ERPA 2014

Investment in higher professional education in Russia: Value-based approach

Andrei B. Ankudinov, Milyausha Kh. Biktemirova, Elvira I. Khairullina

*Kazan Federal University, Institute of Economics and Finance, 420012, Kazan, Russia, 4, Butlerov st.

Abstract

Over the last decade the number of university graduates in Russia has been growing rapidly. However, the relation between tertiarization of national economy and its competitiveness remains unclear; personal motivation and public efficiency of an individual attaining tertiary education act to a certain extent in different directions. The paper addresses different factors affecting the decision of an individual to opt for a particular level of professional education. Net present value and internal rate of return criteria are used to assess the economic attractiveness of investment in attainment of higher professional education. Our findings demonstrate positive private outcomes of attainment of tertiary degrees and are generally in line with the results of OECD analysis. However, cost-benefit analysis demonstrates that in most cases the more advanced type of tertiary degree is attained the lower are financial efficiency indicators both for men and women.

Keywords: higher professional education; tertiarization of economy; cost-benefit analysis; discounted cash-flows.

1. Introduction

Fierce public debate on the efficiency of national system of secondary and higher education has resulted in a wide variety of publications on the subject appearing in national media. However, in the bulk of the publications journalistic style heavily prevails. Economic characteristics of educational system are generally ignored in favor of mantra of irretrievably lost educational traditions which just happened to be the best in the world. The very idea of
optimization of national system of tertiary as well as upper secondary vocational education represents so politically sensitive issue that very few researchers dare to approach it using economical criteria, however important the latter appear to be for building up competitive advantages of national economy.

Meanwhile the high-quality education becomes more and more expensive. It should be noted that not only explicit costs matter: relatively low unemployment rate in Russia drives up opportunity cost (in the form of foregone earnings) of staying for up to six years as a full-time student.

The average figures can be somewhat misleading since growing demand for education certificates of whatever quality is met with virtually unlimited low-cost supply: new specialisms have been set up mostly in economics, management, law and the humanities, where they did not require substantial investment in hard assets (Motova and Pykkö, 2012).

Adequate supply of university graduates to Russian labor market is substantially distorted by compulsory military service. Generally negative economic and welfare effects of military draft in Russia have received empirical confirmation (Lokshin and Yemtsov, 2008), while empirical analysis of its adverse effect on the labor market equilibrium has yet to be performed (not a single academic study of the problem is known to the authors of this paper). Article 24 of Federal Law on Military Duty and Military Service adds further complexity to the problem, exempting full-time post-graduate students from military service effectively for 4 years (Federal Law on Military Duty and Military Service, 1998). At the same time the literature contains some evidence in support of aforementioned conclusion for developed labor markets: abolition of the compulsory conscription in France had been followed by a significant decrease in the number of years spent at school by male students, as well as in the proportion of male degree holders (Maurin and Xenogiani, 2005).

Shaping of demand for graduates with university degrees appears to be no less complex process. Apart from purely economic considerations it is heavily influenced by factors of psychological, historical and traditional nature. Besides, in emerging market economies it is the very fact of a person holding university diploma which in many cases actually matters for the labor market (Konstantinovskiy, 2012; Li et al., 2008).

From the perspective of efficiency of national economy, excess of over-educated (not always overqualified) workforce is tantamount to imposition of additional costs on businesses. In this paper we try to draw attention to the sensitive issue of balancing the supply of university graduates with actual needs of national economy. The problem is especially important under the current conditions of the combined effect of economic stagnation and increasing competition as a result of Russia’s accession towards WTO.

2. Tertiarization of national economy as a problem

In this section we address the issue of existing imbalances in levels of workforce education in modern Russia. However overwhelming is the collected worldwide evidence in favor of further enhancement of education levels of population from both social and economical viewpoints, the remedy may be by no means universally applicable.

General tertiarization of national economy is by no means only Russian problem. The most recent statistical data available show that by the year 2011 in a number of quite dissimilar countries the percentage of population that has attained tertiary education is around 50% (Russia, Canada, Japan, Korea, Israel), but it is Russia who is the leader when it comes to the working-age population (25-64 year-olds) as a whole (OECD, Education at a Glance 2013). However, the majority of OECD countries demonstrate much more modest percentages of graduates with tertiary education, with some most economically successful ones, like Germany or Austria falling well behind even the average OECD levels.

