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Education policies and performance of the Visegrad countries in light of their OECD membership: a comparative study

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Non scholae sed vitae discimus (Latin proverb)

Abstract: The Visegrad countries, i.e. the Czech Republic, Hungary, Poland and Slovakia, have been historically linked to each other and have followed comparable development paths. Apart from their recent cooperation in the Visegrad Group (V4), they went through the EU accession process in parallel (1993-2004), and joined the OECD within a few years' time (1995-2000). These processes have all impacted these countries in their transition from socialism to democracy and market economy. Nevertheless, the outcomes of this process vary country by country. The OECD, an international organization targeting economic development in the first place, plays a key role in the development of education in its member states. In fact, over the past few decades since the V4 countries joined the organization, the OECD has revisited the role of education attributing it the role of one of the key pillars of competitive economic development. Accordingly, the OECD has promoted education development through its guidelines and measurement schemes. In this paper, the V4's education policies and performance are assessed in light of their OECD membership. Quantitative and qualitative comparative analyses are carried out. As education is a long-term investment yielding results years after the investment is undertaken, we also seek to establish intertemporal correlations between the V4's investments in education and their economic performance today and in the future.
Keywords: Visegrad countries (V4), OECD, education, economic development, systemic transition

Introduction

The 20th anniversary of Poland's and Hungary's membership in the Organization for Economic Co-operation and Development

(OECD) serves as an opportunity to look back at what has happened in these countries since 1996. The time of them becoming members of the OECD was a time full of great expectations and hope. The Eastern enlargement of the European Union (EU) had already been initiated, the pain of economic transformation had lessened, and prospects of economic and social development were bright. In the early years following the collapse of communism in Central and Eastern Europe (CEE), there were substantial differences in the speed of advancements though (Csaba, 2007). Hungary used to be one of the best performers in many respects, but it lost most of its competitive advantages in the 2000s. In contrast, Poland's economy displayed some features and capabilities that could only be exploited later. Czechoslovakia split into two countries in 1993, so the original Visegrad group of three countries (V3) formed in February 1991 became a cooperation of four (V4) in 1993. These very countries established the Central European Free Trade Association (CEFTA) in December 1992 aiming in this way to consolidate their prospects of joining the EU within a reasonable period of time.

The Czech Republic was somewhat quicker than Poland and Hungary in joining the OECD in that it signed the organization's founding Convention on 12 December 1995. Slovakia, the 'latecomer' of the Visegrad countries in terms of transition, signed the Convention on 14 December 2000. Overall, by the turn of the millennium, all V4 countries were OECD members. The objective of this paper is to address the question of how education policies and performance of the V4 countries have been influenced by their OECD membership. Our hypothesis is that an evident correlation exists, namely that the vivid relations with and within the OECD have in fact shaped education policies in these countries, thus influencing not only their educational but also their economic performance. In order to address this research question, first, we make a case for education as the key pillar of economic development. In the next step, the increased attention and growing expertise of the OECD in view of education and its role in socio-economic development are highlighted. In what follows, the frequently neglected aspect of the systemic transition process in the V4 countries, namely the transformation of their educational systems and policies, is discussed. Next, by reference to data and statistical analysis, the V4 countries' performance in edu-

cation is presented and correlated with their economic performance. In the conclusions, we dwell on the lessons that can be drawn from the 20 years of the V4 countries' membership in the OECD.

1. A snapshot into the relationship between education and socio-economic development

Classical economics defines three basic factors of production: capital (K), labour (L), and area (A, the territory on which economic activities take place) (Kopányi, 1993). The model more or less adequately describes the framework of the 19th century capitalist economies. Nevertheless, in the 20th century, and especially in its second half, that form(ula) changes substantially. Two inter-connected factors enter the picture: technology that acts as a factor of production independent of capital and labour (and, frequently, of area as well). Partly embedded in technology, partly in other less tangible forms, a further factor of production that gains importance is knowledge (Boda, Juhász and Stocker, 2009). Economics can by no means disregard these developments.

