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AN EFFECTIVENESS ANALYSIS OF INVESTMENT IN THE HIGHER EDUCATION SECTOR

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There is a high competition in and the rapid pace of change of the global market for higher education and research. That should lead to an increase in welfare, because education is a public wealth. Furthermore, investing in the higher education system could increase productivity in an economy. In that respect, the result of the R&D work should translate into a foundation for the birth and incubation of new business entities supported by new technologies. In the time of the economic crisis and growing scarcity of resources there is a need for a very informed decision making process. Henceforth, there should be an appropriate methodology for an effectiveness analysis of an investment in the Higher Education sector. This paper examines the issues from the Higher Education sector, Development and Growth Policy, and Cost Benefit Analysis.

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INTRODUCTION

The global market for higher education and research is becoming ever more competitive. In order to keep up with the rapid pace of change, universities are investing in their education and research infrastructure. Now that education and research has become a target of investment, a question arises about the profitability or the value for money of that investment. Since education is a public wealth, its effectiveness should be measured to demonstrate an increase in welfare. In order to make the right investment decision, policy makers and university authorities should compare their project proposals with alternatives. Such a comparison can prioritize the allocation of scarce capital to different levels of education by universities or governments.

Nowadays, a very important driver of investment processes is the internationalization of university activities such as science, technology transfer, and teaching. Public institutions and universities pay particular attention to innovation policies, e.g. Regional Innovation Strategies, in order to attract the international enterprises (MNEs) that are seeking the best location for their R&D activities (Prange 2008). As a result, cooperation between universities and industry takes place on a global level.

Investing in the higher education system or in the human capital at large, could increase the productivity in an economy. Hence, due to its scarcity, capital should be invested in both infrastructure and people to create a sufficiently strong synergy effect. There is a tendency in developed economies to put more emphasis on investing in R&D infrastructure, and as a result the investment in human capital is often neglected[1]. There is a growing body of evidence from developing countries that workers' productivity is correlated with the number of years spent in education. Some authors address this issue and use the example of China. Those authors ask the question "do the private returns to schooling as reflected in wage differentials accurately reflect differences in the true marginal product associated with education?" (Fleisher 2008). This issue is of much use in the evaluation of higher education investments.

DEVELOPMENT ECONOMIES AND DEVELOPMENT BASED ON EVIDENCE

There is a growing body of development literature which puts an emphasis on education as a development factor (Stiglitz 2002; Sachs 2005; Piasecki 2007; Easterly 2007). This is especially the case for research and development (R&D) and clusters as an engine for regional and national development (Porter 2008). The transformation processes taking place in developing countries are at the center of economic debate, with special emphasis on higher education as well. The Growth Report from 2008[2] produced by the Commission on Growth and Development, shows some interesting findings in the area of development policy. It shows the role of higher education in adding new skills and jobs to the economy and thus

[1] It is a very common mistake to think that such an obvious prerequisite is not worth bothering to study. However, the rapid change in the knowledge needs of a society and economy entails lifelong learning. As a result R&D investments may not suit the skill levels of the citizens.

[2] There was a follow up to this report; in October 2009 the Commission issued a Special Report – *Post Crisis Growth in Developing Countries*. The Commission ended its work in 2010.

mirrors the shift from the traditional time frame for education to lifelong learning. "Instead of providing targeted support to labor-intensive sectors, governments must expand higher education to support the growing service sector of the economy. Skills must be upgraded across the spectrum of employment. Otherwise, the disappearance of unskilled manufacturing jobs will leave the less skilled and less educated part of the population stranded without good employment options" (The Growth Report 2008: 9).

The Report shows that investments should be made as early as possible to bring gains to the economy. Different levels of education compete with each other for public money. Just like different public sector services compete with each other: particularly education, healthcare, and pensions (see Kwiek 2008a; Kwiek 2008). This shows that policy makers have a very important role to play in the process. "Investments in early childhood raise the returns to investments later in life—children must learn how to learn. How, then, should governments divide their budgets among primary, secondary, and tertiary education (that is, universities, colleges, and the like)?" (The Growth Report 2008: 38). This raises the question of investment allocations and the right education policy.