Determinants of percentage of population who have attained higher education may significantly vary from country to country due to a number of reasons, proper econometric analysis of which goes far beyond the scope of this paper. In case of Canada relatively high level of population with tertiary education may result from attractive quality-to-price ratio of national system of university education which makes it possible for the Canadians to offer acquired qualifications to the south of their border and overseas. Immigration policies in Israel and Canada may also contribute to high percentages of university graduates. Export-oriented economies of Japan and South Korea by definition require substantial investment in highly qualified university graduates. None of these is applicable to modern Russia.
In volume terms the system of higher professional education in Russia demonstrates outstanding achievements: between 2000 and 2013 the annual number of graduates went up from 635100 to 1397300 (Russia statistical yearbook, 2013). Annual expenditures per student had also gone up from 2005 to 2009 by 60 percentage points (albeit from comparatively low level – OECD, Education at a Glance 2012), reaching $7 622.

However, when it comes to actual utilization of acquired knowledge and skills, the situation becomes quite different. Gross disproportions are observed between levels of qualification of employees in Russia and what is actually required for positions they occupy, especially in trade and services sector, transport and communications, housing and utilities, consumer goods and food industries. While certain types of services belong to the group of noncompetitive activities which would not experience any particular problems as a result of Russia’s accession to WTO, manufacturing and trade sectors with high percentage of employees with unreasonably high qualification (by their own estimates) as well as correspondingly high salary expectations may add additional financial burden on those sectors thus further lowering their competitiveness (Ankudinov and Lebedev, 2013).

The numbers may somewhat differ, however, all of them indicate the existence of substantial imbalances in structure as well as composition of workforce in Russia (Morgan and Kliucharev, 2012; Sinitsina, 2011).

Logical way out of the current predicament is achievement of closest possible correlation between attained level of education of workforce and professional functions they perform. However, it is much easier said than done: national traditions, soviet era heritage (rather than legacy) as well as formidable private interests make it a Herculean task. Besides, the labor market is not enough informationally efficient to send well-timed signals to national system of tertiary education. At the same time, it is at least naïve to expect that over-educated workforce on its own would drive labor productivity up; it would rather increase the labor costs. The example of Germany which has less than half as many university graduates as a percentage of total workforce than Russia demonstrates that it is possible to achieve a trade-off between level of educational attainment and efficiency of national economy.

More spending on education by no means always produce better results. In times of constrained resources the latter have to be allocated in the most efficient way. One of the well-known approaches here is to develop the system of vocational education and training programs, which can include education in advanced manufacturing, a skilled trade, or other specialized areas. To fix cars or keep accounting books one does need to hold university degree in mechanical engineering of accounting. Ideally, it should be a conscious decision to opt for the opportunity to acquire the practical skills, knowledge, and understanding necessary for employment in a particular occupation, but not a result of failure of a university graduate to be promoted to a managerial position.

Vocational education and training or well-established apprenticeship systems are well developed in a number countries, such as Austria, the Czech Republic, Germany, Slovenia and some others. It has nothing in common with the ill-fated soviet-era attempts dating back to the 1980-s to force youngsters to join technical vocational schools. Motivation has to be entirely economical; however, a number of collateral issues have to be addressed, including the problems of military draft, low social status of “blue collars” in modern Russia as well as the quality of vocational education and training programs.

Meanwhile, the current statistics demonstrate steady decline in the numbers of graduates of upper secondary vocational education and training programs: between 2005 and 2013 the annual number of graduates had steadily declined from 651400 to 486300 (Russia statistical yearbook, 2013).

Therefore, the issue of optimal level of educational attainment remains open: there is a variety of incentives acting sometimes in the opposite directions.

In the next section we address the problem of efficiency of investments in professional education using analytical financial tools of capital budgeting.

3. Economic efficiency of investment in attaining different levels of higher professional education

Since general analysis of incentives to attain professional education in Russia demonstrates inconclusive results while absolute figures indicate increasing demand for university degrees on the part of the population, we turn now to value-based approach towards analysis of educational investments efficiency.