Knowledge as a factor of production has some special characteristics. Specifically, knowledge is considered capital in the sense that it appears in stock and amortizes in time. Nevertheless, at the same time, knowledge is connected to the labour force in the sense that it only functions as a factor of production if it is utilised by individuals. These characteristics imply that the knowledge base has to be established and has to be continuously taken care of. This can be attained primarily through education, construed in its broadest sense. In this view, education is the activity in the course of which a crucial factor of production, i.e. knowledge, is created, maintained, and developed.

The World Economic Forum (WEF), an international not-for-profit organization established in 1971 that has published the Global Competitiveness Reports every year since 1979, has developed the Global Competitiveness Index (GCI). The GCI consists of 12 pillars defining the basic requirements of a country's competitiveness. Health and primary education are pillar 4, and higher education and training makes up pillar 5. According to the latest report (Schwab, 2015: 36), "basic education increases the efficiency of each individual worker", while

> [q]uality higher education is crucial for economies that want to move up the value chain beyond simple production processes and products. In particular, today's globalizing economy requires countries to nurture pools of well-educated workers who are able to perform complex tasks and adapt rapidly to their changing environment and the evolving needs of the production system (Schwab, 2015: 36).

In our investigation of the Visegrad countries' educational performance later in this study, we will use selected education indicators from the GCI (Figures 4-6).

The importance of education in countries' competitiveness is emphasized by the chief economist of the WEF, Sala-i-Martin (2010). He distinguishes between basic education, incl. literacy and primary schooling, as a component of basic human capital, and advanced education, incl. secondary and tertiary schooling and flexible skills, that is essential in advanced economies. He also stresses that the quality of education determines the wealth creation capabilities of countries, primarily through the following skills: complex problem solving capabilities, rapid adaptivity, and the ability to successfully react to new needs. Accordingly, in our analysis we will employ quality-of-education indicators from the GCI sub-indicators to assess the performance and prospects of the V4 countries.

Quite a different question is that of the relationship between the quality of higher education and training and a country's prospect to move up the value chain. Mankind produces products and services fulfilling its needs in more and more integrated ways. The higher the level at which a firm or an economy enters the value chain, the higher value added it is capable of realizing (Borbély, 2009). Stepping upwards the income ladder definitely has its own dynamics; however, education is a crucial element of the process. Therefore, evidently, education has an economic aspect. This has been recognised by another influential international organization in the field of economic development, i.e. the OECD.

2. The OECD and education: from a general interest to expert policy-advice

Education has been on the OECD's agenda since its establishment even if education as a separate goal or policy was not mentioned in

the founding Convention. Nevertheless, the importance of education within the OECD's activities has gradually increased; in parallel with its growing role in economic development worldwide. The decision to establish a separate Directorate for Education was made in 2002. At present, the OECD carries out research, forms recommendations, and fosters cooperation in the following fields of education: early childhood education and care, schooling (investments, organization and learners), transitions beyond initial education, higher education, lifelong learning and adults, the outcomes, benefits and returns from education, equity and equality of opportunity in education, innovation and knowledge management (OECD, 2012). In the latest *Education Today* report (OECD, 2012), the organization identified some phenomena and trends in member countries in relation to education. Accordingly, today's knowledge economy calls for an increasingly educated and skilled workforce. The importance of how pre-primary school education influences educational outcomes at later ages is gradually being recognized. While young people complete secondary education in increasing numbers (with girls outperforming boys), it is not only an issue of quantity. In other words, quality of education and equality in access to it matter greatly as well. Not surprisingly, teachers have a key role in delivering quality education. This in turn points out the importance of the quality of teachers' training.

As people's active lifetime expands, it becomes crucial that education at all levels, including lifelong education and on-the-job training schemes, actually equips people with the skills needed at the workplace. In fact, the ageing of the population calls for apt educational schemes at elder ages as well. The challenge is huge as training needs are changing dynamically so educational schemes have to be flexible, both methodologically and content-wise. In line with these trends, effective delivery of so-called soft skills such as the ability to learn and the ability to adapt is also an increasingly important task of education today. Last but not least, a major cultural shift is needed on behalf of policy makers, employers and employees towards optimal exploitation of talent. Overall, as the above discussion suggests, the challenges that successful educational policy-making needs to face are multiple and the stakes are high.

