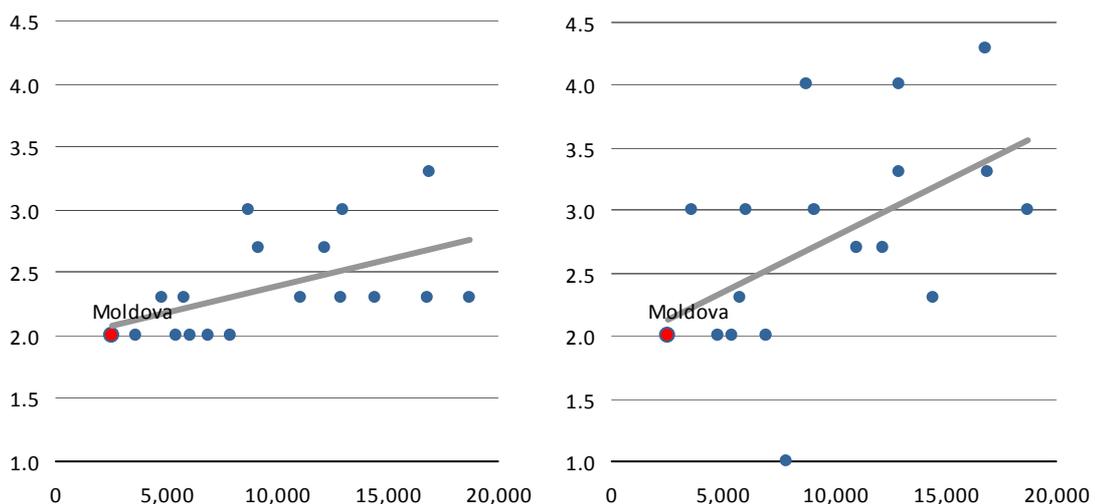
Figure 25. The quality of ground transport infrastructure (WEF evaluation) versus GDP per capita, PPP, 2005, USD.



Source: World Economic Forum, WEF Rating, 2006

Computations performed based on the EBRD evaluation in the Transition Indicators reports confirm the same thing – even if considered separately, both components of the ground transport infrastructure, roads and the railways, are situated under the regression lines (**Figure 26**).

Figure 26. Quality of roads and railways infrastructure (EBRD evaluation) versus GDP per capita at PPP, USD



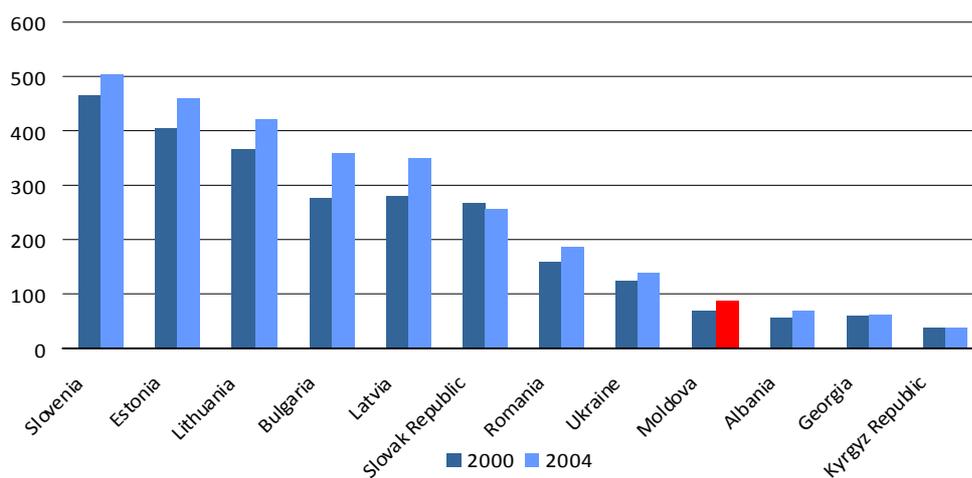
Source: EBRD, Transition Reports 2003 – 2007, Infrastructure transition indicators

The importance of the Moldovan road infrastructure is conditioned by the fact that due to its geographical position, the country may be considered as the gate between the CIS members and South-Eastern Europe. This assumption is even more accurate in case we take account of commercial contacts, spoken languages and the culture of this region of Europe. Since Moldova today is a border country with the

European Union and with other countries situated to the East, the Pan European IX Corridor (Moscow – Kiev – Chisinau – Bucharest) that crosses the country from East to West is expected to gain a bigger role.

However, keeping in mind the status of the Moldovan road network, it seems that the newly emerged opportunities could be lost, and the country would not be able to benefit from them properly due to its deteriorated ground transport infrastructure, and, especially, due to its out-of-date road network.

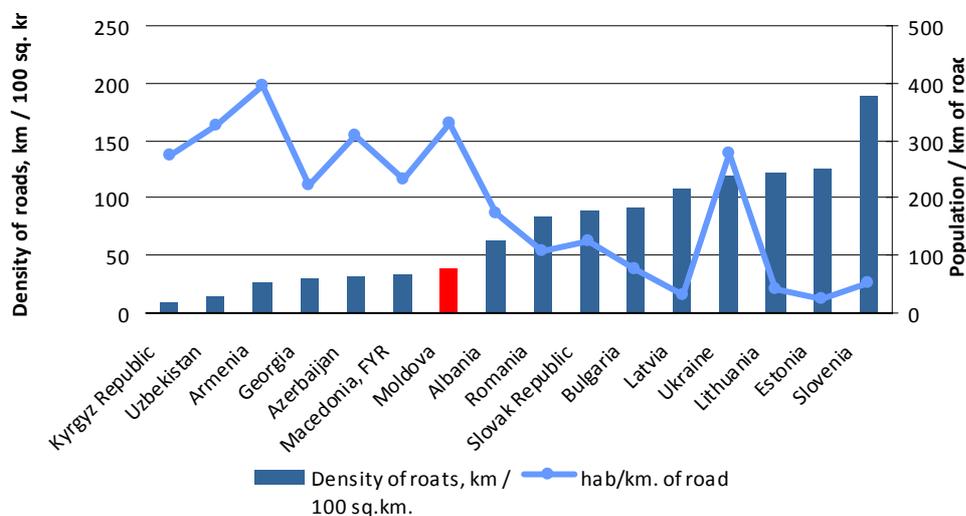
Figure 27. Motor Vehicles (per 1,000 inhabitants)



Source: World Development Indicators, World Bank, 2005

According to the available data¹⁹, the total length of the road network in Moldova is approximately 16,800 km, out of which 3,600 km are classified as national roads and the rest as local roads. Taking into account the country size, its population, and the number of vehicles per 1,000 inhabitants (Figure 27), the size of the road network *per se* could be considered as adequate, without any need to expand it substantially at present.

Figure 28. Density of roads and the number of inhabitants per 1 km of roads



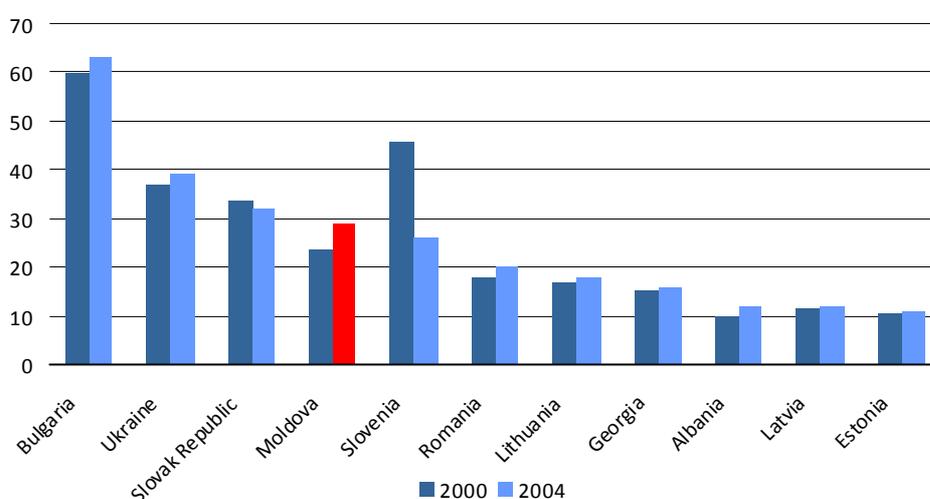
Source: Authors' computations based on the World Development Indicators, World Bank, WDI 2004

¹⁹ Data obtained from the Ministry of Transportations and Roads.

Despite of that, the conditions may change in the future. If in terms of the density of roads per 100 sq. km the situation seems to be acceptable, taking into consideration the number of inhabitants per one km of roads (Figure 28), we can draw the conclusion that along with the economic development, enhancement of population's welfare and increase in the number of cars, the Moldovan roads could become rather congested in the not so far away future.

In fact, even in case of considering the number of cars per one km of roads in 2004, at that time the Republic of Moldova was already among the top reference countries, having registered a more evident growth of traffic density versus other countries in comparison with the situation of 2000 (Figure 29).

Figure 29. Motor Vehicles per 1 km of roads

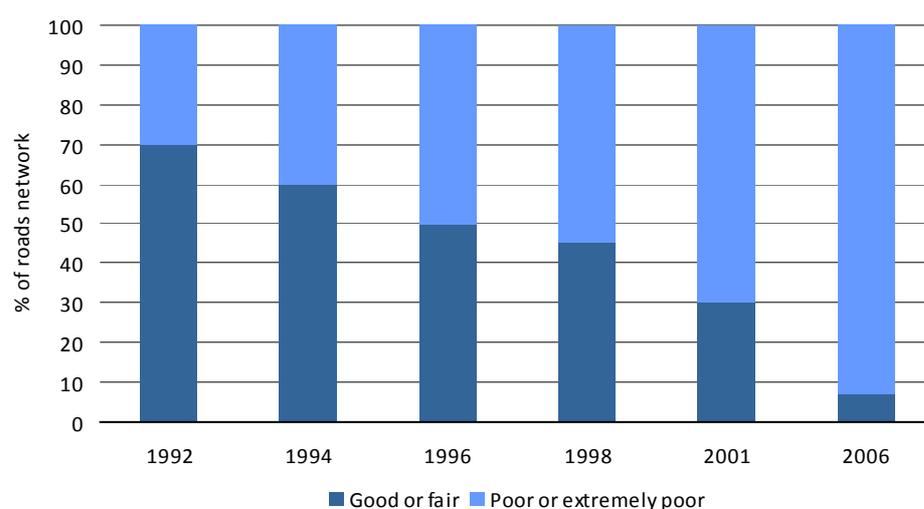


Source: World Development Indicators, World Bank, 2005

In this way, in terms of road infrastructure, it seems that the major problem is the quality of the existing network. In a Study conducted by the World Bank it has been mentioned that if the Moldovan road network would have benefited from proper maintenance works, its asset value would be about 12 billion USD²⁰. Along with that, despite the fact that nearly 90% of all roads are paved, according to an assessment conducted in 2001, more than 67 % of national roads and over 75% of local roads are considered to be in poor condition. The latest evaluations²¹ reveal that the proportion of roads in poor and very poor condition is getting close to 100% (Figure 30).

²⁰ An assessment of the national road network asset value was conducted as part of the World Bank Report WB 2006 Public Expenditure Review.

²¹ The latest evaluation of the country road network status was conducted in December 2006 – February 2007 within the WB support for preparing the Transport Sector Strategy of the Republic of Moldova.

Figure 30. Evolution of the Moldovan road network status

Source: The World Bank 2006 Report on Public Expenditure Review, Transport Chapter

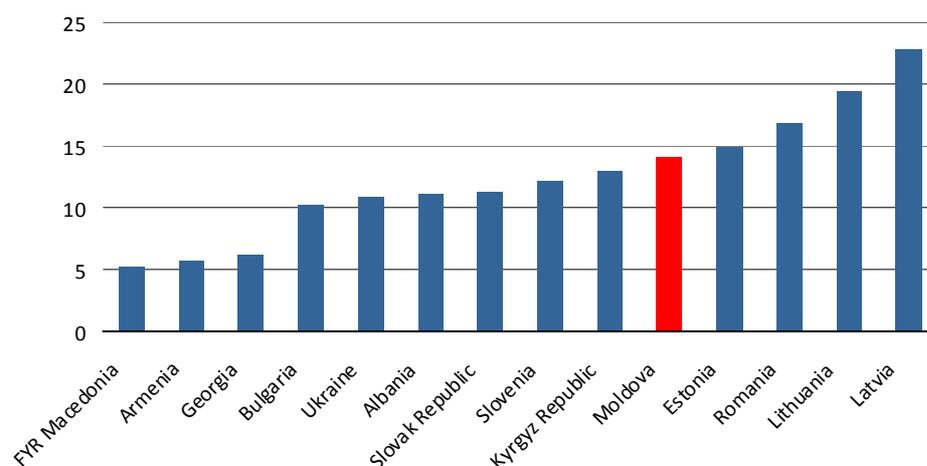
This is the direct result of long-term negligence towards the roads within the last 15 years, in the course of which few resources have been spent for road rehabilitation and maintenance. About 400 km of roads that were asphalted some time ago, have lost the asphalt layer and have been transformed into roads paved with gravel or even unpaved. The current asset value of the road network is estimated at only 8.4 billion USD versus 12 billion USD in case the network would have been maintained in a proper condition. The loss of asset value due to inadequate maintenance and rehabilitation is estimated at 3.6 billion USD, which is a significant amount, if we take into account the country GDP for 2006, which is only close to this figure.

In a series of studies conducted previously²², it is shown that just the vehicle operation costs on roads of poor quality are by 30% higher versus the situation when they circulate on good roads. This figure does not include the losses associated with the increased number of accidents due to poor road condition, which are also quite large (Figure 31) even in comparison with countries that have more cars per 1,000 inhabitants (Figure 27).

In terms of vehicle operating costs, the most recent studies²³ show that, in fact, depending on the vehicle type and the road status on which the vehicle is exploited, the losses (30% of operational costs) may vary from 9.7 and 2.2 US cents per one run km, while the cumulative losses incurred by all users of national roads during 1997 – 2006 amounted 1.8 billion US Dollars.

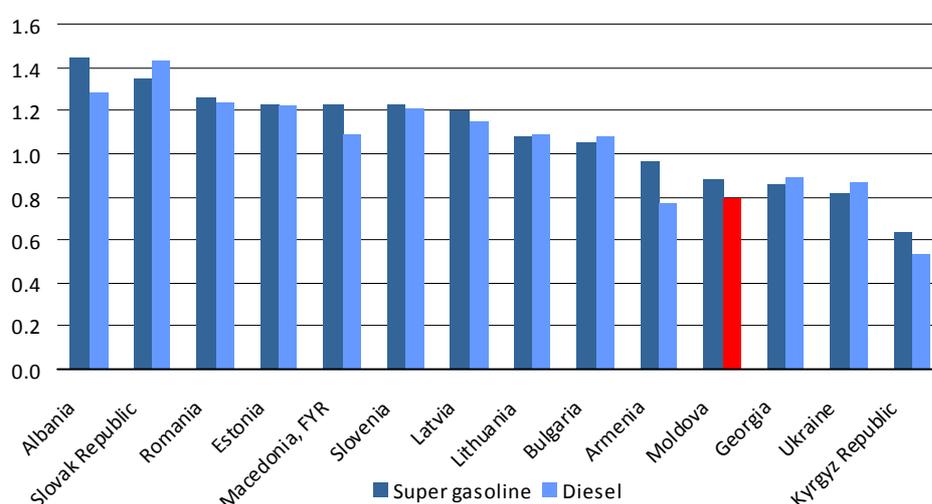
²² Studies conducted in 1994, 1998 and 2001 with the EBRD support show an essential increase of vehicle operating costs in the conditions of circulation on poor maintained roads.

²³ The WB 2006 Report on Public Expenditure Review, Transport Chapter.

Figure 31. Mortality caused by road accidents, cases per 100,000 of population, 1998 – 2003

Source: World Development Indicators, World Bank, 2007

At present, with the support of the World Bank, a strategic policy paper is being developed that would address the issues related to maintenance and rehabilitation of the national road network, including the finance needs and establishing a transparent system for collecting the necessary financial resources. Keeping in mind the low price for gasoline and diesel oil in comparison with the countries from the region (Figure 32), a potential price increase by levying a relatively small fee per liter of fuel would reduce the problem of financing the maintenance of the Moldovan road network.

Figure 32. Prices for gasoline and Diesel fuel in 2006, USD per liter

Source: World Development Indicators, World Bank, 2007

The aforementioned strategic paper points out that the most important reforms in the road sector would be those related to the establishment of a reliable and stable mechanism for financing the road maintenance, reforming the approach towards road maintenance and introducing a system for checking the weight on axle in order to reduce the circulation of overloaded trucks on the country roads.