The approach is by no means new: it has been developing since 1960-s mostly in the United States (Hansen, 1963; Becker, 1964; Mincer, 1974; Cohn and Geske, 1986; Cohn and Hughes, 1994), which is no wonder since
among the developed countries the latter is characterized by to the largest extent market-oriented decision-making when it comes to investment in education. However straightforward the application of Net Present Value and Internal Rate of Return criteria towards valuation of economic efficiency of investments in education is, it is the relevant assumptions that heavily influence the results and as such represent significant part of discussion in most publications. Quite a long history of research into the problem of cost-benefit analysis of educational investments includes the issues still remaining unresolved, such as the choice of proper discount rate for cash flows or valuation of growth options involved.

In this study we use the authoritative methodology of OECD (OECD, Education at a Glance 2013) which has been applied to perform the analyses of public and private costs and benefits of investment in education. Due to some reasons (most likely because of missing data) calculations for Russia are not presented in OECD publications. We try to make up for this gap, since as far as our knowledge goes no attempt of comprehensive study using either Discounted Cash Flows (DCF) approach or econometric analysis of Russian data has been made. However, missing data did not allow us to calculate the public returns to professional education in Russia. Besides, interpretation of public versus private returns to education has to be performed with great caution, especially when it comes to emerging market economies. According to human capital theory it is individuals not governments who make decisions over investing in education (even if the latter up to a certain level may be compulsory, it is up to an individual to decide whether to invest his or her time and efforts in gaining skills and knowledge or just to simulate the efforts provided the system allows it). However, classical human capital theory is based on the assumptions of perfect markets and rational investors (individuals). Then the government simply has to follow the principle of (tax) neutrality, leaving the individuals to make value maximizing investment decisions. However, even developed market economies experience deviations from the ideal world where the aforementioned assumptions hold; even more so the new market economies, where in the living memory of the majority of population the state was responsible for almost all kinds of investing decisions including those concerning investment in education.

Up until recently DCF-based financial indicators of educational investment efficiency have generally been considered separately for particular levels of educational attainment. However, it is the incremental values of financial indicators that are of real importance when it comes to decision-making on the part of individuals. In line with the latest version of OECD methodology we compute the NPV and IRR of tertiary education separately for men and women in Russia as compared to a man and a woman attaining upper secondary or post-secondary non-tertiary education. Computations are performed in equivalent US Dollars.

Valuation of NPV and IRR indicators involve somewhat cumbersome calculations not presented here for the sake of brevity (the authors can provide detailed description of data and algorithms used upon request). Statistical information was obtained from Rosstat databases as well as data of RIA Novosti and National Research University Higher School of Economics monitoring of for-profit education.

Table 1 summarizes the results of NPV and IRR calculations for Bachelor’s (4 years of study), Specialist’s (5 years of study) and Master’s (6 years of study) degrees for the years 2005 to 2011.

<table>
<thead>
<tr>
<th>Year</th>
<th>Financial indicator</th>
<th>Men Bachelor</th>
<th>Men Specialist</th>
<th>Women Bachelor</th>
<th>Women Specialist</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>NPV</td>
<td>16 215.99</td>
<td>21 459.58</td>
<td>12 195.31</td>
<td>12 195.31</td>
</tr>
<tr>
<td></td>
<td>IRR</td>
<td>6.93%</td>
<td>10.33%</td>
<td>8.22%</td>
<td>9.34%</td>
</tr>
<tr>
<td>2007</td>
<td>NPV</td>
<td>32 861.43</td>
<td>42 202.55</td>
<td>25 315.47</td>
<td>25 119.28</td>
</tr>
<tr>
<td></td>
<td>IRR</td>
<td>8.24%</td>
<td>13.17%</td>
<td>10.12%</td>
<td>12.01%</td>
</tr>
<tr>
<td>2009</td>
<td>NPV</td>
<td>45 932.56</td>
<td>55 091.98</td>
<td>32 994.54</td>
<td>32 487.22</td>
</tr>
<tr>
<td></td>
<td>IRR</td>
<td>10.04%</td>
<td>15.69%</td>
<td>11.69%</td>
<td>13.84%</td>
</tr>
<tr>
<td>2011</td>
<td>NPV</td>
<td>58 850.87</td>
<td>70 822.37</td>
<td>44 814.45</td>
<td>43 987.55</td>
</tr>
<tr>
<td></td>
<td>IRR</td>
<td>9.92%</td>
<td>15.50%</td>
<td>8.99%</td>
<td>14.39%</td>
</tr>
</tbody>
</table>