A rather popular and widely used and cited series of the OECD in the field of education is the annually published series of reports titled *Education at a Glance*. The series addresses the interest of a broad audience including governments, researchers, practicing educators, and policy experts. Every year, the report looks at the quality of learning outcomes, the policy measures and contextual factors shaping these outcomes, as well as the private and social returns on investments in education. Considerable progress has taken place since the launch of the series in 1998 but there are still shortcomings in a successful incorporation of the OECD data and findings in national policies. Therefore, in its consecutive reports, the OECD strives for equipping its member states with ever better tools designed to improve their own performance and thus deliver better results, not only in education but also in economic development.

3. Education: prospects and challenges as seen by the OECD

The latest edition of the *Education at a Glance* report (OECD, 2015) has identified certain rather robust causalities regarding learning outcomes, policies and the context of education. Of these, we find it crucial to emphasize that higher educational attainment levels definitely imply higher employment rates. This means that tertiary education is increasingly important in ensuring future employability. Furthermore, the benefits of education are not merely financial, i.e. better educated people enjoy better health conditions and have better life prospects overall. They are also more participative and have more trust in others. In general, they are more engaged in the world surrounding them. As for the challenges, the report states that, despite visible progress, women are still underrepresented in certain fields of education, especially in science, technology, engineering and mathematics (STEM). Furthermore, the report highlights, people's socioeconomic background still has a very strong impact on performance; these differences are further deepened by the selectivity of education systems. A rather new but significant post-crisis phenomenon is the NEET-challenge, i.e. not in employment, education or training, visible among the youth, that definitely has to be tackled by national policies that have been mostly unsuccessful in this respect so far. The

OECD nevertheless strives for providing policy recommendations to its members in this particular field too.

As for the financing of education in the OECD member countries, the global crisis had an impact in this regard as well; with a delay typical for social systems with large inertia. Therefore, it was between 2010 and 2012 that public spending on education fell in many OECD countries. It was due to the deteriorated public finance situation following the global financial and economic crisis. We will see later (in Figure 1) that the Visegrad countries were no exception from these trends; apart from the Czech Republic where the trend took a great momentum in this very time period. The issue is highly relevant as education in the OECD countries is mostly publicly funded. Nevertheless, among the educational sectors, tertiary education attracts the highest proportion of private sources, both in relative and absolute terms.

The Programme for International Student Assessment (PISA) carried out every three years since 2000 is perhaps the most widely known activity of the OECD in the field of education. Each PISA edition is an ample and thorough report on the at-that-time 15-year-olds' skills. There are three areas of constant PISA assessments: students' reading performance, mathematics performance, and science performance. In addition, in the course of each round of assessments, there is a fourth area of analysis. This fourth area is always defined by the PISA Governing Board. In the latest, the 2012 assessment, creative problem solving – students' skills in tackling real-life problems was this additional area (OECD, 2014). In our analysis, we will also take a look at the Visegrad countries' PISA results.

As a matter of fact, there are further tools by which the OECD aims at supporting its member countries in developing their education policies. These tools, less popular among the wide public, include The Programme for the International Assessment of Adult Competences (PIAAC), which measures adults' proficiency in key information-processing skills: literacy, numeracy, and problem-solving in technology-rich environments. The Teaching and Learning International Survey (TALIS) offers teachers and school leaders to express their views in 6 areas: learning environment, appraisal and feedback, teaching practices and classroom environment, development and support, school leadership, self-efficacy and job satisfaction. The Indicators of Education Systems (INES) initiative, under

the *Education at a Glance* publications, provides data on the performance of the education systems in the OECD member countries and a set of partner countries. The OECD Employment Outlook reports are also published annually, with special regard to their chapters on skills needs, skills use at work, skills mismatch, skills and inequality etc. In addition, the OECD regularly carries out various activities in the field of Lifelong Learning (LLL) and supports or manages further thematic research projects, e.g. Field, Kuczera and Pont (2007); OECD (2013); Auriol, Misu and Freeman (2013). In the following, we turn our attention specifically to the V4 countries and their membership in the OECD, with special regard to advancements in the field of education.