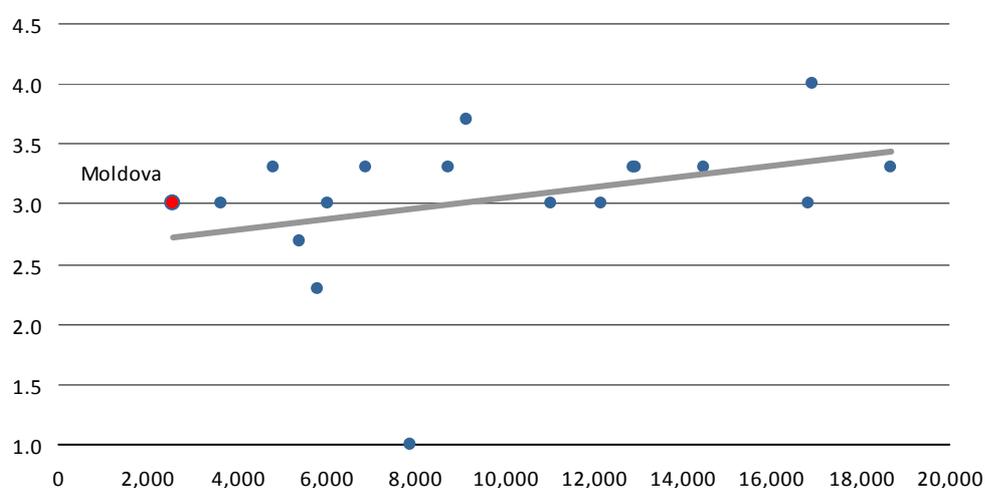
5.5 Energy Infrastructure

The energy sector infrastructure is more or less adequate, still it records a slightly elevated level of losses in the process of transportation and distribution of electric power.

The Energy Sector in general and its branches of electric power generation and distribution in particular, is considered as one of the main sectors of the Moldovan economy, which, to some extent, determines the success in implementing the national development programs and economic stability in general. Access to electric power is granted across the country regardless of the location. The electric power represents about 23% of the total energy consumption. The residential sector consumes around 39%, being followed by the trade and public sectors with 29% and by industry with 23%.

In comparison with the Road and Water Supply Infrastructures, the Power Generation Infrastructure seems to be in a slightly more favorable situation. This conclusion is confirmed by the regression versus GDP per capita (**Figure 33**), which places the status of power engineering above the average regression line, which means at first glance that the Power Engineering Infrastructure, even if it is a constraint, the latter is not a binding constraint.

Figure 33 Quality of the Electric Power Supply Infrastructure versus GDP per head at PPP, USD.



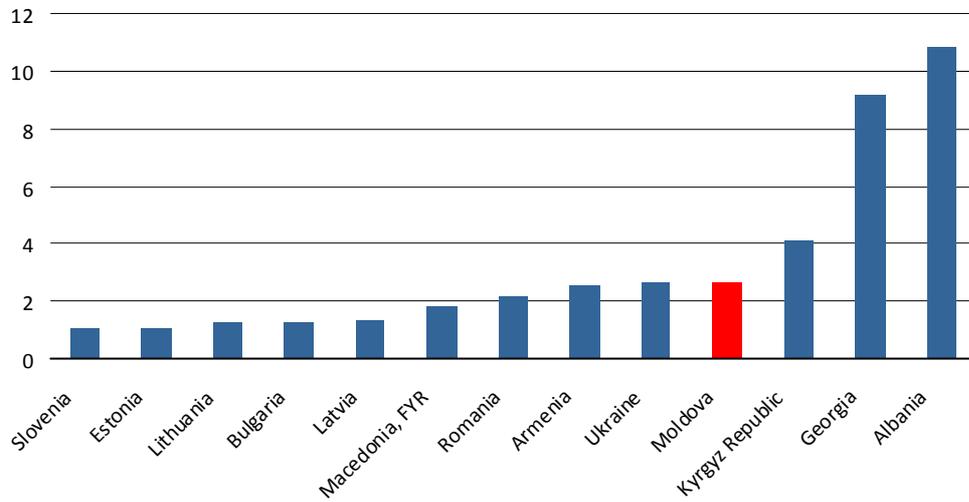
Source: EBRD, *Infrastructure Transition Indicators*, 2006

Value of sales lost due to deficiencies in electric power supply does not indicate something outstanding, Moldova being placed among the countries with average losses (Figure 34).

However, the current situation in the power generation sector of the Republic of Moldova is not pretty stable yet and it could worsen in the future. In this context it should be mentioned that Moldova receives electricity from two sources. The first source is represented mainly by three stations with heating systems that work on natural gas. These stations co-generate approximately 30% of the domestic

consumption of electric power in the process of production of thermal energy for Chisinau and Balti.

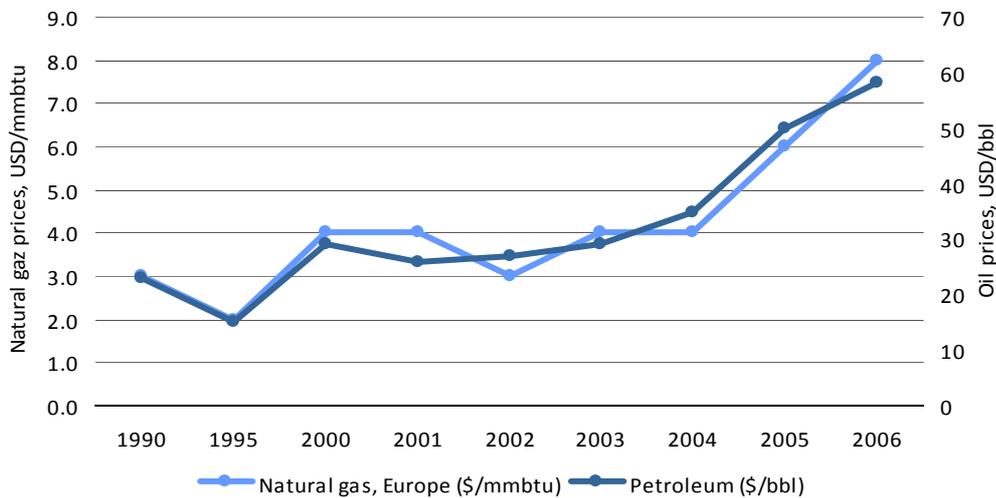
Figure 34 The lost value due to deficiencies in electric power supply, % from sales.



Source: Enterprise Survey, World Bank, 2005

The second source is represented by the imports from Ukraine, covering cover about 70% of the energy consumed. In the past, a significant part of the country electric power needs was covered by the Electric Station from Cuciurgan²⁴, which currently does not supply electric power to the right bank of Nistru River.

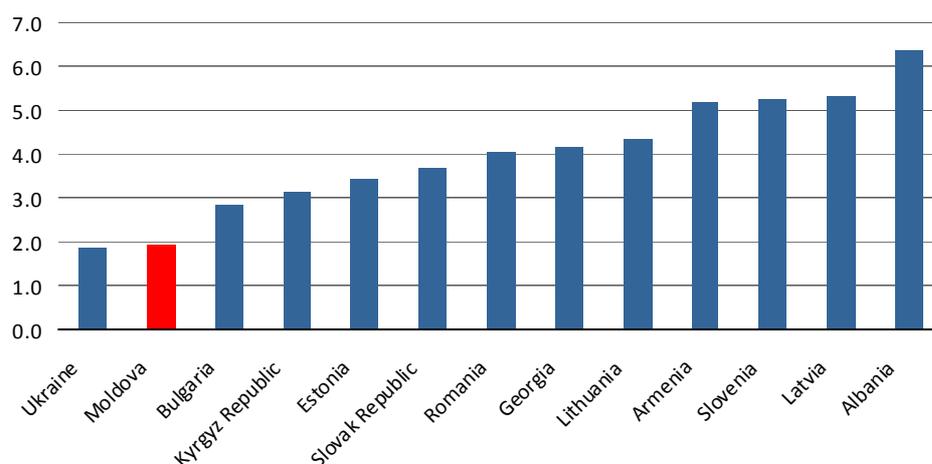
Figure 35. Average prices for petroleum and natural gas on the European markets.



Source: World Development Indicators, World Bank, 2007

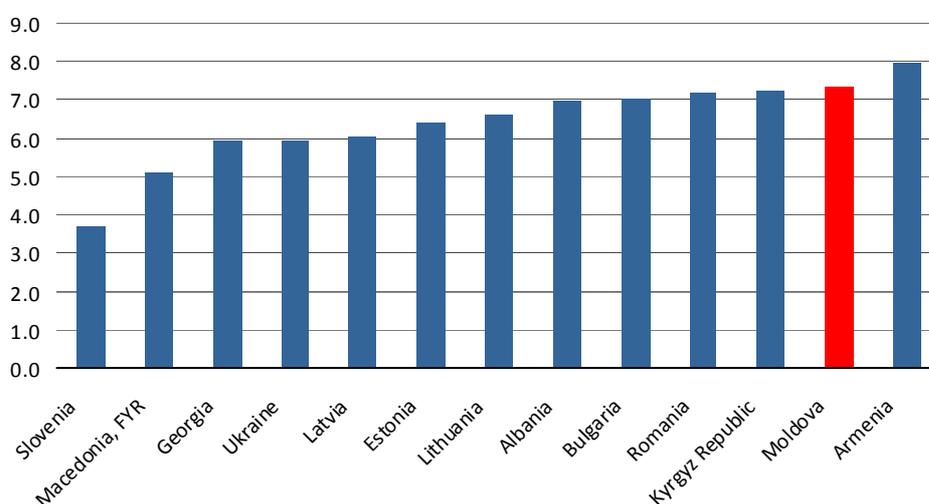
Due to the fact that the Moldovan electric power generating facilities use natural gas only, which price increased more than twice starting from 2006 on the background of augmentation of prices for oil and natural gas on the international markets (Figure 35), and in the next couple of years prices may go up even more, the price for electric power will grow for sure.

²⁴ The Station from Cuciurgan is the largest in the region, located on the left bank of Nistru River that currently is not under the control of Moldovan authorities.

Figure 36. GDP per one unit of energy used (2000 PPP USD/ kg oil equivalent)

Source: World Development Indicators, World Bank, 2005

Certainly, the energy price increase may reduce from competitiveness of Moldovan enterprises because the energy in Moldova is used inefficiently at present, which is confirmed by the volume of GDP obtained per one unit of energy used (Figure 36), which shows an alarming high level consumption of energy. The same alarming situation is confirmed by the energy consumption as a proportion of sales (Figure 37).

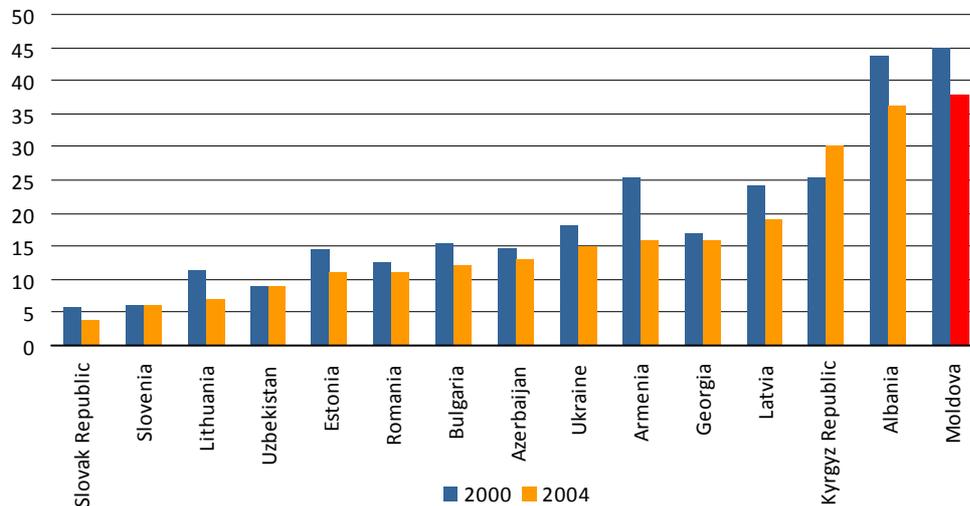
Figure 37. Energy consumption, % of sales

Source: Enterprise Survey index, World Bank, 2005

The arrangements for electric power imports from Ukraine may have positive implications in terms of vulnerability to the price level of electric power. Even if we take into account the fact that this agreement is valid until the end of 2007, and the price for electric power will grow, it is noteworthy that the electric power from Ukraine is a mixture of energy generated by nuclear stations (45%), by stations that use natural gas (31%); by stations that use coal (18%) and by stations that use other sources (6%). As a result, the price per electric power should be less sensitive to changes in prices for natural gas, and the Moldovan companies might

benefit to some extent from relatively smaller prices for electric power. A constraint here could be the limited capacity to interconnect the Moldovan and Ukrainian electric power grids.

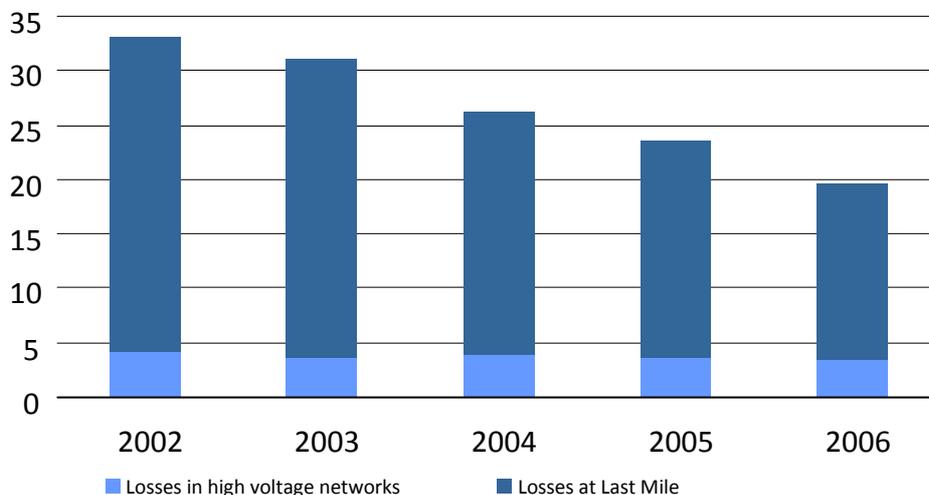
Figure 38. Losses of electric power in the course of its transportation and distribution, % of obtained energy



Source: World Development Indicators, World Bank, 2005

In any case, the issue of increased consumption of energy does not cause major competitive disadvantages as long as Moldova benefits from reduced prices for energy. However, taking into account the worldwide upward trend of prices for energy resources (including electric power), it could be the case that in the nearest future the country will face an important problem aggravated by the losses incurred during transporting and distributing of the electric power. According to the World Development Indicators (Figure 38), Moldova ranks the first in terms of electric power losses in the course of its transportation and distribution with over 35% in 2004.

Figure 39. Losses of electric power in the course of its transportation and distribution according to the ANRE data, % of obtained energy



Source: National Energy Regulatory Agency, 2007

Data retrieved from the National Energy Regulatory Agency (ANRE) show actually a smaller percent of losses in comparison with the World Development Indicators (**Figure 39**). But taking into account the volume of losses of over 25% recorded in 2004, this fact does not change radically the position of Moldova versus the countries selected for analysis. However, it seems that largest losses are recorded at the distribution stage, and the distribution companies try to undertake specific measures to mitigate these losses.

In conclusion, we can mention that the situation in the Moldovan energy sector is characterized by a quasi-total dependence (approximately 97%) from imports of primary energy resources and reduced availability of import sources for electric power and natural gas. The limited capacities of domestic facilities to generate electric power (30% from the needs only) on the right bank of Nistru River and weak capacities to interconnect the Moldovan energy system with the European systems represent another issue. We have to mention here that, according to the field-related expert opinions, even the structure of the existing grid for transporting the electric power does not correspond to requirements for ensuring the country energy security.

In the same context, limited investments in energy sector rehabilitation and development led to an advanced physical depreciation of the sector equipment: approximately 60% of equipment is used for an over 30-year period and 40% of equipment is used during more than 40 years. This situation conducts to a reduced quality of electric power supply services as well as to enhanced losses in the course of energy transportation and distribution, and ultimately, to low sector efficiency.

During the past several years, the Government has undertaken actions aimed at reforming the energy sector by developing and adopting decisions aimed at sector de-monopolization and decentralization, and promotion of competition by attracting and encouraging private investments on the energy market and improving the energy and economic efficiency. In spite of the carried out efforts, the situation in the energy sector continues to remain tense. It is envisaged that the current situation may be addressed through continuing the economic reform in the energy complex and expanding the relations with the external energy markets.

Altogether, the available evidences suggest that infrastructure components are developing unequally, some urging for more additional attention than others.

With respect to the quality of the infrastructure in general, based on the performed Analysis, one can draw the conclusion that the telecommunication sector has got fewest problems (Table 2). The electric power and water supply and sewerage infrastructures, although they need attention in terms of investments and services quality, it seems that they do not represent binding constraints to business development, at least now. And finally, the road infrastructure seems to be the area mostly affected by the shortage of investments, which affects both the population and business development, especially in the regions.

Table 2. Assessment of Infrastructure Components of the Republic of Moldova

Infrastructure	Status ²⁵
Telecommunications	+
Water Supply and Sewerage Services	+ / -
Roads	-
Electric power	+ / -

Although the Moldovan companies do not complain too much about the infrastructure constraints, it seems that the companies have been established mostly in those areas where the infrastructure is not an issue; for instance, more than 50% of all Moldovan companies are established in Chisinau and their contribution to the country GDP exceeds 50%. The clusters of companies in Chisinau boost up prices for the production factors (e.g. human resources and immovable properties) in the Capital in comparison with the rest of the country. One conclusion in this context would be that the road deteriorated infrastructure mitigates the labor force mobility. And the price discrepancy for the production factors is an implicit indicator of regional gaps in availability of infrastructure components.