In line with OECD methodology real interest rate of 3% is used as a discount rate (OECD, Education at a Glance 2013). A number of other important assumptions have been made. Due to insufficiency of relevant information we assumed that the relation between average incomes of men and women of the same age stays constant throughout all
the period under consideration. We also assumed the same rate of change with age in incomes of individuals with different levels of education. Educational grants as well as possible reduction of social benefits were not considered.

Equations and formulae should be typed in MathType, and numbered consecutively with Arabic numerals in parentheses on the right hand side of the page (if referred to explicitly in the text). They should also be separated from the surrounding text by one space.

4. Discussion

Cost-benefit analysis of economic efficiency of investment in tertiary education in Russia shows two distinctive trends: net present values of private investments in all types of tertiary education had gone substantially up between 2005 and 2011 for both men and women (increase in internal rates of return was by no means that dramatic). Second distinctive trend is that for both men and women the more advanced type of tertiary degree they attain the lower is its financial efficiency. While the first trend can be explained by macroeconomic trends as well as the very nature of NPV and IRR indicators as absolute and relative values respectively, the second one is in line with supposition made in previous sections of “over-education” of workforce in Russia. One should also take into account the mentioned earlier effect of a university degree of whatever quality and specialism as a precondition of acquiring any kind of position except manual worker posts, which is characteristic of some emerging markets. The latter explains why the gap in financial efficiency between 4 year Bachelor programs and 3-year vocational education and training programs is so wide.

Nevertheless, in general our findings demonstrate positive private outcomes of attainment of tertiary degrees of all types and are thus in line with the results of OECD analysis (albeit with comparatively low values of NPV).

However, a number of limitations of the performed analysis have to be noted. In addition to conceptual limitations and restrictive assumptions listed in the OECD report (OECD, Education at a Glance 2013), the choice of discount rate should be singled out as the major source of NPV overestimation. Effectively risk-free rate of 3% is hardly indicative of all risks involved in investing in human capital in an emerging market. High sensitivity of net present value of education towards discount rate forces us to urge great caution in interpreting the results of our calculations.

This study is on a preliminary stage and suffers from numerous other limitations. Nonetheless, the findings of our study may provide the reference and path for future research regarding cost-benefit analysis of investment in professional education from both private and public perspectives. Future research should focus on easing some of the numerous restrictions and limitations involved in the analysis. In particular, the problem of identifying the discount rate reflecting the specific risks involved in investing in human capital in emerging markets has to be thoroughly studied. The problems of embedded in professional education growth options valuation as well as cost-benefit analyses of educational investments in different fields of study can also be addressed. The latter line of research might become especially fruitful for emerging market economies since even in developed markets the financial efficiency indicators may substantially differ for different specialties inside the same field of study.

5. Conclusion

The results obtained in the course of our analysis of different factors affecting the efficiency of educational investments in Russia allow for the following conclusions:

- private net present values of investments in higher professional education remain positive for both men and women for the 2005-2011 period, albeit with substantially lower values of NPV as compared to average OECD values;
- private internal rates of return for the same period are comparable to those of OECD countries and demonstrate comfortable financial safety margin over the risk-free rate;
- both NPV and IRR indicators demonstrate general upward trend for the same period;
- net present values and internal rates of return of investment in Master’s degree attainment are substantially lower compared to those of Specialist’s and Bachelor’s degrees for both men and women;
the identified positive trend in private financial indicators of educational investments efficiency suggests that however unbalanced is the structure and composition of workforce in Russia, the unwelcome process of overtertiariaization of national economy will continue.

Acknowledgements

Andrei Ankudinov and MilyaushaBiktemirova acknowledge receiving support from state-funded research program of Kazan federal university. We are responsible for all errors, while Andrei Ankudinov is solely responsible for heavy style of the manuscript.

References

Russia (2013), Statistical Data Book, Rosstat, Moscow, 2013, p. 221.