4. Transition of education systems in the Visegrad countries

Starting in 1989, the Central Eastern European countries (CEECs), formerly under political, economic and military influence and control of the Soviet Union, underwent a massive transition and transformation process, usually referred to as system change, aimed at establishing the foundations of democracy and market economy. This was an unprecedented transition compared to all that had happened before and has occurred in the world since then, regarding its complexity, its peaceful and non-violent nature, and the relatively short period of time in which it occurred (Kornai, 2006). It is out of the scope of this article to examine the nature of the transition in detail. Nevertheless, we do have to point out the "stop-go" nature of policy reforms in all fields, i.e. sometimes development has tendentiously been followed by uncertainty, stagnation, and often even regression (Mihályi, 2014).

Suffice it to stress that changes in education, including the education policy, content of the educational programmes and the design of the educational systems were part of the process of transition, also manifesting signs of this stop-go nature. In other words, changes in education followed a catching-up policy, including: the destruction of any political and ideological control in education, liberalization or the elimination of state monopoly. Education systems in the V4 countries in the 2000s still show signs of the socialist legacy. That is, in

a European comparison, there are high enrolment rates at lower levels (primary and secondary education) but lower employment levels with such educational attainments. Simultaneously, below-average enrolment rates and average employment rates are observable for the higher education group. On the other hand, participation in adult training has remained outstandingly low throughout the decades and such institutions and schemes are still largely missing in these countries (Farkas, 2011).

Even though the state remained the provider of basic educational services in these countries, it lost a significant amount of its power to affect education policy and the way schools work. This was accompanied by the recognition of free will, the right for every person to make their choices in relation to their own studies. Policy changes were different from one country to another as a result of their different geopolitical and historical characteristics but they did share a few common features: educational reforms were affected both by Western trends and by old, historical traditions, creating a synthesis of past practices and new, international trends. With the partial liberalization of the education sector, private institutions, international organizations, including the World Bank (WB), the OECD, or later the EU, and other actors came into play in shaping policy actions. Education expenses in all V4 countries started to increase and, simultaneously, the number of students started growing as well. Then, as economic actors realised the extent to which education can positively affect economic growth, educational attainment became an important factor influencing wages, providing an incentive for people to continue their studies (Eszes, 1997). By the millennium turn, the V4 countries encountered many problems and challenges in the field of education as well, which partly derived from their uneven social transformation processes. The WB, very active in the area, at that time providing financial aid for countries in need or in transition, assessed the CEEs education policies and identified five main challenges where improvements were needed.

In line with the WB's assessment (WB, 2001), the first challenge concerned the fact that, although by the turn of the millennium the transition from command economy to market economy had already been in progress for a decade, many CEEs were still struggling with the economic transition. Many of them were unable to catch up with

the new global, knowledge-based economy and successfully adjust to changes taking place worldwide. As a matter of fact, these countries faced the risk of returning to century-old education habits due to their inability to embrace new global reality. The second challenge, as identified by the WB, consisted in the argument that poverty and inequality had not decreased but risen in the CEEs over the period of transition. In fact, this issue had at that time been neglected by policymakers in the field of education and, among many other consequences, neglected the fact that a number of students from families without adequate income could not continue their education.

The third challenge the CEEs had to face was of financial nature. That is, new educational policy legislation led to institutional changes that resulted in an uneven distribution of funds and in shrinking financial resources. Following the implementation of respective reforms in education, funding arrived from different actors, not solely from the state as it used to be the case during communism. In many cases, education policy could not keep up with this fragmentation of funding and could not cope with changes in decision-making either, implying the delegation of responsibilities to lower levels, and the state losing its monopoly position as a decision-maker.