²⁵ "+" – good conditions; "+/-" – relatively poor conditions but currently do not represent a binding constraint; "-" – poor conditions that could represent a binding constraint;

6 Innovations

All research tools employed during the analysis consistently suggest that ability to innovate and to use the results of innovations is not the binding constraint in Moldova.

This result is quite provocative given that „Moldovan companies do not innovate” and „Moldovan products are not competitive” are two of the most widely circulated statements with respect to the Moldovan economy. Indeed, the Moldovan wines have not penetrated extensively the Western markets, while domestic consumers from Chisinau have noticed the substitution of local juices and drinks on the supermarket shelves with products from Ukraine and Turkey.

Such casual remarks are related to traditional highly visible products. At the same time, Moldova’s comparative advantage may simply lie in new export-oriented products and not in some of its more visible traditional products. The progress in such innovations is less visible from the ordinary consumer’s point of view.

6.1 Conceptualization and Data

From the growth point of view, the role of technological advance consists in introducing new products and enhancing the quality of the assortment of current products. This process occurs differently depending on country position vis-à-vis the technological frontier:

- Countries on the frontier (with high tech) design new products and establish new quality/performance standards; and
- Countries below the frontier, which have out-of-date production technologies, reduce the distance between the country technological level and the world technological scope/edge through technological imitation and adjustment of the existing products and tech.

The real technological advance usually results in enlarging the list of goods produced by the country (sophistication) and enhancing the quality of the existing products²⁶. Records about the number of produced goods are not available, but there are data about the number of exported goods. Focusing on exports provides an additional benefit – the exported goods are competitive by definition, or correspond to minimum quality standards.

²⁶ Some economists argue that indeed, for a rapidly developing country the number of produced goods in dynamics follows a U-shape pattern, i.e. it increases fast when the country is intensively exploiting the benefits of technological progress, but also takes a slight downward trend after a certain critical point. In any case we can assume that Moldova did not pass such point yet.

Let us estimate the Moldovan economy innovation capacity and innovational performance through:

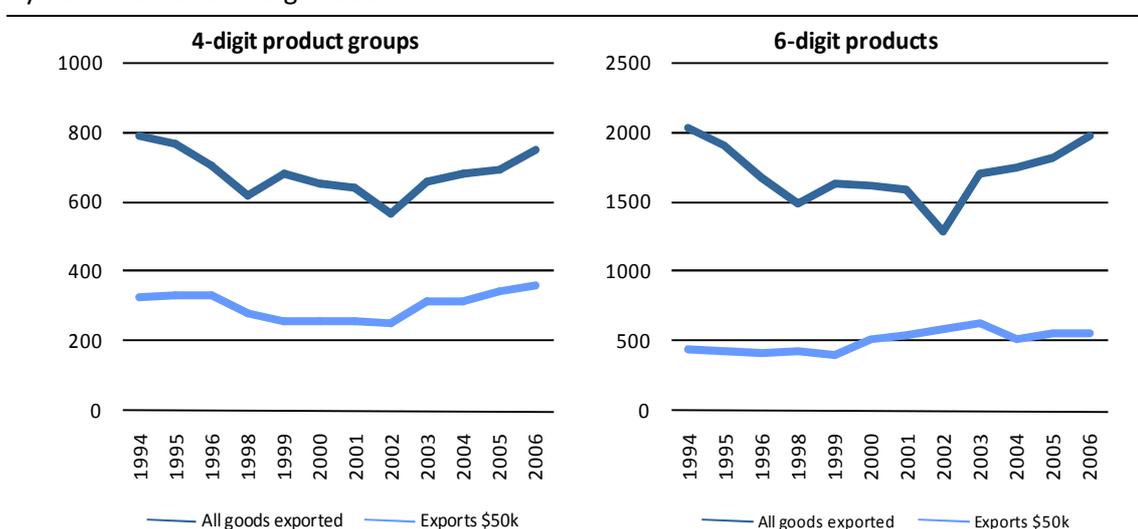
- Evolution of the export sophisticated level and cross-country performance comparison in this area;
- Comparative performance in registration of patents of inventions as a measure of R&D;
- Comparative performance in adopting innovations at the enterprise level.

In order to assess the export sophistication we will use the ComTrade database²⁷, compiled by the UN with products grouped according to the *Harmonized System* classification up to four digits (groups of products) and six digits (products).

6.2 The Export Basket Size and Composition

Lately, Moldova has recorded evident increase in the number of exported goods: from 653 products in 2000 to 751 in 2006, which is a 15% growth. This evolution is represented by the left panel of Figure 40. On the same panel one can see that the number of export goods totaling over 50 thousand USD (adjusted to dollar inflation) grew up even more: by 40%. The right panel displays the increase in the number of six-digit products according to the *Harmonized System*.

Figure 40. Evolution in the number of exported goods classified according to the Harmonized System four- and six-digit codes



Source: ComTrade and Authors' computations

Note: Data for 1997 are not reliable and have been eliminated from the Analysis

These graphs show that currently the Moldovan export basket is slightly smaller than it was in 1994. Concomitantly, the noticeable increase in the number of exported goods during the last several years may reveal a) discovery of new products, or b) mere resumption of exports of some traditional goods; the accurate answer may be found by analyzing the composition of the export basket.

²⁷ ComTrade, UN. <http://www.comtrade.un.org>. Requires subscription.

Table 3 below displays just some overlaps in the top ten Moldovan exports carried out in 1994 and 2006. Obviously, only two types of goods are comprised by both lists; hence the Moldovan export basket has suffered some major structural changes in the course of the past decade. This notification supports the hypothesis that the recent growth in the number of exported goods reveals the introduction of production innovations.

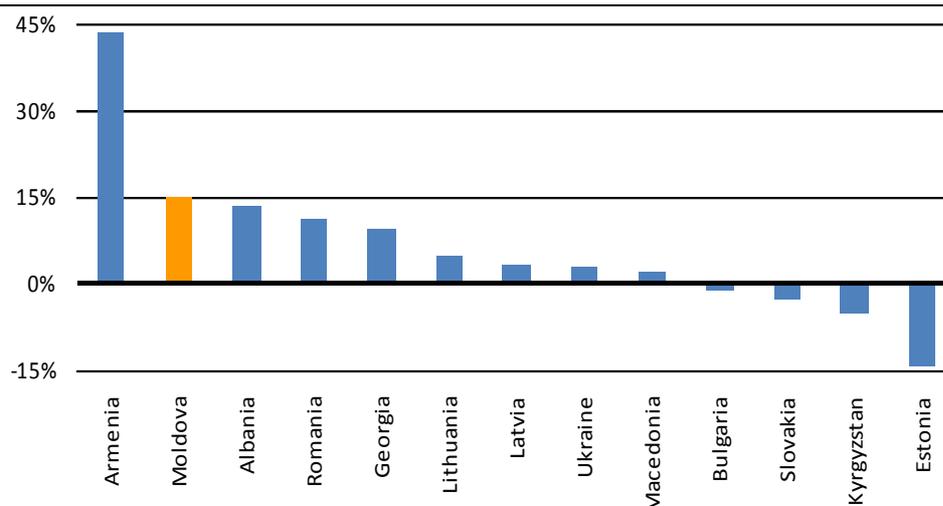
Table 3. The Moldovan top ten exports in 1994 and 2006, four-digits

#	1994			2006		
	Code	Description	Value, thousand USD	Code	Description	Value, thousand USD
1	2204	Grape wines, including wines fortified with alcohol; grape stum/must	62,280	2204	Grape wines, including wines fortified with alcohol; grape stum/must	161,081
2	2208	Undenaturated ethyl alcohol under 80%	33,456	0802	Other peel fruits, nuts, fresh or dried, shelled or peeled	37,479
3	1701	Solid cane or beet sugar and chemically pure sucrose	30,975	6203	Men' suits or ensembles	34,395
4	1005	Maize (corn)	30,974	1512	Sunflower oil	32,027
5	0806	Grapes, fresh or dried	23,969	6204	Women' ensembles, jackets, dresses, skirts, and trousers	31,931
6	0808	Apples, pears and quinces, fresh	23,885	6109	T-shirts and singlets, knitted or crocheted	27,808
7	2009	Fruits and juices, non-fermented	21,380	7010	Glass bottles, flasks, jars, mugs etc.	27,666
8	0202	Beef, frozen	14,517	7213	Iron laminated bars and rods	24,942
9	2401	Unprocessed tobacco	14,081	2208	Undenaturated ethyl alcohol under 80%	23,242
10	8528	TV receivers	13,499	2520	Gypsum, anhydride	22,712

Source: ComTrade, UN

We can argue that the shrink in the number of exported goods in the course of 1994-2001 was a natural consequence of the Moldovan economy opening to the world, and, more important, the opening of economies of the main trade partners. Within the new conditions, a large part of the export basket did not match the country real comparative advantages and, therefore, was replaced. Subsequently, Moldova managed to introduce new products, which contravenes the widely spread affirmations that Moldova does not innovate.

Moldova is among regional leaders on the pace of exports diversification. Figure 41 portrays the percentage evolution of the number of exported goods (2006 versus 2000) from Moldova and from other countries of the region. This evolution sustains the preliminary conclusion that the Moldovan economy not only is able to discover new products, but also does it successfully in comparison with other countries from the region.

Figure 41. Change in the number of exported goods, %, 2006 vs. 2000

Source: ComTrade and Authors' computations

6.3 Exports Sophistication Level

In order to analyze the sophistication level, it is necessary to turn from counting the export basket goods to their individual assessment. Therefore, we will use the index EXPY²⁸ to assess the sophistication level of the goods exported by a country. It is well-known that the developed countries focus on manufacturing more sophisticated goods, while the poor countries produce and export typical sets with less complex items. The EXPY index captures the complexity and sophistication of goods from the country export basket.

Export sophistication level of Moldova is high enough, suggesting that the country is able to use the results of technological progress and to adapt accordingly.

The Graph from Figure 42 ranks the exports sophistication indexes EXPY from over 150 countries versus GDP per capita from those countries (Moldova is highlighted in orange). First of all, we notice strong correlation between the GDP per capita and EXPY²⁹, which is due to the EXPY index structure. The position on the vertical versus the cross-country regression line shows the relative sophistication of country exports. For instance, the value of EXPY for Moldova is 8,439 USD, which is far higher than the predicted level (6,300 USD) for a country with such a level of GDP per capita.

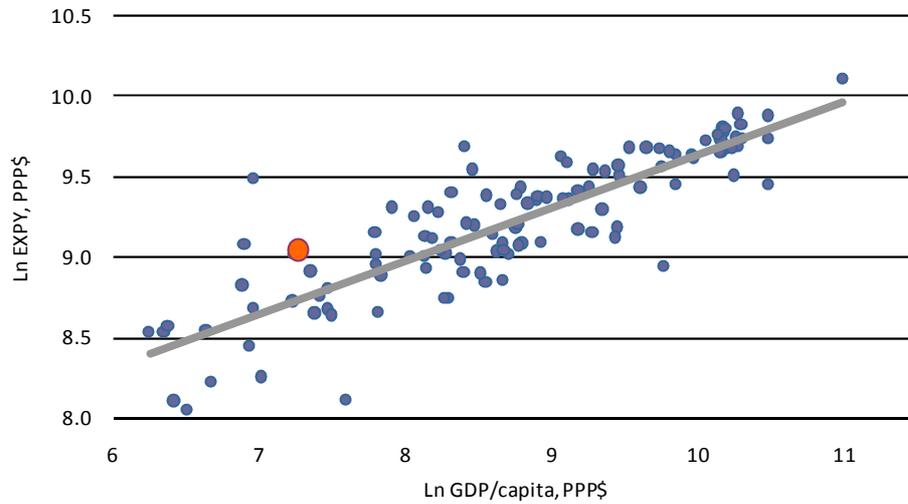
The sophistication index EXPY for Moldova, which is abnormally high, means that the country export basket is more sophisticated than expected. However, it is logically to presume that such a performance is quite common for all economies in transition since they have high potential of human capital and industrial

²⁸ Hausmann, Ricardo, Hwang, Jason and Dani Rodrik. 2005. "What You Export Matters". NBER Working Paper No. 11905. Available online at <http://www.nber.org/papers/w11905>. The October 2006 version available at <http://ksghome.harvard.edu/~drodrik/hhr.pdf>

²⁹ R²=73.3%

experience. Therefore, it is more appropriate to compare Moldova performance with other countries from the region.

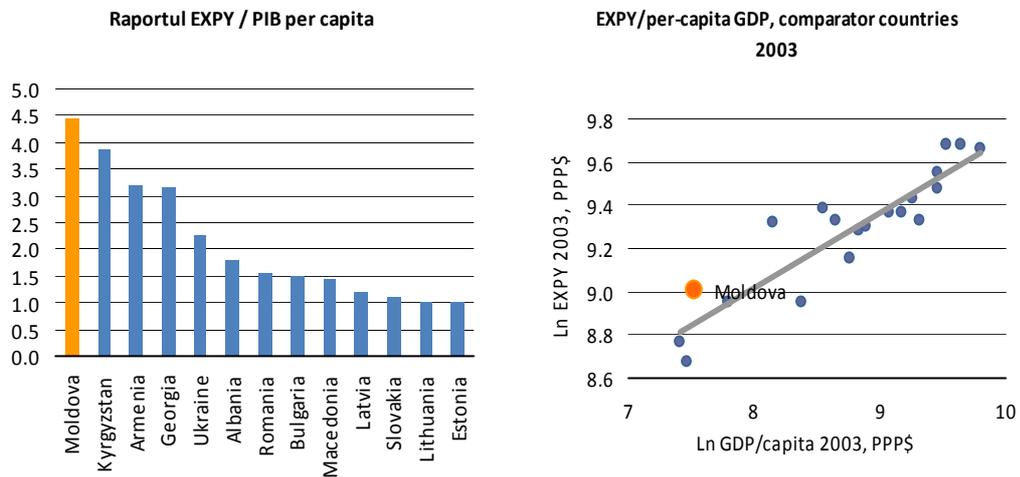
Figure 42. Correlation between GDP per capita and EXPY for the year of 2003



Source: Hausmann & Rodrik (2005)

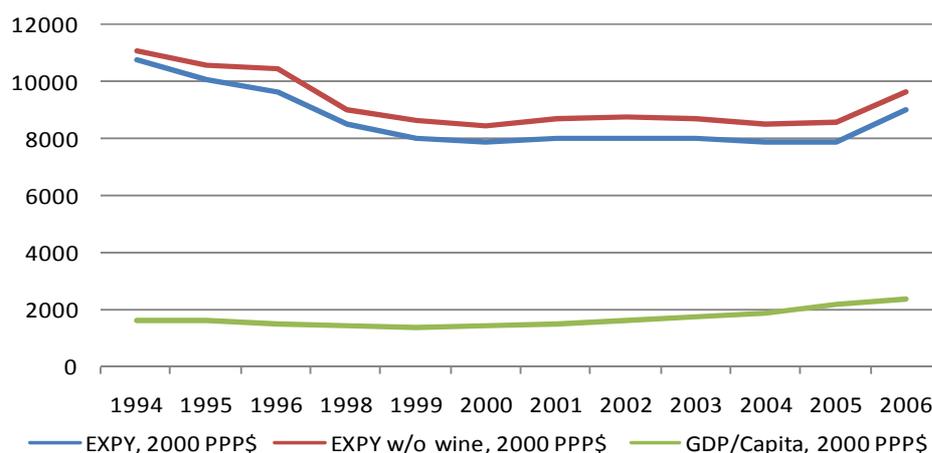
Figure 43 below displays the same cross-country regression for the group of comparable countries only. The left panel shows that Moldova has got high EXPY/GDP per capita ratio in comparison with the other countries. The right panel refreshes the regression for the countries in transition only. We notice that Moldova is above the regression line again.

Figure 43. Sophistication of exports for countries in transition, 2003



Source: Hausmann & Rodrik (2005), ComTrade, the Author's computations

A potential source of critique for having used the EXPY indicator for assessing the exports sophistication level results from the fact that the Moldovan basket of exported goods is prevailed by wine, which represents around 15% of the total exports. Worldwide, the wine is produced in the temperate zone of the Globe, dominated by rich countries.

Figure 44. Evolution of EXPY and GDP per capita for Moldova, years 1994-2006

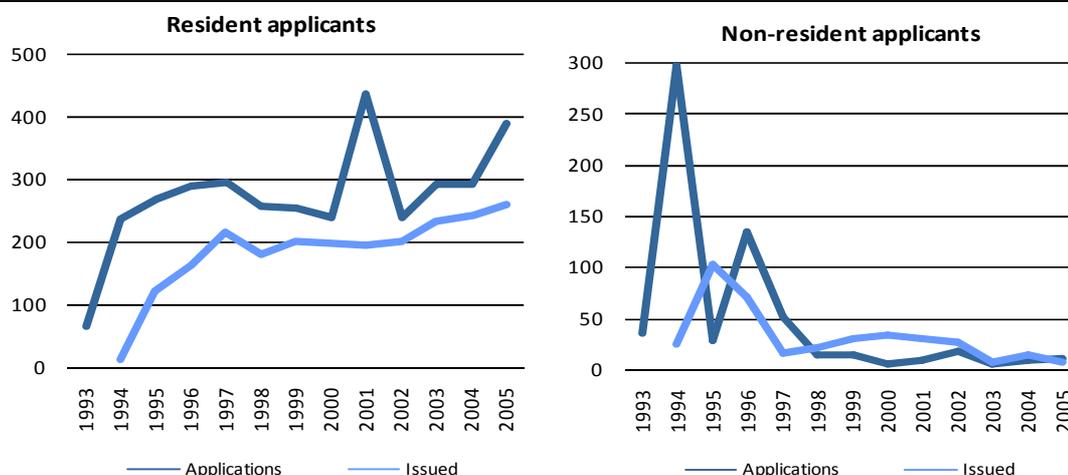
Source: Data from ComTrade. Authors' computations based on the PRODY data from Hausmann & Rodrik (2005)

Note: Data for 1997 are not reliable and have been eliminated from the Analysis

Figure 44 recomputed the EXPY for all Moldovan exports but wine. Contrary to expectations, the EXPY of this incomplete basket of exported goods is higher than the index for the full basket. We notice that the year of 2006 was specifically advantageous for the exports sophisticated level, which may be explained by the reallocation of investments from the winemaking sector to more sophisticated products.