In terms of the interconnection between higher education and the global economy, the Report provides an important insight into the role of international education in knowledge transfer. For example, Chinese students travel around the world in order to receive a good quality education, especially to universities from the USA and Europe. "In general, higher education in advanced countries has figured prominently in the training of senior managers, policy makers, and political leaders in a wide range of countries. […] By studying abroad, students acquire international contacts, which will help them remain abreast of new thinking long after they have left the classroom" (The Growth Report 2008: 43). Furthermore, China's example provides evidence that the right development policy must be balanced. "…policy makers show an intense determination to expand higher education and research, in response to the growing demand for human capital" (The Growth Report 2008: 83).

In terms of the benefits of higher education to international trade, there is the example of Sub-Saharan Africa. A well-recognized drawback to trade is to be landlocked, which is often the case in Africa. Hence, investment in higher education should take into account teaching programs in commerce and international business knowledge. "As the investment in higher education rises, there is a growing incremental opportunity for "trade" in services, domestically and regionally, and perhaps internationally. This is of particular importance to landlocked countries" (The Growth Report 2008: 73). The role of the R&D in international trade is described by many authors

(Rymarczyk i Wróblewski 2004; Rynarzewski i Zielińska-Głębocka 2006). Multinational enterprises (MNEs) pay ever more attention to the higher education sector in locations where they want to put their operations.

AMERICAN UNIVERSITIES: THE HIGHER EDUCATION WORLD ROLE MODEL

Many in the academic community envy the USA's higher education system. Nonetheless, there are a growing number of analysts that look at it with skepticism. The Economist compared today's Universities with the car industry in the America of the past, which was once the envy of the world. The magazine argues that value for money is simply not present in the USA's higher education system, that it tends to put an emphasis on hiring star professors and invests heavily in luxury infrastructure, such as fancy sport arenas and dormitories. "This luxury model is unlikely to survive what is turning into a prolonged economic downturn. Parents are much less willing to take on debt than they were and much more willing to look abroad for better deals. The internet also poses a growing threat to what Bill Gates calls "place-based colleges". Online, you can listen to the world's best lecturers for next to nothing. America's universities lost their way badly in the era of easy money. If they do not find it again, they may go the way of GM" (The Economist. Sep 2nd 2010). That is the problem with over-investment, which in a time of crisis does not fit the situation and provides universities instead with higher maintenance costs. This is evidence for why the e-learning concept cannot flourish. In a period of austerity, investment in the field of higher education will not be unaffected. In terms of a cost benefit analysis, this kind of investment could be regarded as unimportant for citizens, whereas in fact it is rather in the self-interests of universities, helping them attract more and more students.

POLAND'S INVESTMENT IN THE HIGHER EDUCATION SECTOR UNDER THE EUROPEAN UNION COHESION POLICY 2007-2013.

Projects in the field of R&D infrastructure should determine the direction of research in Poland in the years to come by building a knowledge-based economy. Individual projects are implemented in selected areas of activity in the higher education sector. What matters most is the scale and impact of the new Research Infrastructure (RI). The Polish government provided the legal framework for the implementation process to ensure that the

intervention reached the targeted beneficiaries. Some of the projects are of strategic importance for development, supported under the "Innovative Economy" Operational Programme, and are consistent with the objectives of the National Strategic Reference Framework for 2007–2013. The projects have been placed on the strategic list because of their contribution to the objectives of the National Development Strategy for the period 2007–2015, which is to raise the standards and quality of life of Polish citizens through investment in research and development. The most important objective of the projects is to provide infrastructure facilities with the capacity to carry out specialized research. Interdisciplinary research teams will also be supported to use the new RIs infrastructure projects. The teams in each of the R&D centers will conduct research and development projects targeted at the needs of industry on national and international levels. The results of the RIs activities should be translated into the number of companies using the services of these specialized research laboratories.

The selection of projects applying for funding under the "Innovative Economy" OP requires that the goals set by universities have been subjected to legal review and analysis. The individual projects were required to prepare an investment analysis using a specified methodology. Universities have to prepare a range of documents, including an application for funding, feasibility studies, and a report on environmental impact assessment.

The most important part of the evaluation is determined by a Cost-Benefit Analysis, which is the main analytical tool for assessing public investments. The Cost-Benefit Analysis method provides an investor with the information which can facilitate the decision-making process. A university must begin by defining the goals that will translate into benefits for the targeted beneficiaries. The second step requires identifying the scope of a project and what is necessary to achieve its objectives. After determining the basic elements of the project a feasibility study has to be carried out, with special emphasis on the description of alternatives. In terms of the organizational, legal and technical aspects of an investment in higher education, a managing body must be established. If a project is to generate revenue, it is necessary to conduct a demand analysis. A university should present alternatives to the basic scenario, to justify the investment decision. The alternatives analysis does not relate only to technical issues, but it also indicates how project objectives could be achieved differently.