The fourth issue, even if not always associated with education policy, is that – as experts suggest – even if expenditure on education relative to GDP per capita is high, educational institutions in the CEEs, due to their organizational underdevelopment and thus relative inefficiency in relation to their counterparts in the more developed countries, require more resources than optimally needed to achieve their targets, thus making education cost-inefficient. This derives from budgeting traditions from pre-soviet eras, and from the fact that teachers are specialized in one or two subjects, implying that they are not fully utilized during a workday (WB, 2001). The final, fifth, challenge to the educational sectors in the CEEs was the new, multi-level education system with highly distributed responsibilities and roles, new actors, and the involvement of the civil sphere, companies, and even parents. It had to be learned how such systems could successfully be governed and what reorganization of tasks the new status quo required (Halász, 2002).

During the EU accession negotiations, 'Education and training' were negotiated under Chapter 18 of the accession treaties. At this point, it

has to be stressed that education and training belong primarily to the competences of EU member states. At the supranational level, there are only certain directives that have to be adopted, and there is the possibility to participate in the EU-managed programmes in these fields as well. In fact, the Erasmus programme is perhaps the most well-known, most popular, and the closest-to-the-people programme of the EU, ever. In the course of negotiating Chapter 18 of the accession treaties, none of the acceding countries claimed any transitional arrangements in that area (EC, 2002).

Accession to the EU in 2004 appeared to be a great opportunity for receiving substantial assistance in tackling education policy issues in the new member states. This expectation was not unfounded as at the EU level many reforms affecting education systems had been previously agreed. The 1998 Amsterdam Treaty created the legal basis for coordinating national employment policies, which was connected to education in the form of emphasis on training, competitiveness, and lifelong learning, thus embodying education in employment policy. The 2000 Lisbon Summit extended policy coordination to the social sector, including education as well and launching a new intergovernmental tool, the Open Method of Coordination (OMC). In the field of higher education, the Bologna Process was the first main European impulse for the new member states. In primary and secondary education, the new competence-based approach appeared as a similarly substantial input. The EU provided benchmarks in education as well, which served as orientation, and fostered coordination and monitoring (Halász, 2015).

5. The Visegrad countries' performance in education in light of their OECD membership

Having attained a threshold of systemic changes related to transition and transformation of their economies, starting in the late 1990s, education in the Visegrad countries begun to accommodate to the challenges and specificities prevalent in the international context. Following their joining of the OECD, as of 2000 (Table 1), the CEEs have participated in a number of assessment programmes run under the aegis of the OECD. These data offer an insight into the developments

and evolution of their respective education systems, policies, and approaches.

Table 1 shows the Visegrad countries' participation in the various assessment programmes organized by the OECD.

Table 1. Visegrad countries' participation in the OECD education assessment programmes

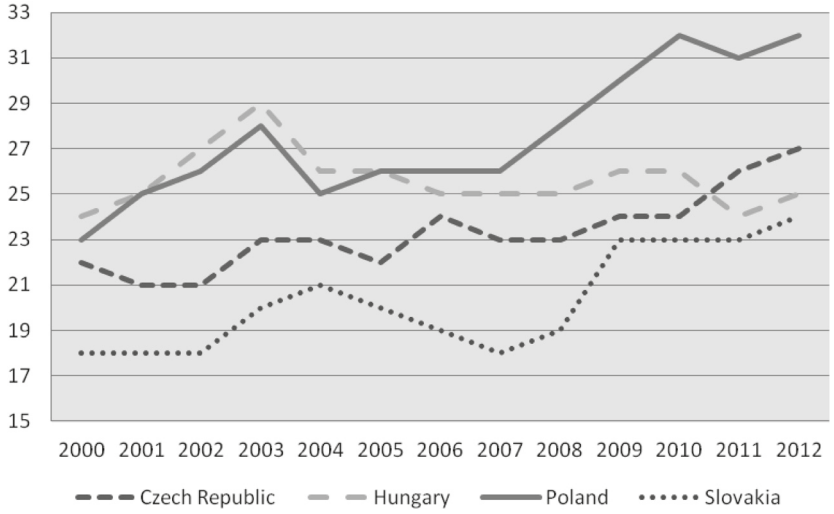
Country	Participation in programme										
	PISA 2000	PISA 2003	PISA 2006	PISA 2009	PISA 2012	PISA 2015	TALIS 2008	TALIS 2013	PIAAC Round 1 (2008-2013)	PIAAC Round 2 (2012-2016)	PIAAC Round 3 (2016-2019)
Czech Republic	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Hungary	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Poland	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Slovakia	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Authors' own compilation based on OECD data and reports, incl. Programme for International Student Assessment (PISA) 2000-2015, https://www.oecd.org/pisa/; The OECD Teaching and Learning International Survey (TALIS) 2008-2013, http://www.oecd.org/edu/school/talis.htm; Survey of Adult Skills (PIAAC) 2008-2019, http://www.oecd.org/skills/piaac/publicdataandanalysis/#d.en.408927 (accessed 2016-07-25).