6.4 Patents

The number of registered patents is much larger than expected from a country with such a size and development level as Moldova. The previous analysis was focused on the final outcomes of innovations. In addition, we can investigate the inputs of innovation, especially R&D.

Figure 45. Number of patents filed in Moldova, by the origin of applicants

Source: AGEPI. <http://www.moldovanpatentoffice.org/english/statistics.html>

Figure 45 shows the evolution of the number of requests for patents and the number of patents issued by the origin of applicants. The number of applications

from residents has got a stable upward trend, while the number of applications from non-residents dropped substantially.

Since we consider specifically the domestic capacity to innovate, we will focus on applications filled out by residents. In order to assess the performance of Moldova on a global scale, we can use the following regression:

$$\ln Patents = A + B_1 \ln(GDP/capita) + B_2 \ln(Population) + B_3 TertiaryEnrollment + e$$

The exogenous parameters of this regression are GDP per capita, population and the rate of higher education. The results are displayed in Table 4.

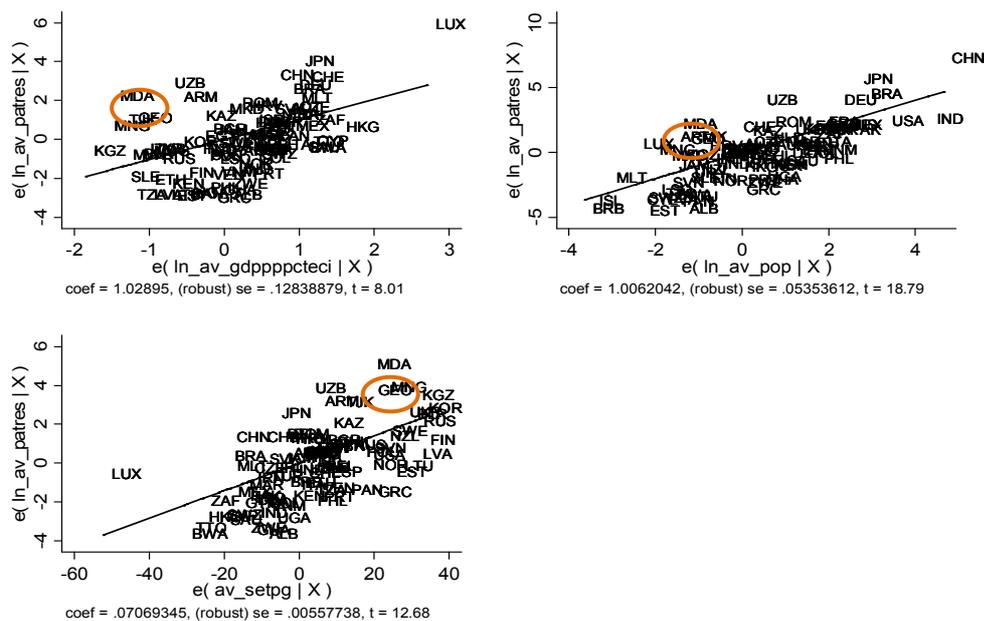
Table 4. Result of regression. Dependent Variable: number of patents per year

Variable	Coefficient	Standard Error	T-stat
Ln GDP/capita, PPP	1.029	0.1283888	8.01
Ln Population	1.006	0.0535361	18.79
Tertiary Enrollment	0.070	0.0055774	12.68
Constant	-22.958	1.461185	-15.71
			R²=0.7998

The Graphs below present the partial correlations for independent variables.

These graphs clearly show that the number of patents issued in Moldova exceeds significantly the expected patent level for a country with such GDP/capita, population, and tertiary enrollment. The regression predicts that the Moldovan residents should have filed for seven patents only; the actual number recorded in the course of 2000-2004 is around 300, or 43 times more than expected.

Figure 46. Partial correlation between the number of patents and the Regression of Independent Variables

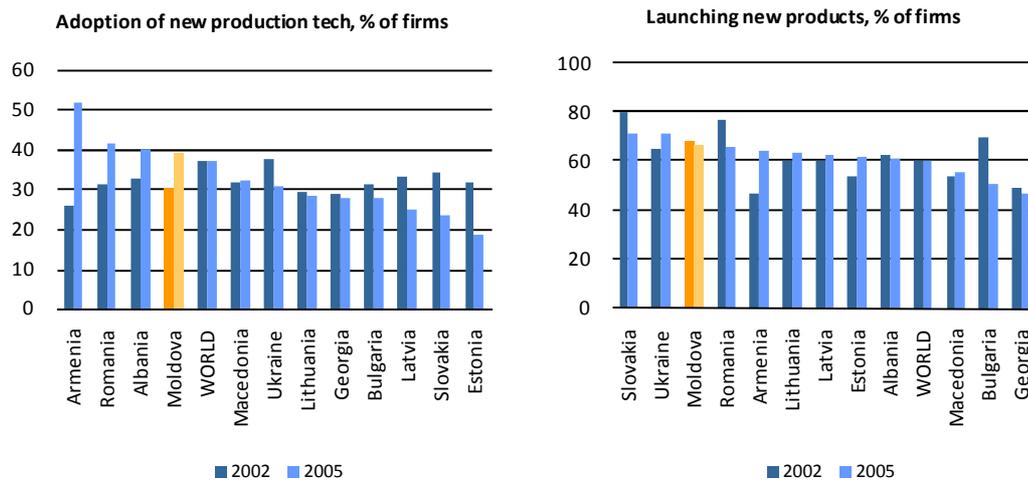


Source: Authors' computations using the data from the World Development Indicators 2007, World Bank.

6.5 Innovations at the Enterprise Level

The Moldovan enterprises are reaching the stage of intensified usage of technological advance. The capacity to acquire new skills/knowledge is just a pre-condition; a major importance belongs to the ability to introduce relevant changes in enterprise daily activities. Data collected by the „Doing Business 2006” Survey compare the performance of Moldova with other countries in terms of direct adoption of new products and technologies (Figure 47).

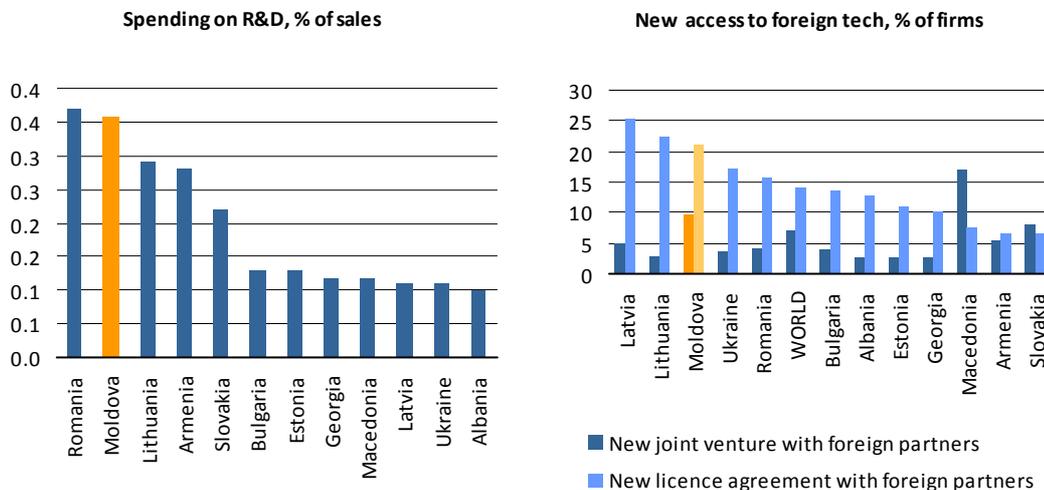
Figure 47. Adopting new production technologies and launching new products



Source: Doing Business 2006, World Bank

Moldova is roughly at the same level as other countries from the region in terms of the percentage of firms that have adopted new technologies, and among the leaders in terms of the percentage of firms that have launched new products. Remarkable, the country has got upward trends in the area of adoption new technologies (2005 versus 2002).

Figure 48. Technologic effort and potential access to foreign high technologies



Source: Doing Business 2006, World Bank

This trend is supported by additional evidences (Figure 48). The left panel shows that the expenditure on R&D incurred by the Moldovan enterprises as a percentage of total enterprise sales is higher than in most of the countries from the region. The right panel displays the potential for accessing foreign new technologies, comparatively with other countries from the region, expressed by the number of new joint ventures and the number of firms that concluded new licensing agreements with their foreign partners.

The overall conclusion of this Chapter is that the deficiency of innovations is not a binding constraint to economic growth. Compared to other countries, the exporters diversify successfully the traded goods, the researchers supply a large number of patents (which have a doubtful degree of implementation), and enterprises report positive innovation-related outcomes.

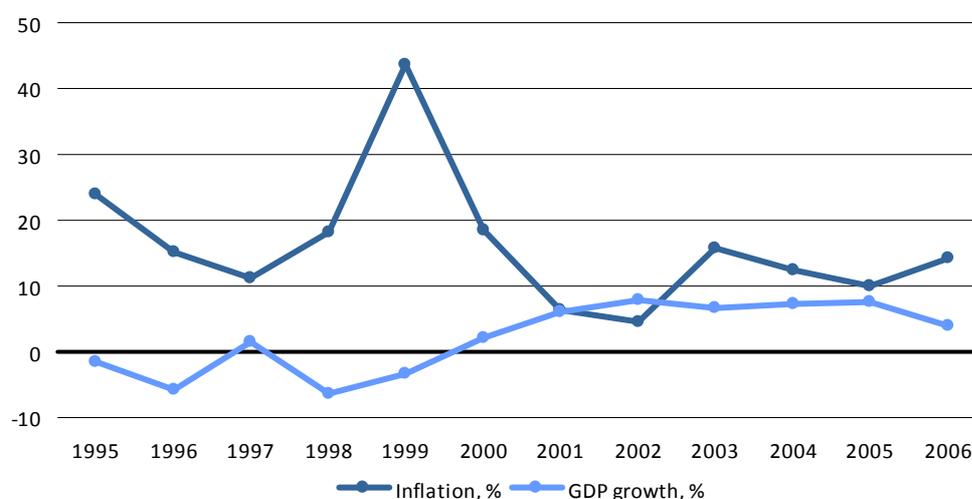
7 Macroeconomic Risks

7.1 Economic Growth

Moldova has registered a certain success in achieving macroeconomic stability and moderate economic growth.

Due to the delay in reforms and as a result of structural deficiencies and strong macroeconomic shocks, the Republic of Moldova has entered the transition period being poorer than the majority of the Central and Eastern Europe states, having gone through a transformational rather acute and long-term process (Figure 49). The year of 2000 revealed signs of slight re-launching of the national economy on the background of reduced inflation (in fact, the first signs of stalling the economic decline were noticed in the last quarter of 1999). The average growth rate of GDP recorded during 2000-2006 was 6.2%. The economic growth exceeded the average level recorded in Central and Eastern Europe (4.2%), but slightly lower than the average growth achieved by CIS countries (7.2%). The growth would have been resumed earlier and would have been much stronger should the Republic of Moldova manage to diversify the external trade and implement consistent structural and institutional reforms³⁰. The recovery of economy was partly conditioned by the macroeconomic stability, by an external environment relatively favorable and by the strong evolution of internal and external demand for consumption, fueled by remittances³¹. Furthermore, economic growth is associated with reduction of the inflation rate.

Figure 49. Economic Growth and Inflation rate Dynamics in the Republic of Moldova



Source: EIU Country Data, EBRD, IMF, NBM, 2006

³⁰ National Human Development Report, 2006

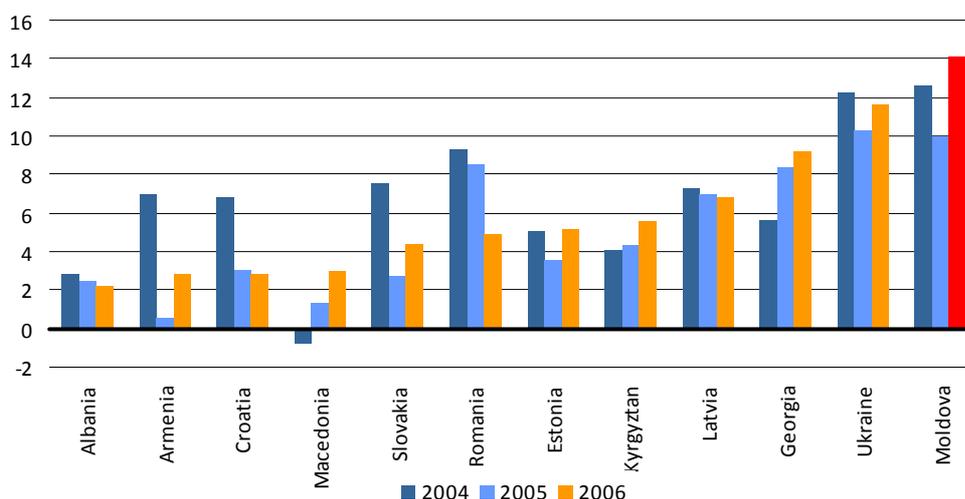
³¹ World Bank, 2005

7.2 Inflation

Inflation remains an important issue for the country economy. The National Bank of Moldova (NBM) has firmly stated its commitment to decrease inflation by all means. The reduction of inflation rate from about 2000% in 1993 to 4.4% in 2002 has established a positive trend towards stabilization of the Moldovan Leu. However, this reduction was preceded by certain tough fluctuations, in particular in 1998-1999, with inflation rate of 18.3% and 43.3%; that pulse was caused by the Russian financial crisis, and the Republic of Moldova was a captive of the distortion since approximately 70% of its external trade was with its Eastern partners. During 2001-2002, the National Bank of Moldova managed to bring inflation to one digit. But due to external shocks, inflation reached almost 12% during 2004-2006. Another factor that pushed inflation was considerable influx of remittances that spurred consumption.

Analyzing the evolution of prices in the Republic of Moldova, there is no particularly strong correlation between monthly and quarterly evolutions of monetary aggregates and inflation rate. This allows us conclude that in general, inflation in Moldova does not have a monetary feature, being generated mostly by non-monetary factors, in other words, it is imported. Moreover, Moldova imports approximately 95% of energy resources, most of them from Russia, respectively, directly or indirectly, this conjuncture has a definite impact over the rate of inflation³². The trends of inflation (comparative) recorded in the course of the past years are shown in Figure 50.

Figure 50 Inflation rates: regional aspects.



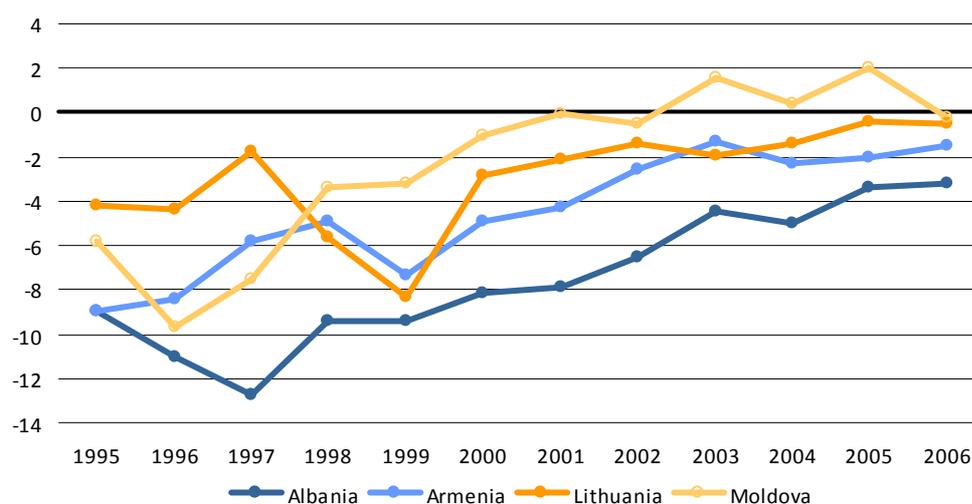
Source: EIU Country Data, EBRD, IMF, 2006

³² For instance, Gazprom suddenly increased the price for the natural gas supplied to the Republic of Moldova from 80 USD/1000m³ to 110 USD/1000m³ in January 2006, and, afterwards, to 170 USD/1000m³ in July 2006. These shocks had a negative impact on the economic growth and inflation indicators in 2006 and it is assumed that their influence will affect the next several years.