The financial and economic analysis forms the largest part of the Cost Benefit Analysis. The financial analysis first determines the time horizon and constitutes the reference for forecasts. The financial analysis includes such aspects as the total investment cost, the calculation of performance indicators, the financial sustainability of the project, and, last but not least,

a calculation of the rate of co-financing (financing gap approach). The economic analysis is performed in order to measure the externalities of the project. The calculation of the economic net present value (ENPV) is a very important part of the analysis from the point of view of the project. The ENPV in principle, decides whether the project is worth funding, i.e. whether the benefits to society outweigh the costs. A sensitivity and risk assessment should be conducted as well, very often with the use of statistics. Nonetheless, some authors argue that there are many limitations in statistical approaches such as the Gauss normal distribution (Taleb 2010).

Evaluation of the effects of the project in the Cost-Benefit Analysis method makes it possible to demonstrate that the original assumptions and concepts could be translated into tangible socio-economic benefits. Each investment requires a financial analysis, which involves calculating the effectiveness indicators. The indicator most recognized by financial theory and practice is the net present value (NPV) which takes into account the time value of money. Formula 1.1 shows that we needed to know what the discount rate is that makes it possible to calculate the present value[3] of the future net cash flows.

Formula 1.1

$$NPV = \sum_{t=0}^{n} \frac{NCF_t}{(1+r)^t}$$

NPV – net present value; NCF – net cash flow; r – discount rate

This formula indicates the financial outcome of an investment. Nonetheless, it does not form the basis for policy makers in the field of higher education upon which the investment decision should be made. The NPV only informs as to the increase in value from an investor's perspective. Since higher education investments are made on the behalf of whole societies, the present value of an investment should be measured from a broader perspective. Thus we need to modify the NPV in order to show what the growth in welfare is. To do that we use the economic net present value (ENPV). Formula 1.2 shows the modifications which take into account the social factor of the investment[4]. The ENCF will be corrected by the deduction of indirect and direct taxes, adding social benefits and costs. For example, we add an increase in alumni incomes as a social benefit, and as a social cost we might introduce income lost during the time of studying. The social discount rate will mirror the expectations of the growth in regional or national welfare as expressed by the forecast for Gross Domestic Product (GDP).

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[3] For more on origins of and formula background, see Fisher, Irving (1907).

[4] For use of a cost benefit analysis and this approach to R&D investment analysis, see, for example: (European Commission 2008).

Formula 1.2

$$ENPV - \sum_{t=0}^{n} \frac{ENCF_t}{(1+sr)^t}$$

ENPV – economic net present value; ENCF – economic net cash flow;
sr – social discount rate

The economic net present value has many applications, and the more complex algorithm for the purposes of estimating higher education investment outcomes will be the subject of further studies.

CONCLUSIONS

The need to estimate the outcomes of R&D investment arise not only from a university's point of view but from that of a whole society as well. A well-recognized analytical tool for this purpose is a cost benefit analysis[5]. A standard approach should be based on financial cash flow, with further modifications towards economic flows. The difficult part of an R&D project is that the benefits of it will take years to materialize (i.e. the spin-off effects), and they are also very difficult to quantify.

A university's R&D project should have long–term effects which contribute to the building of a modern economy based on innovative solutions resulting from research work conducted by the R&D centre. Technologies and products developed in an R&D centre should raise the level of innovative enterprises. The result of the R&D work should translate into a foundation for the birth and incubation of new business entities supported by new technologies. In order to compete on European and global R&D markets, new investments should add the drivers of growth to an economy. Therefore, a project should increase the number of research and development projects, and this entails international cooperation. A very important social result is the number of directly created new jobs, including newly created full-time specialized jobs, with a positive change in the level of high skilled workers in an economy. The evaluation of a university's R&D investment should take all the above-mentioned indicators[6] into consideration. Henceforth, this should be the appropriate methodology for the effectiveness analysis of an investment in the Higher Education sector.

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[5] The cost benefit analysis is required by the EC for the R&D investments' approval process.

[6] This rational is behind many strategies and policies at the European Union level connected with the R&D sector.

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