As the V4 countries joined the OECD, the EU, and revitalized cooperation within the V4 group, extraordinary convergence with Western European countries as regards the main education indicators was recorded. The most prominent evidence of convergence took place in educational expenditures. Specifically, by 2012 the rate of annual expenditures, as percentage of GDP, increased to ca. 5%, which is the OECD average; expenditures per student have been constantly increasing as well (see also Pleśniarska, 2016).

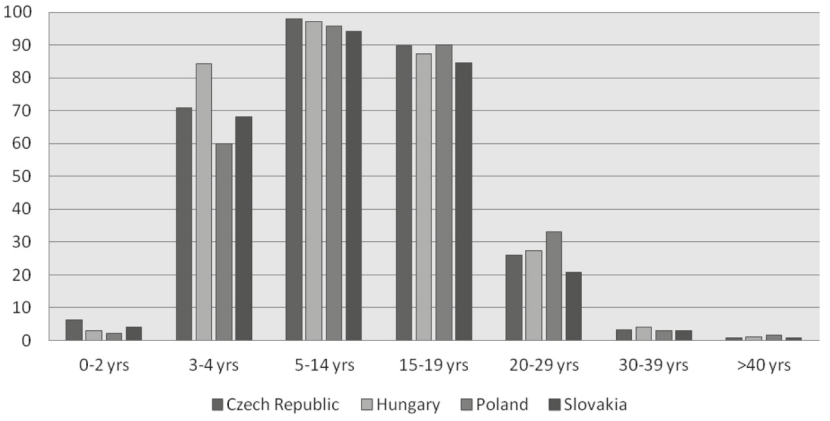
Figure 2 shows how per student expenditures relative to GDP per capita changed between 2000 and 2012. The figure reveals the variety in the dynamics across the V4 countries, with Poland spending the most per student every year since 2005, Slovakia following a more fluctuating, yet still increasing path, and Hungary losing momentum around the accession to the EU in 2004.

Figure 1. Annual expenditure per student relative to GDP per capita in the Visegrad countries based on full-time equivalents, 2000-2012



Source: Authors' own compilation based on OECD statistics, OECD.Stat, Dataset: Educational finance indicators (accessed 2016-06-29).

Figure 2. Enrolment rates as a percentage of the respective age group in the Visegrad countries, full- and part-time students in public and private institutions, 2013