7.3 Budget Deficit

At present the budget deficit does not seem to be an issue for the economy. Since 2000, the budget deficit in Moldova has not exceeded 1% of GDP. Moreover, for several years (2003-2005) the state budget had a surplus, and that situation can be noticed clearly in Figure 51. However, things may complicate in case we expand the time horizon. The prolonged dialogue with the IMF experts does not consider, in general, this year; rather, it considers the perspective – appearance of inevitable constraints over the budget beyond the fiscal reform effects (fiscal amnesty, levying zero rate taxes on economic agents)³³. Should we add the expenses related to wage increase, the need to augment the allocations for education and healthcare, those related to infrastructure etc., we could come to an increase of budget expenditures of at least 3-4% of annual GDP, a scenario that could put some pressure over the public consolidated budget over the next years. Hence, the importance of building up a midterm budget becomes evident (multiannual budget programming/planning) and considering the tax policy in a broader context.

Figure 51. Budget Deficit: regional comparison



Source: EIU Country Data, EBRD, IMF, NBM, NBS, 2006

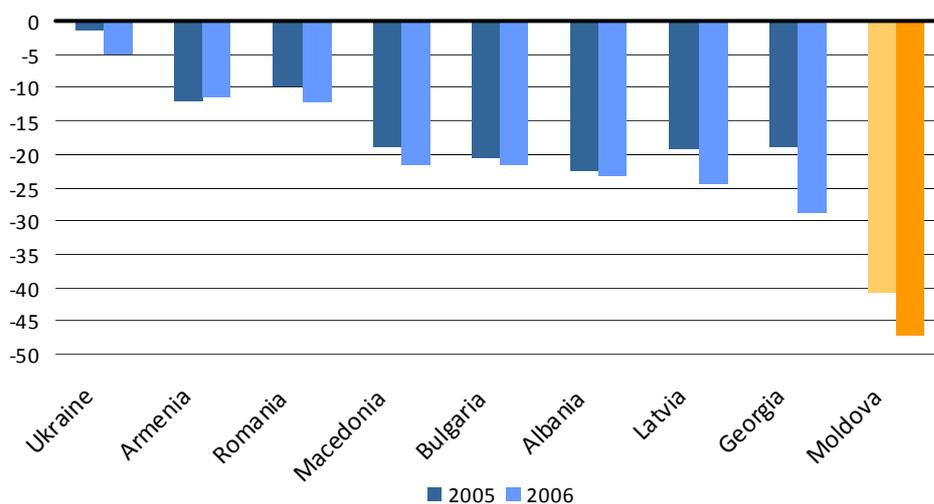
7.4 External Position

External deficits (trade, current account) are usually referred as very acute macroeconomic issues, although it might be not necessarily true. The dramatic growth of the trade balance deficit within the past period might indicate that the situation in the external sector has got a pretty negative trend. For instance, in 2006 the trade deficit reached the level of 47% of GDP as it is shown in Figure 52. This is an additional reason to ascertain that Moldova has got a consumption-oriented economy, of imported goods in particular; the production sector being not capable to satisfy the domestic demand so far. However, there are opinions that production sector does not necessarily has to be able to do that. Importing

³³ The Law on amendments and addenda to some legislative acts, No. 111-XVI from April 27, 2007, Official Monitor No. 64-66/300 from May 11, 2007.

tomatoes from Turkey and juices from Ukraine is reasonable as far as they are cheaper than the local ones. The market shall choose itself the areas where the country shall specialize, instead of being pushed towards some industries from the past that might be too costly and inefficient in present. Also, the deficit is not the most relevant measure of competitiveness, as there are countries that have significantly larger deficits such as Estonia and Poland.

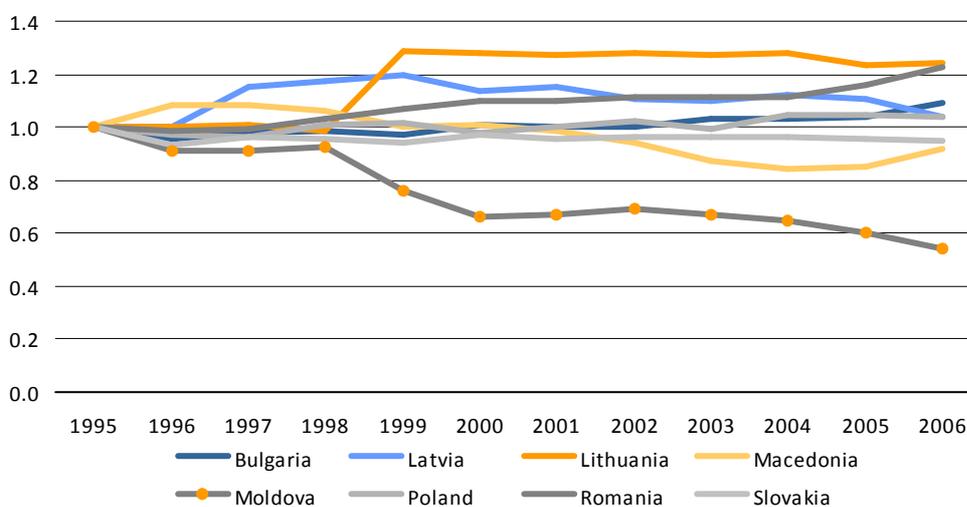
Figure 52. Trade deficit, % of GDP



Source: Economic Intelligence Unit Country Data, EBRD, IMF, 2006

As long as the trade and current account deficits are covered by remittances, their depth is not that important. It could be a normal situation when the excess of foreign currency in a country returns to where it comes from. In the same time, the most of the current account deficit is created by private sector activities, or alternatively the private sector borrows more than the state. It might be explained by the fact that the private sector is more rational than the state, hoping on greater incomes in predictable future.

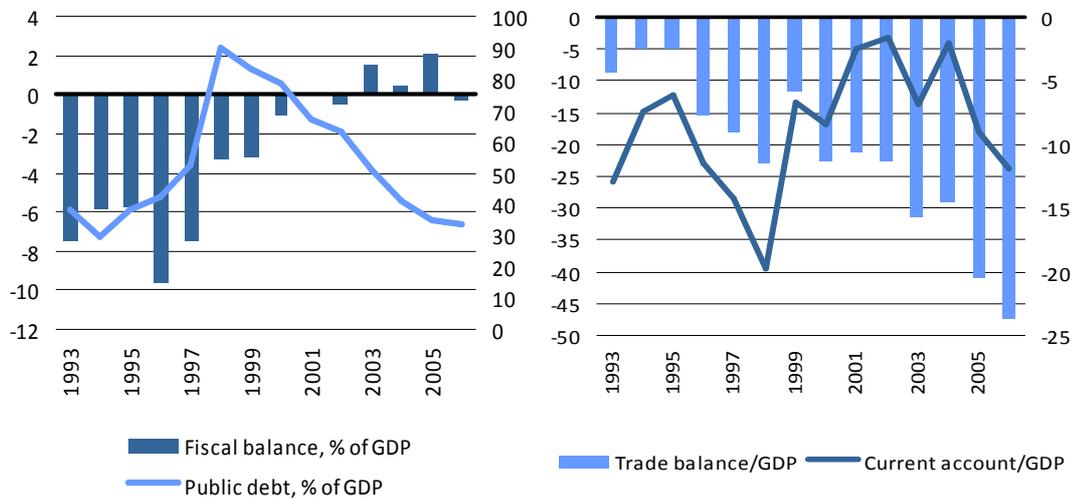
Figure 53. Terms of Trade



Source: EIU Country Data, EBRD, IMF, 2006; calculations of the authors

However, it does not exclude that, on the background of an expected reduction of the interest rates in domestic currency as well as on the trends of the Moldovan Leu appreciation³⁴, the growth of external deficits would become impossible to stop.

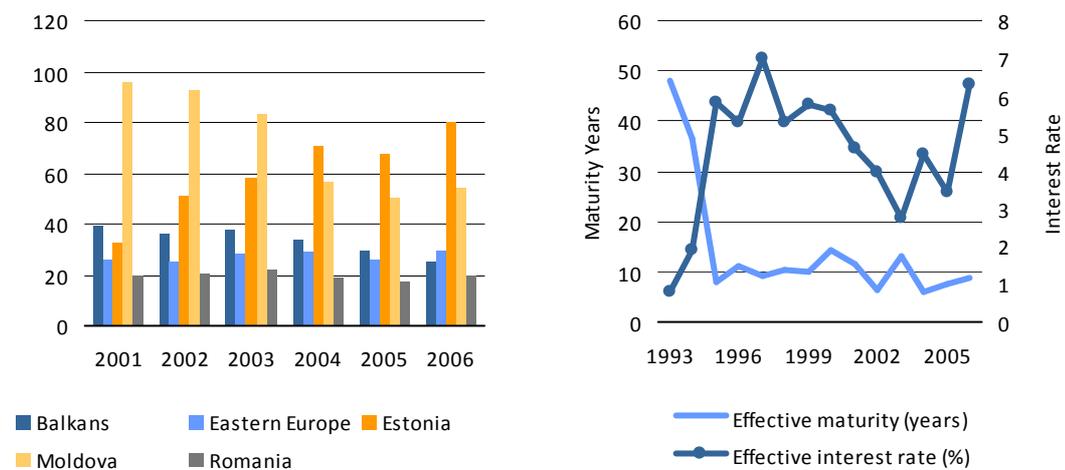
Figure 54. External deficits (Trade, Current Account, Public Debt), % of GDP



Source: EIU Country Data, EBRD, IMF, 2006; annual reports of NBM and MF

At the same time, one can notice the worsening in the terms of trade. Moldova evolved towards the world terms of trade, but it was affected differentially in comparison with other former Soviet countries. Thus, at present, with one export unit one could buy half of the goods produced in 1995-1997 (Figure 53). We can ascertain that external competitiveness of Moldovan goods is low so far, which is affected also by the high cost of energy resources included in the price of the final product.

Figure 55. Public External Debt and financial maturity



Source: EIU Country Data, EBRD, IMF, 2006

34 Iurie Gotișan, “Strong leu, great leu or new heights for the dollar”, <http://www.e-democracy.md/en/comments/socioeconomic/200705151/>

Financing the deficits was relatively easy in the past year, as it was discussed above, in particular through the remittances in foreign currency (less through FDI and placements), but at the end of the day it could be the case that the deficit will reach a certain critical level that would be difficult to sustain. Moreover, if the private sector will continue to borrow like it does at present, while the budget deficit increases, then the Current Account deficit will make up over 15% of GDP. From this standpoint, over heightening of the Current Account Deficit would raise questions to investors in terms of the risk posed on the placement of their money in Moldova due to potential macroeconomic disequilibria.

The net external debt of Moldova to GDP recorded downward trends in the past five years. If in 2001 it made up 97% of GDP, then by the end of 2006 the net debt constituted already 54% (Figure 54). Furthermore, the international borrowing conditions are not among the best. Also, Moldova practically is absent on the external financial markets, therefore it is granted short financial maturity and high interest rates (Figure 55).

Table 5. Risk premium

Country	Rating Long-Term (Moody's)	Adjusted Basic Margin	Risk Premium total	Risk Premium for the country
Euro zone	Aaa	0	4.91%	0.00%
Slovenia	Aa2	50	5.66%	0.75%
Czech Republic	A1	70	5.96%	1.05%
Estonia	A1	70	5.96%	1.05%
Slovakia	A1	70	5.96%	1.05%
Cyprus	A2	80	6.11%	1.20%
Latvia	A2	80	6.11%	1.20%
Lithuania	A2	80	6.11%	1.20%
Poland	A2	80	6.11%	1.20%
Malta	A3	85	6.19%	1.28%
Croatia	Baa1	100	6.41%	1.50%
Kazakhstan	Baa1	100	6.41%	1.50%
Russia	Baa2	115	6.64%	1.73%
Bulgaria	Baa3	135	6.94%	2.03%
Romania	Baa3	135	6.94%	2.03%
Azerbaijan	Ba1	200	7.91%	3.00%
Armenia	Ba2	250	8.66%	3.75%
Turkey	Ba3	300	9.41%	4.50%
Ukraine	B1	350	10.16%	5.25%
Moldova	Caa1	600	13.91%	9.00%

Source: Adopted from Aswath Damodaran (2007)

http://pages.stern.nyu.edu/%7Eadamodar/New_Home_Page/datafile/ctryprem.html

The country risk rating is reduced. The international financial evaluation agencies like Moody's Investors Services or Fitch IBCA that rate country risks based upon

the evolution of the main macroeconomic indicators, have provided low rating to the Republic of Moldova. For example, Moldova has got the lowest financial rating from the region assessed by Moody's Investors (Table 5). However, the country ratings established by agencies vary. Recently, Fitch IBCA has amended the rating granted to the Republic of Moldova for borrowings from „stable” to „positive”, as a result of country stability and economic growth and the adopted fiscal discipline. Concomitantly, Fitch has reconfirmed the rating granted to Moldova for long-term external liabilities in foreign currency and national currency at the level of „B-” and, respectively, „B”.

In conclusion, available evidence altogether suggests that macroeconomic environment is not the binding constraint for growth in Moldova. There are however some potentially worrying aspects such as:

- Inflation Rate Upward Trends; (however, inflation in the Republic of Moldova demonstrates rather a more marked seasonality, this being linked to the economy still heavy dependence on the Agricultural Sector, on massive imports, and on emerging markets as well), and
- External Deficit Aggravation (Trade, Current Account, External Public debt), deficits that make the country economy more vulnerable to external economic shocks.

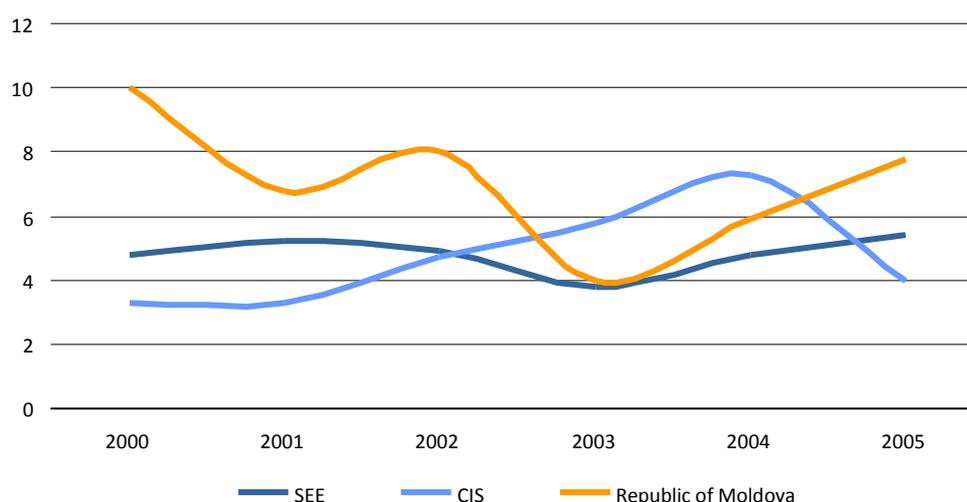
8 Investment and Business Climate

8.1 Foreign Direct Investments

The volume of foreign direct investments (FDI) is one of the main indicators that show how successful a country economic policies and perspectives are. For Moldova however, it depicts a rather questionable performance. When the FDI are at rise, it may serve as an incentive for other foreign investors to allocate new resources to that particular economy. Thus, after a certain threshold of suspiciousness has been overcome, FDI become an important driving tool for high quality economic development³⁵. In this context it is worth mentioning that the FDI are important not just as foreign currency resources, but also as a combination of experience, knowledge, management practices, marketing innovations and technological know-how, stimulating domestic capital investments as well.

The relatively reduced volume of investments in the Republic of Moldova seems to be conditioned to large extent by a regulatory framework less favorable in comparison with the countries from the region. Despite the fact that the first stage of the regulatory reform of entrepreneurial activity (the „Guillotine” Law) has been implemented successfully in Moldova, and currently the second stage has been unrolling, companies continue to mention regulatory-type constraints as the main cause that impedes their development.

Figure 56. The FDI Net Inflow, % of GDP



Source: RNDU, computed by the Authors based on the EBRD data, 2005

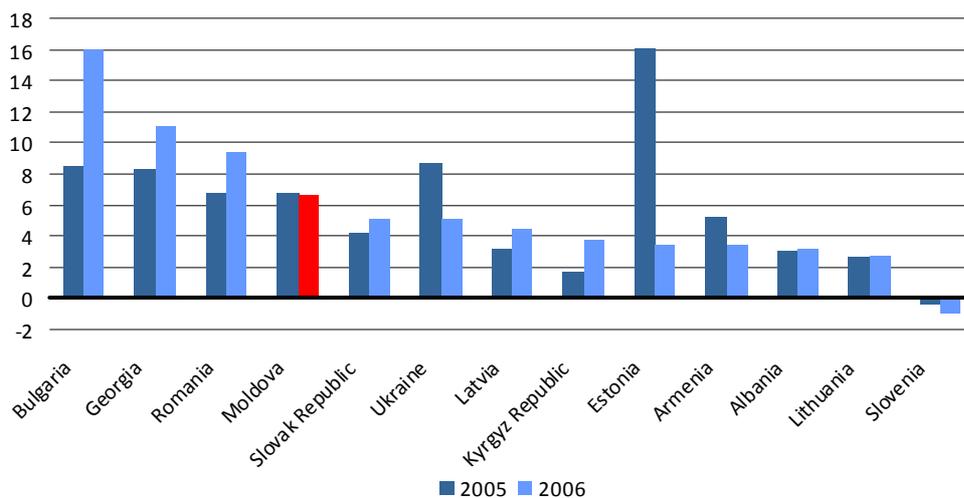
In particular, the conditions of licensing and authorization issuance, the rigidity of labor legislation, and the objectivity of the judiciary system are considered by

³⁵ The Economist, „The Cutting Edge”, February 22, 2001.

companies as most important constraints that shall be addressed in order to ensure sustainable economic growth.

Lack of FDI inflows may reflect deficiencies in business climate. As for the foreign investments inflows, the performance of the Republic of Moldova is ambiguous compared to the world. From the one side, in terms of the FDI / GDP ratio, Moldova has reached and maintains relatively high rates, even higher than the ones recorded by the Central and Eastern Europe countries (Figure 56).

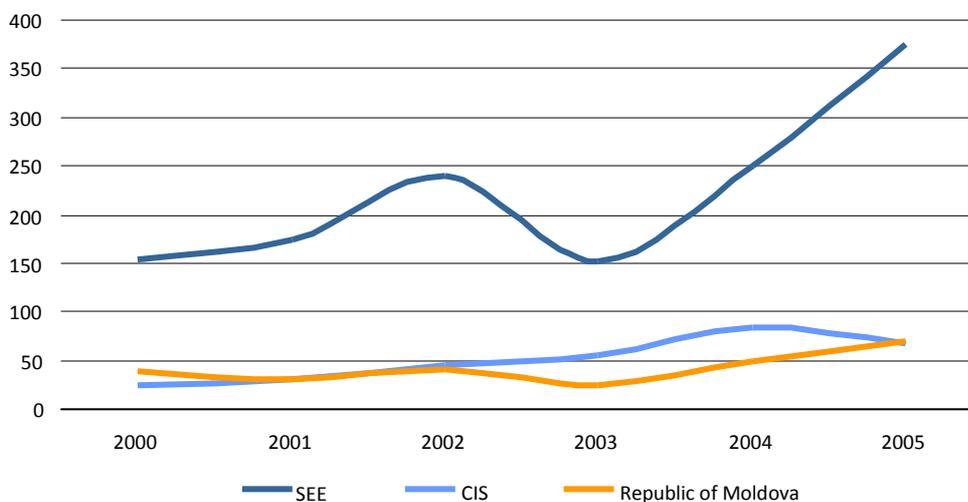
Figure 57. FDI Inflow 2005 - 2006, % of GDP



Source: Transition Report 2007, EBRD

The flow of foreign investments to Moldova in comparison with the countries selected for constraints analysis, shows a similar situation in terms of investment/GDP ratio, Moldova is among the leaders, leaving behind countries more developed like Slovakia, Latvia, Lithuania, Estonia and Slovenia, based on the 2006 data (Figure 57).

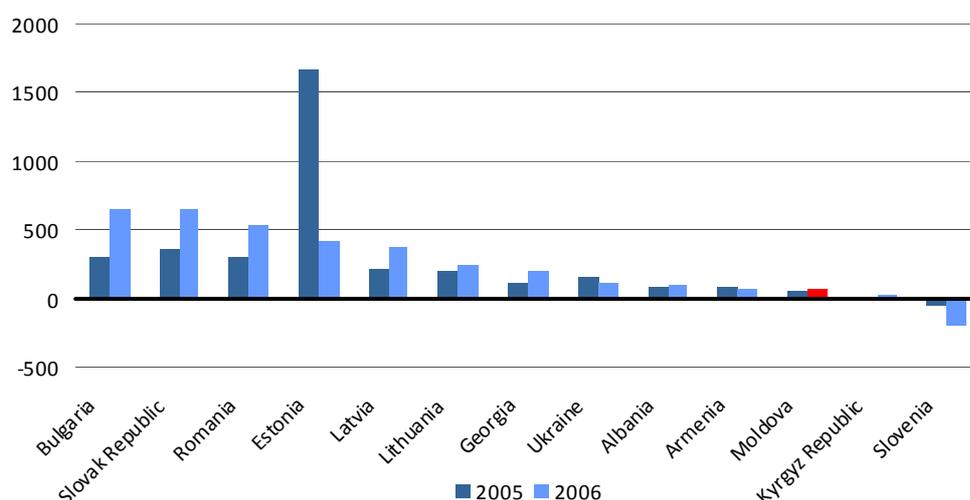
Figure 58. Net Inflow of FDI per capita 2000 - 2005, USD.



Source: RNDU, computed by the Authors based on the EBRD data, 2005

However, as in case of other countries from the CIS, the relatively high level of FDI to GDP is explained rather by the reduced level of GDP than by the FDI nominal volume. As it is shown in Figure 58, FDI per capita for the Republic of Moldova is pretty small in comparison with the CEE countries and similar to the CIS states, situation confirmed by a comparison with the countries selected for constraints analysis (Figure 59).

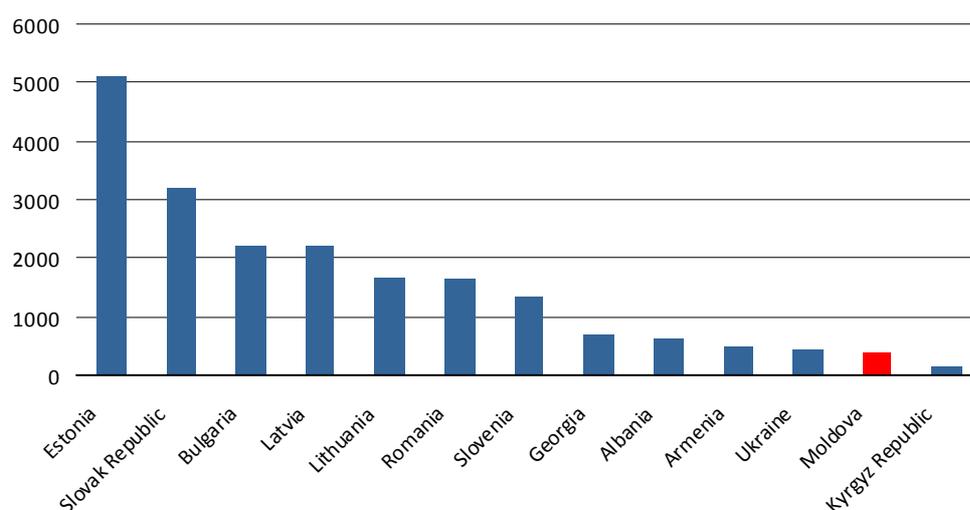
Figure 59. Flow of FDI per capita 2005 - 2006, USD



Source: Transition Report 2007, EBRD

In the aftermath, the cumulative volume of foreign investments per capita in the Republic of Moldova is, practically, the smallest in comparison with the countries considered and places Moldova on the last but one place in the classification, having outmatched the Kyrgyz Republic only (Figure 60).

Figure 60. Cumulative FDI per capita 1989 - 2006, USD.



Source: Transition Report, 2007, EBRD

This situation can be explained by multiple and complex reasons. According to the opinions expressed by companies, investors, experts, international financial organizations, non-governmental organizations as well as based on the studies conducted so far, these causes may be summarized in several most important

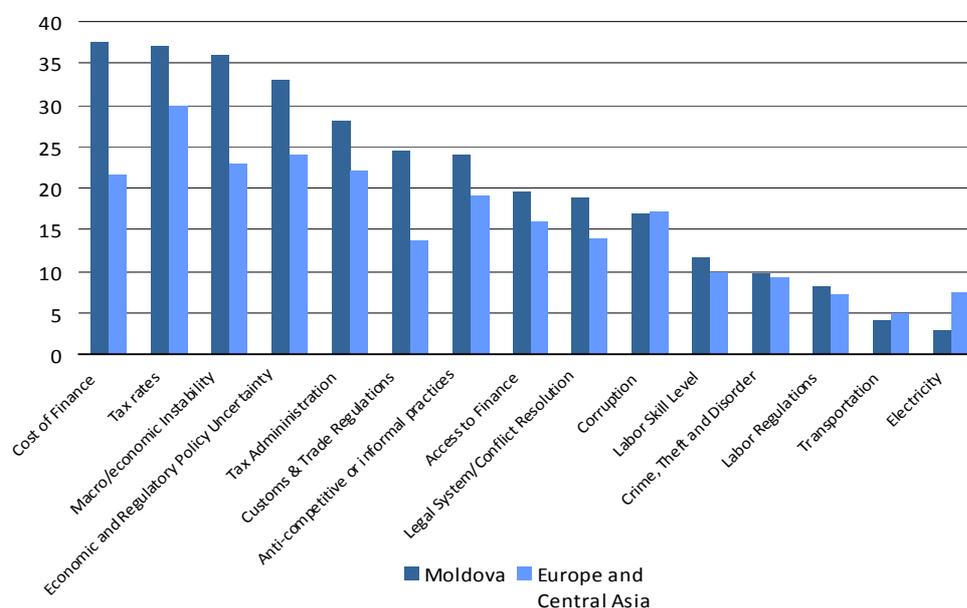
categories, e.g. small domestic economy, limited natural resources, underdeveloped physical and social infrastructure, unstable framework of economic policies, unfavorable investment climate, mistrust in Justice, in some of the cases, insufficient connection of the education system with the market demands/requirements.

8.2 Conditions for Doing Business

Conditions for doing business are still perceived as not entirely favorable, despite all the efforts put by the Government to improve them.

Foreign investors as well as Moldovan companies pretty often complain about frequent audits and inspections, having suggested the authorities to revise the functions of inspection bodies in order to prevent doubling the audits³⁶. Concomitantly, it seems that the business regulatory costs were pretty high in the past five years and, hence, discouraged private investments³⁷. In fact, in the Republic of Moldova, the majority of constraints, except for those related to corruption, transports and electricity, are mentioned more often than on the average by companies from Europe and Central Asia (Figure 61), meaning that the perception of investment climate in Moldova is worse than in indicated states.

Figure 61. Major Mentioned Constraints, % of Moldovan companies vs. Europe and Central Asia.



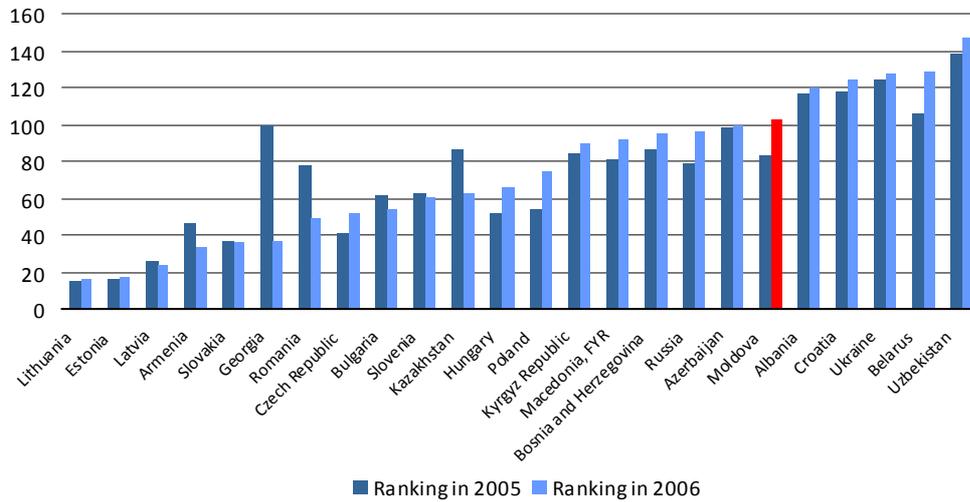
Source: Enterprise Survey Index, World Bank, 2005

³⁶ Foreign Investors Association FIA, *White Book, 2006*

³⁷ Studies with respect to the business environment and enterprise performance conducted by the WB -EBRD (BEEPS1, 2002 and BEEPS2, 2005) in 1,600 small and medium-sized enterprises and based on country official data.

In 2006, Moldova dropped by 19 positions in the world ranking of doing business. The World Bank Survey on Doing Business conditions shows a decline in the country position in the world classification from the 84th place it held in 2005 to the 103rd, finding itself on the last places compared to the countries from Eastern Europe and Central Asia (Figure 62).

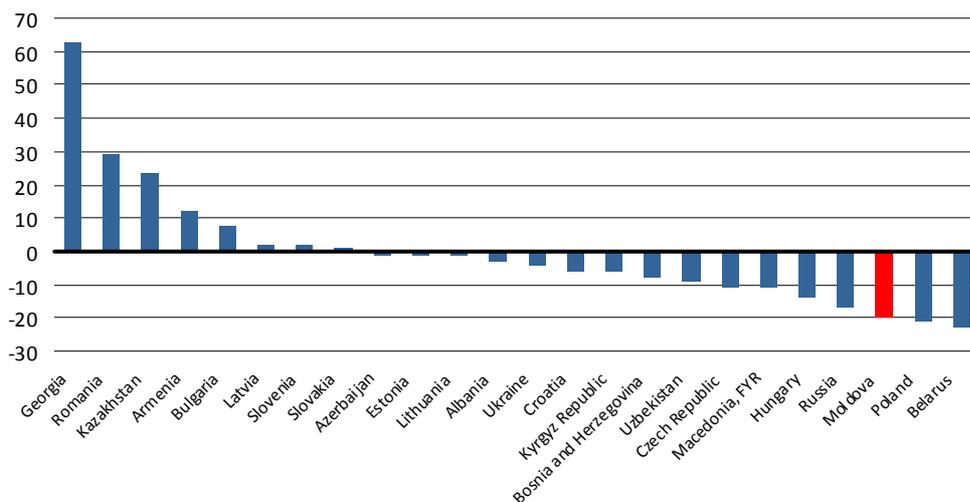
Figure 62. Ranking the conditions for doing businesses; 2006 vs. 2005



Source: Doing Business Survey, World Bank, 2006

In this context, it is notable that the majority of countries from the Eastern Europe and Central Asia also fell in ranking. However, Moldova proved to be the “first” in the descending speed (Figure 63), which would state that practically in all countries, except for Moldova, reforms have been implemented more rapidly.

Figure 63. Changing the Ranking of conditions for doing businesses; 2006 vs. 2005

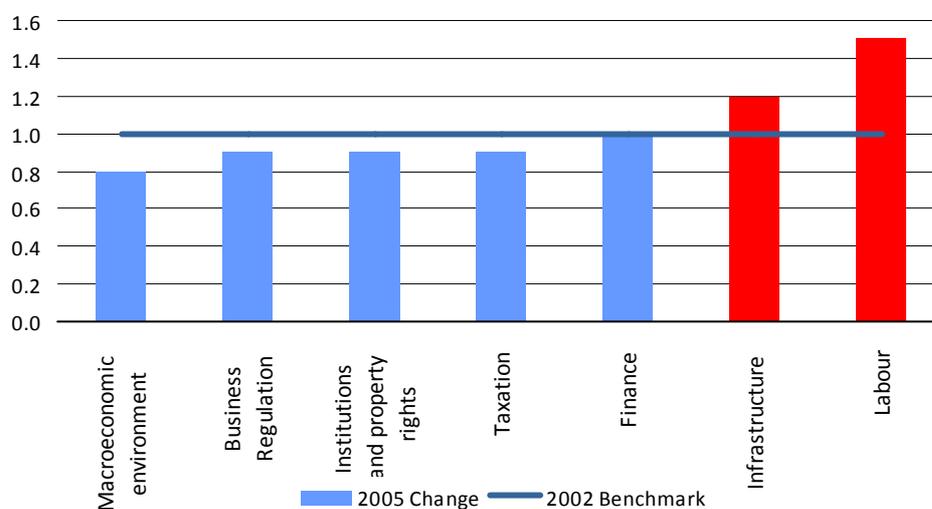


Source: Doing Business Survey, World Bank, 2006

The position of Moldova in the World Bank ranking with respect to the conditions of doing business has got a downward trend although other reports state that, in general, the conditions in the country are not worsening, may be except for

infrastructure and labor (Figure 64). It might be the case that in other countries the conditions for doing business are improving more rapidly.

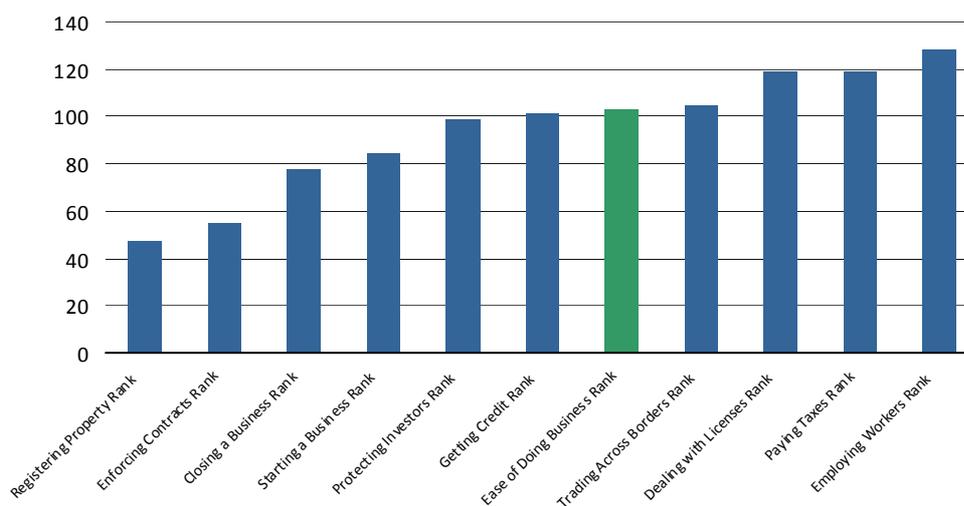
Figure 64. Changing the Moldovan Business Environment Conditions, 2005 vs. 2002³⁸



Source: EBRD Transition Report 2006

Worsening recorded in 2006 varies among diverse business climate components. The ranking components that worsen Moldova's general position include import / export conditions, licensing conditions and authorization issuance, taxation and tax payment conditions, and staff employment conditions (Figure 65). Apparently, these are the possible candidates for being the main constraints for of economic growth.

Figure 65. Rank Components with respect to conditions for doing business in Moldova.

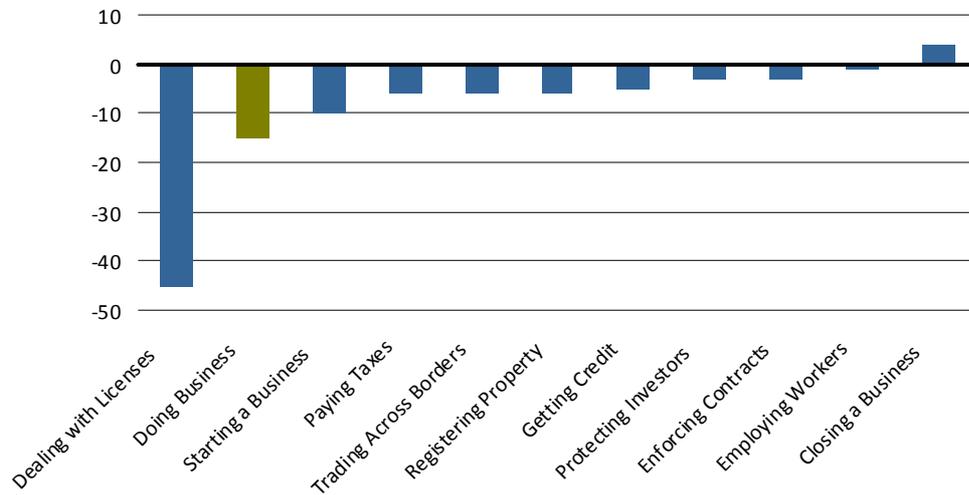


Source: Doing Business Survey, World Bank, 2006

³⁸ Here, the year of 2002 is considered as benchmark, and the figure portrays changes that took place until 2005, covering seven aspects of the business environment: macroeconomic environment, business regulation, institutional and property rights, taxation, finance, infrastructure and labor force. Cases where the indicator exceeds the benchmark indicate deterioration in the business environment, which is ranked at a scale of 1 (no obstacle) to 4 (major obstacle).

The ranking component on which Moldova recorded the fastest fall is licensing and authorization issuance, followed by the conditions for launching businesses, taxation and tax payment conditions, registration of property, and access to credits (Figure 66).

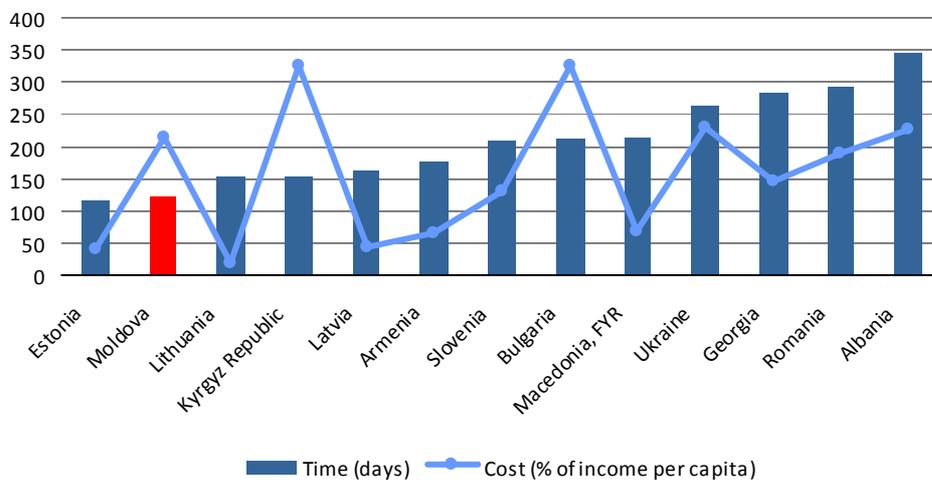
Figure 66. Change in the Rank Components in Moldova, 2006 vs. 2005



Source: Doing Business Survey, World Bank, 2007

A comparative analysis of conditions for licensing and authorization issuance shows that Moldova, in fact, does not hold the worst position on these matters, except the costs associated with getting licenses and authorizations, which could be a more noticeable constraint (Figure 67). However, the major drawback of this estimation is that it mostly covers licenses in understanding of “document that allows you to start working” (on which Moldova performs well) and does not cover diverse permits and authorizations that businesses need for day to day operations. Most complaints from firms refer to the later type of permits, which are expensive in terms of finance and time and have a rather questionable legal statute.

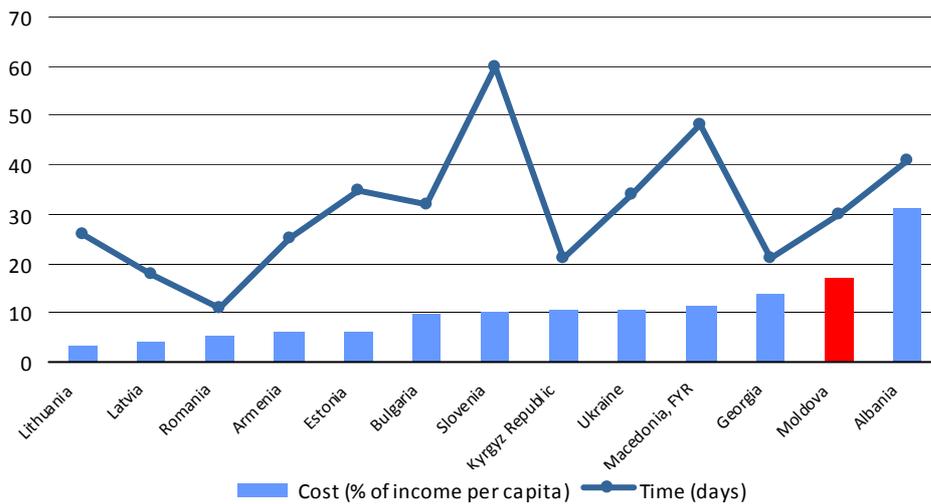
Figure 67. Conditions of Licensing



Source: Doing Business Survey, World Bank, 2006

As to the procedures needed to open a business, in comparison with other considered countries, Moldova is placed in the middle. What marks Moldova out are the costs compared to the income per capita, where the country is positioned the last but one, which means that comparatively higher costs are in place (Figure 68). Here we have to mention that an eventual more noticeable growth of the country GDP may amend substantially this indicator.

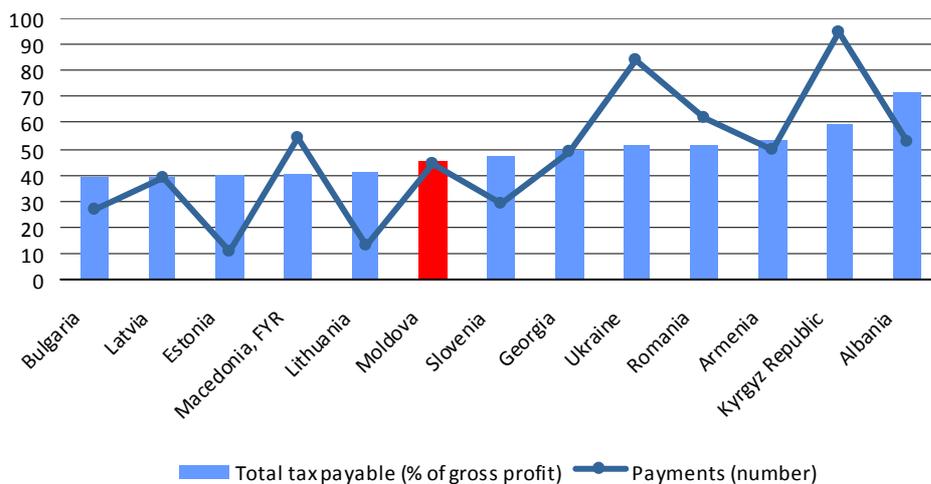
Figure 68. Costs and time needed to launch a business



Source: Doing Business Survey, World Bank, 2006

In terms of taxation, it seems that Moldova is neither better nor worse compared to the others; being placed in the middle in terms of percentage of gross profit and the number of payments (Figure 69)³⁹.

Figure 69. Tax rates and the number of payments



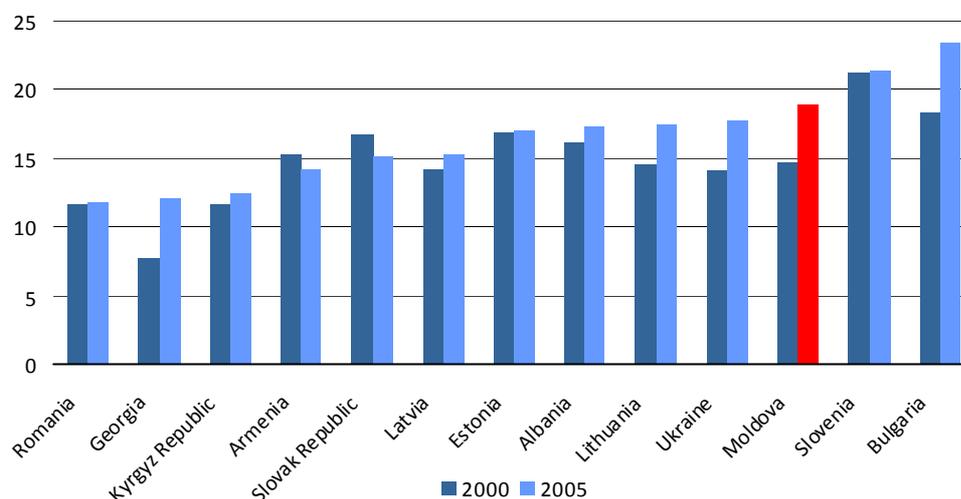
Source: Doing Business Survey, World Bank, 2006

There is an ambiguous situation in terms of taxes as a share of GDP. According to the situation from 2005, the country is placed in the area with the largest taxes⁴⁰

³⁹ Situation is referred to taxes paid to the central budget only.

(Figure 70), which could be associated at that time with an important constraint. However, we need to mention that recently a fiscal liberalization program has been approved, which among other provisions implies complete exemption from profit tax on the reinvested income⁴¹.

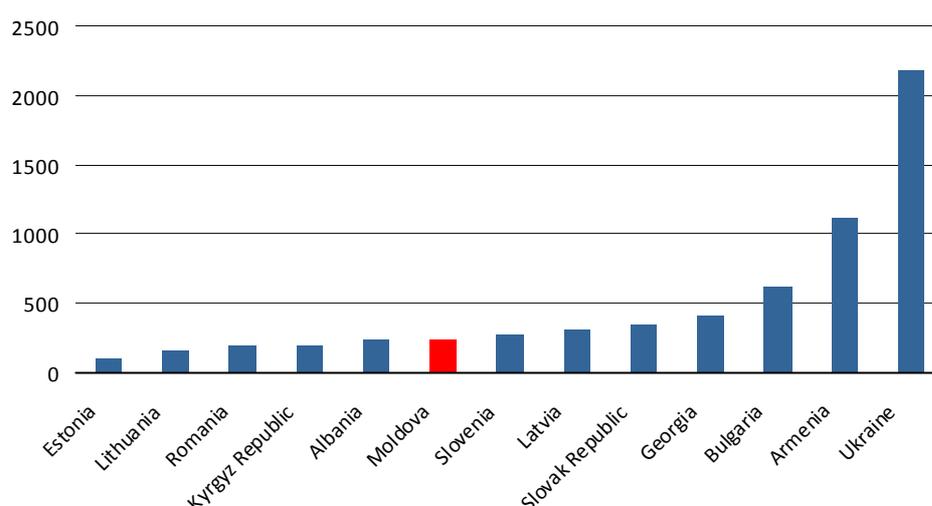
Figure 70. Share of Central Government revenues derived from taxes as a share of GDP (% of GDP).



Source: World Development Indicators, World Bank, 2006

Tax reporting system might need some simplification. The estimation of time necessary for preparation, documentation and payment of taxes by the World Bank does not show something unusual, Moldova registering slightly reduced time necessary for preparation, documentation and payment of taxes to the central budget (Figure 71).

Figure 71. Time for preparation, documentation and payment of taxes in 2006, hours



Source: World Development Indicators, World Bank, 2007

⁴⁰ Data regarding the central government taxes have been adjusted by the WB according to the Government Finance Statistics Manual, 2001.

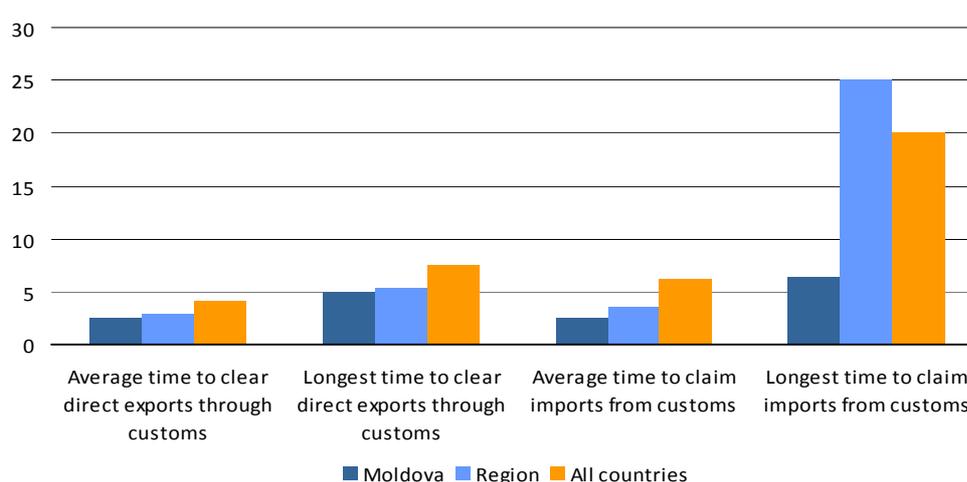
⁴¹ Law No. 111 from April 27, 2007 on Fiscal Liberalization.

However, in terms of enterprise efforts to ensure observance of the current legislation with respect to taxes, in particular, ensuring sound reporting, these seem to be much more significant. According to a study conducted in April 2006⁴², companies are obligated to submit reports to the State Territorial Tax Inspectorates (STTI), Territorial Offices of Statistics (TOS), Territorial Offices of the National Company of Social Insurance (CNAS), the „Apele Moldovei” State Agency and to ecologic inspectorates. Likewise, in order to take records of medical insurance policies, the enterprises have to visit the National Company of Medical Insurance (CNAM). Out of this reports, the major parts of them go to the STTI and TOS, altogether making up between 65% and 88% of the number of titles and 85% - 95% of the volume of efforts necessary to fill out the reports.

In fact, the total real costs related to the reporting process comprise also the costs of wages of persons that carry out this process, and costs related to transport for delivering/submitting reports. Thus, the majority of enterprises spend annually more than two monthly average wages for this purpose⁴³. As for larger enterprises with more considerable turnover, one person should work four-five months to ensure the compliance with the reporting process. The expenses related to trips and submission of reports per se may vary from 30% to 100% of the overall expenses incurred for developing the reports. For rural businesses, the expenses incurred for submission may exceed those for developing the reports several times.

Export/import regime is not heavily overregulated although there are some concerns as to the time effort required.

Figure 72. Constraints related to Import/Export⁴⁴ operations



Source: Enterprise Survey index, World Bank, 2005

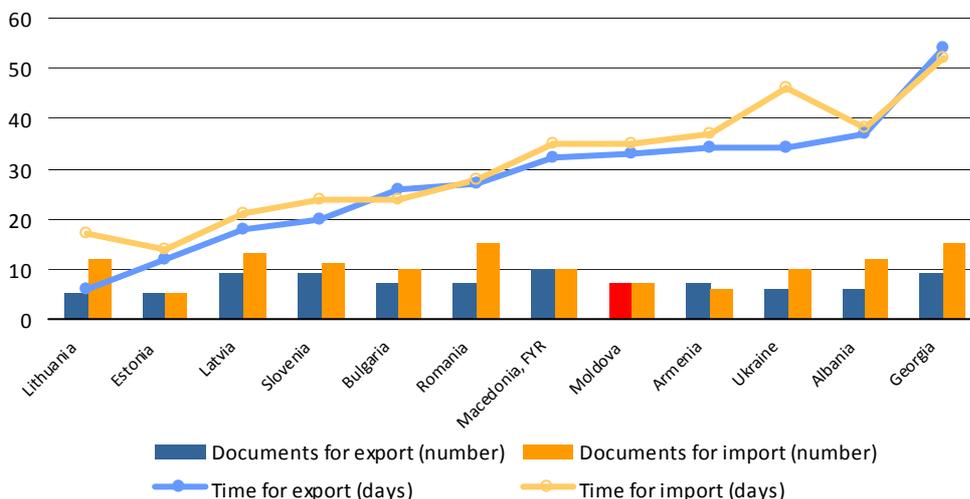
⁴² Study concerning the reporting procedures followed by economic agents from the Republic of Moldova, USAID/BIZPRO, 2006.

⁴³ The average wage in the Republic of Moldova economy made up 1,936 MDL (approximately 150 USD) in April 2007.

⁴⁴ The figure refers to four main indicators that describe the import/export process, i.e. average time (days) to clear export operations through customs; longest time (days) to clear export operations through customs; average time (days) to claim imports from customs; and longest time (days) to claim imports from customs.

Apparently, in comparison with both the countries from the region and all other countries included by the World Bank in the private enterprise activity survey, Moldova is placed under the average in terms of constraints related to import/export operations, in particular, with respect to the average time necessary to clear/claim exports/imports through/from the customs (Figure 72).

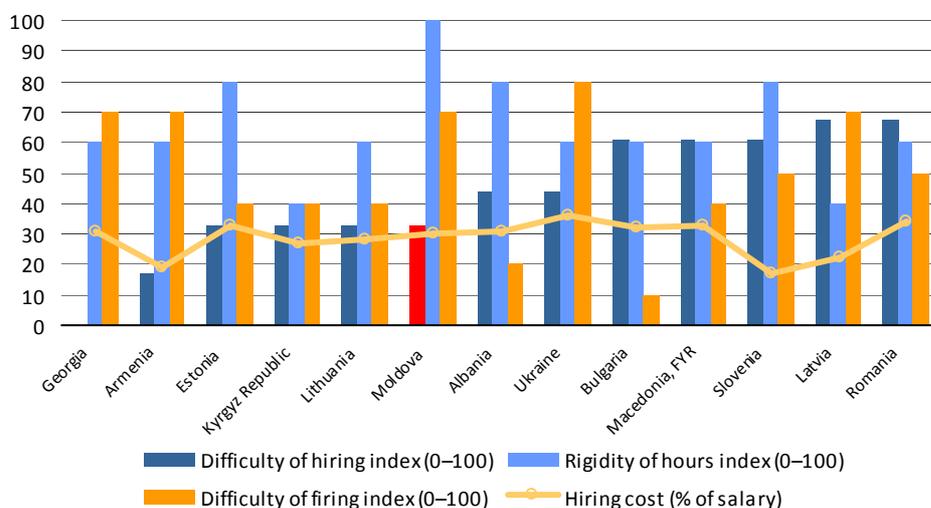
Figure 73. Export/Import Conditions



Source: Doing Business Survey, World Bank, 2006

However, narrowing the sample for comparison shows slightly worsened performance. For example, although the number of documents necessary for import/export operations is still rather small, the amount of time necessary for carrying out import/export operations seems to be larger (Figure 73), Moldova being placed among the countries with the longest time spent in order to comply with the established procedures. Thus, for a small country that does not have a considerable domestic market, this fact might represent an impediment to economic development.

Figure 74. Labor Force Recruitment and Discharging

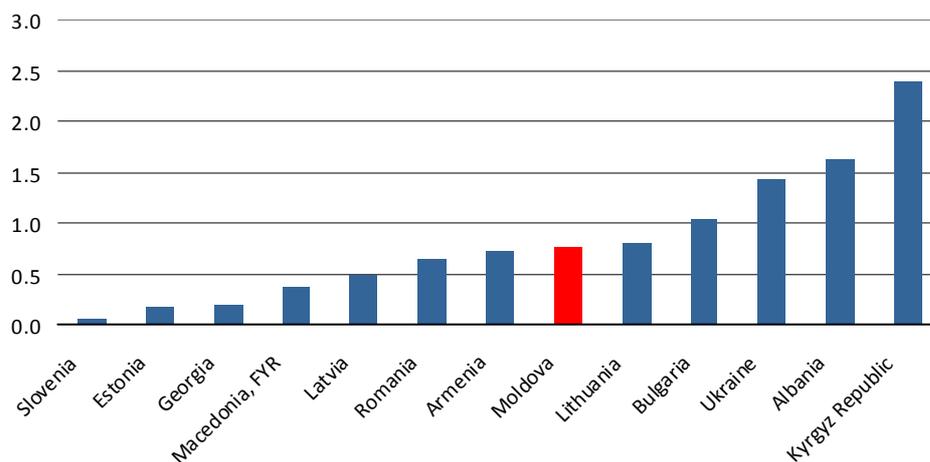


Source: Doing Business Survey, World Bank, 2006.

Some aspects of the labor market are overregulated. The regulatory framework concerning the labor force recruitment and discharge represents another issue more and more frequently mentioned by the enterprises from Moldova (Figure 74). Those indicators reflect the regulatory level of hiring procedures and the rigidity of working hours. Thus, the hiring difficulties index as well as the costs of hiring seems to be under the average for the region, however, the rigidity of working hours and the discharging conditions are elevated, placing Moldova among the countries with maximal rigidity of labor force hiring regulations.

Corruption level might be an issue although not all of the existent studies and indicators explicitly support this statement. The companies-participants to the World Bank 2006 survey show an average level of non-official payments to make things done (Figure 75). We could conclude that in terms of unofficial payment measure of corruption, Moldova is doing well, although the situation in Armenia and Georgia seems to be doing better.

Figure 75. Unofficial payments for a typical company to make things done, % of sales



Source: Enterprise Survey Index, World Bank, 2005.

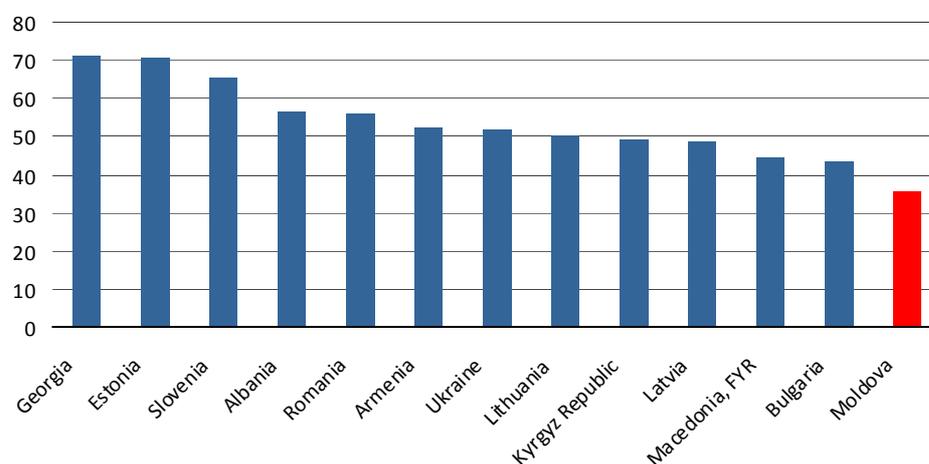
One shall note however that corruption dampens economic development not only by subtracting a certain percentage of revenues of firms. The overall business' perception of the effect of corruption on their activity is much more significant.

One of the critical issues the Moldovan businessmen confront with would be the biased judicial system (Figure 76). With respect to this matter, there are opinions that if entrepreneurs are not sure about the judicial system impartiality they would not be willing to invest. For example, some World Bank reports⁴⁵ declare that almost 80% of the questioned enterprises from Moldova qualify the judicial system as „unfair, expensive, corrupted and incapable to impose the observance of Law”. In other circumstances, more investors believe that the Moldovan justice is

⁴⁵ World Bank Development Data & Statistics.

unreliable for them, due to the fact that the courts of justice protect the state institutions only. The main conclusion drawn based on this situation is that the judicial system could be considered as the biggest constraint, while Moldova is the country with the smallest number of entrepreneurs that trust the system.

Figure 76. Confidence level in the Judicial System, % of questioned persons



Source: Enterprise Survey Index, World Bank, 2005.

As general conclusion comes that in ensemble, the investment climate is one of the most serious constraints faced by businesses from Moldova, and is binding.

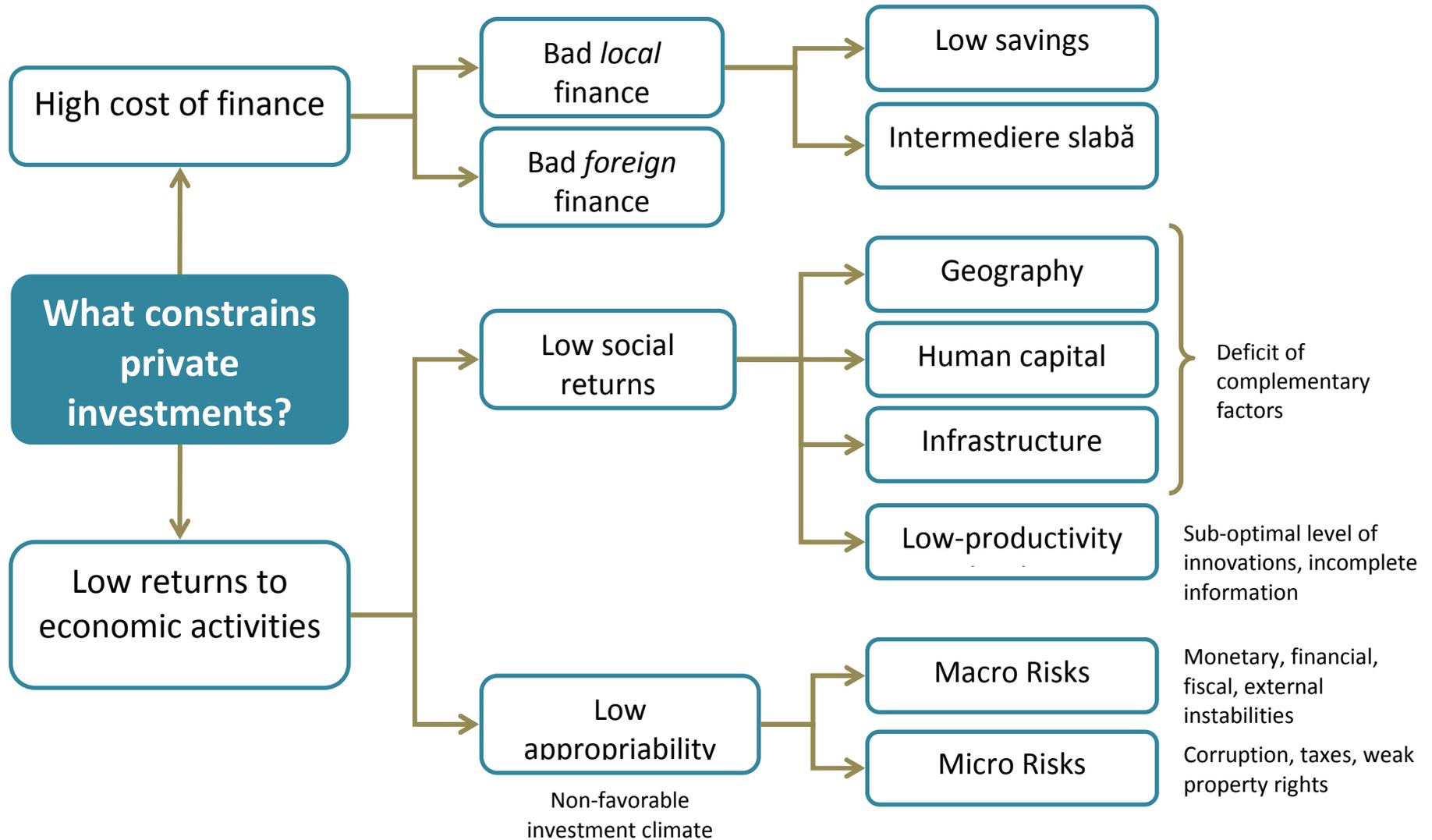
The investment and business climate in Moldova, in comparison with the reference countries, seem to make the country lose its attractiveness. Most important factors are conditions of licenses and authorizations of activities, rigidity of labor relations, and objectivity of the judicial system. There are also unsolved issues with corruption, indirect costs related to taxation process and high number of export/import documents. These issues have to be addressed in the future.

Annexes

Annex 1. Concept of Constraints Analysis

Annex 2. Mincer Regressions

Annex 1: The Concept of Constraints Analysis



Annex 2: Mincer Regressions

Table 1. Regressions of log of hourly wage on number of years of education

	All urban			Urban males		
	(1)	(2)	(3)	(4)	(5)	(6)
Years of education	0.135 (11.85)***	0.134 (11.78)***	0.149 (12.37)***	0.134 (11.35)***	0.127 (11.37)***	0.149 (11.48)***
Experience	0.022 (4.99)***	0.020 (3.93)***	0.017 (3.50)***	0.031 (4.53)***	0.025 (3.41)***	0.021 (3.16)***
Experience squared	-0.001 (6.35)***	-0.001 (5.47)***	-0.000 (4.72)***	-0.001 (5.33)***	-0.001 (4.55)***	-0.001 (4.07)***
Female	-0.271 (11.32)***	-0.268 (12.04)***	-0.195 (9.05)***			
<i>Sector (omitted: agriculture)</i>						
Industry			0.447 (3.83)***			0.546 (4.86)***
Constructions			0.602 (5.26)***			0.711 (6.29)***
Commerce, hotels and restaurants			0.291 (2.80)***			0.448 (3.98)***
Transport and communications			0.571 (5.37)***			0.658 (5.76)***
Public administration, education, healthcare and social assistance			0.223 (2.04)**			0.242 (2.07)**
Other			0.461 (3.30)***			0.505 (3.81)***
<i>Property (omitted: public)</i>						
Private			0.243 (4.43)***			0.239 (4.83)***
Mixed public-private			0.217 (3.15)***			0.145 (1.91)*
Foreign-owned			0.533 (3.21)***			0.690 (2.89)***
Foreign participation			0.225 (2.22)**			0.299 (2.32)**
Constant	1.832 (16.32)***	1.454 (7.89)***	0.818 (4.99)***	1.815 (10.78)***	1.395 (5.70)***	0.573 (3.07)***
Tenure on job		YES	YES		YES	YES
Month dummies	YES	YES	YES	YES	YES	YES
Observations	10923	10433	10433	5270	5008	5008
R ²	0.157	0.166	0.212	0.134	0.160	0.214

t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 2. Regressions of log of hourly wage on education levels

	All urban			Urban males		
	(7)	(8)	(9)	(10)	(11)	(12)
<i>Education (omitted: primary or less)</i>						
Higher education	1.027 (7.11)***	1.065 (6.96)***	1.121 (6.64)***	1.040 (4.39)***	1.236 (8.14)***	1.491 (6.10)***
Vocational education	0.454 (3.42)***	0.500 (3.56)***	0.487 (3.09)***	0.485 (2.07)**	0.709 (4.48)***	0.849 (3.38)***
Secondary complete	0.275 (2.07)**	0.332 (2.37)**	0.318 (2.01)*	0.275 (1.17)	0.535 (3.30)***	0.686 (2.75)***
Secondary incomplete	0.030 (0.19)	0.075 (0.46)	0.081 (0.47)	-0.006 (0.02)	0.214 (1.14)	0.384 (1.47)
Experience	0.024 (5.90)***	0.021 (4.56)***	0.019 (4.17)***	0.031 (4.61)***	0.024 (3.39)***	0.022 (3.37)***
Experience squared	-0.001 (7.33)***	-0.001 (6.16)***	-0.000 (5.39)***	-0.001 (5.44)***	-0.001 (4.52)***	-0.001 (4.31)***
Female	-0.248 (10.38)***	-0.246 (11.11)***	-0.175 (8.00)***			
<i>Sector (omitted: agriculture)</i>						
Industry			0.449 (3.76)***			0.541 (4.73)***
Constructions			0.603 (5.37)***			0.697 (6.37)***
Commerce, hotels and restaurants			0.304 (2.91)***			0.447 (4.03)***
Transport and communications			0.569 (5.26)***			0.649 (5.49)***
Public administration, education, healthcare and social assistance			0.235 (2.16)**			0.235 (2.04)**
Other			0.465 (3.30)***			0.512 (3.78)***
<i>Property (omitted: public)</i>						
Private			0.236 (4.27)***			0.233 (4.71)***
Mixed public-private			0.215 (3.25)***			0.133 (1.74)*
Foreign-owned			0.522 (3.09)***			0.705 (2.91)***
Foreign participation			0.227 (2.16)**			0.319 (2.47)**
Constant	2.827 (19.93)***	2.385 (12.95)***	1.890 (9.86)***	2.801 (10.74)***	2.094 (8.28)***	1.308 (4.81)***
Tenure on job		YES	YES		YES	YES
Month	YES	YES	YES	YES	YES	YES
Observations	10923	10433	10433	5270	5008	5008
R ²	0.161	0.170	0.212	0.139	0.163	0.216

t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3. Is higher education better remunerated by companies with foreign capital?

	Log wage/hour
Higher education	0.701 (13.46)***
Foreign owned firm	0.152 (1.10)
Higher education * foreign owned	0.436 (2.74)***
Experience	0.024 (5.12)***
Experience squared	-0.001 (6.70)***
Female	-0.180 (7.82)***
Constant	2.321 (16.80)***
Sector effects	YES
Tenure on job	YES
Month dummies	YES
Observations	10433
R ²	0.197