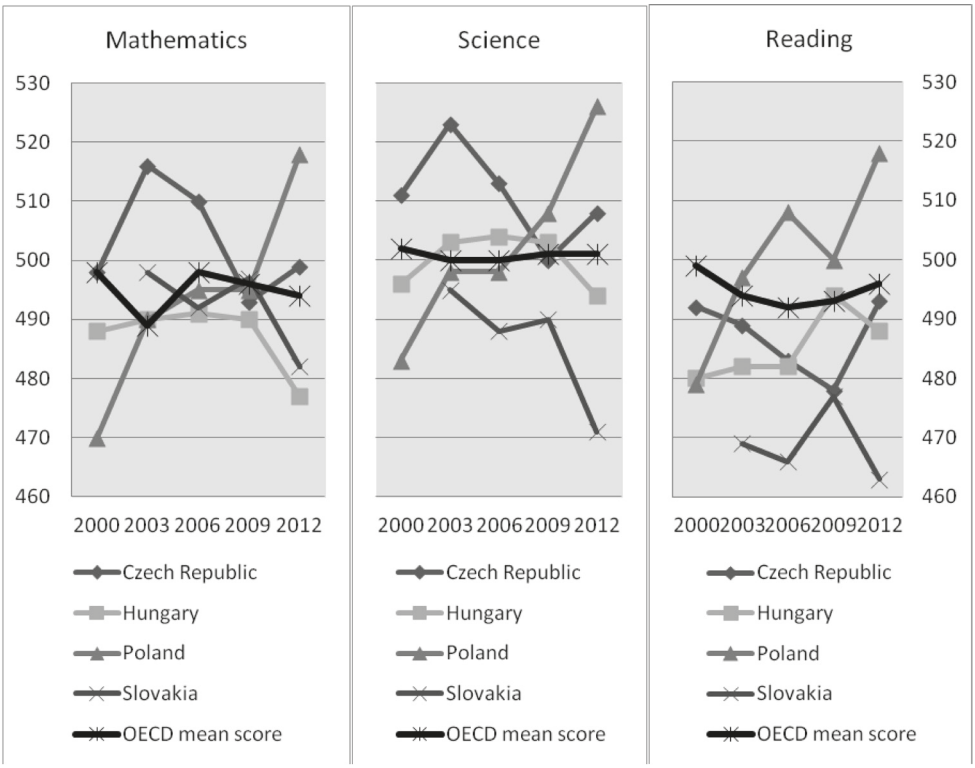
Source: Authors' own compilation based on OECD Online Education Database. OECD.Stat, Dataset: Enrolment rate by age (accessed 2016-07-20).

The number of students, and also their ratio relative to their age group has continuously increased in the Visegrad countries the past two decades. The fact that the rate of students enrolled in some form of education in the age groups 5-14 was nearly 100% in 2013 in all the four countries, and also very high, around 90% in the age group 15-19, confirms the previously mentioned awareness of better labour market opportunities (i.e. higher salaries) being an incentive to continue studies.

PISA scores are considered to provide an extensive description of students' skills in a given country. However, as PISA assesses only a given percentage of a given age group, the scores have their limitations. That is, they may give us an insight into students' performance but cannot offer a comprehensive picture of an entire society of students across ages and levels of education. Nevertheless, it is still important to view PISA scores as they do give us a more or less representative picture of the 15-year-olds, and provide us with an opportunity for comparison – between countries and in time. And also, the performance of the 15-year-olds in a given moment of time may help us in making predictions for employability in the foreseeable future. In this respect, not only the average performance but also the dispersion of the scores and especially the percentage of low-performers is significant (Csapó et al., 2014). Figure 3 shows how PISA scores in the V4 countries have changed relative to the OECD average in the past assessments. Note that Slovakia did not take part in the assessment in 2000 due to joining the organization only at the end of that year.

Drawing on data presented in Figure 3, Poland can currently be considered the best performer among the V4. Moreover, it is the very country that has shown the greatest improvement across the subsequent rounds of assessment, by now surpassing the OECD mean score by far. Actually, Poland was the worst performer in all areas among the examined three countries in 2000 so we can talk about a 'PISA-wonder' in the case of Poland. Until 2009, Hungary had also shown improvement (albeit a more moderate one than Poland had), especially in the field of reading comprehension. Unfortunately, in the 2012 assessment, the scores for Hungary fell; the worsening of performance in mathematics is also striking. Slovakia shows the worst results among the four (except for mathematics where currently Hungary performs the worst), and the tendency in the case of Slovakia is

Figure 3. PISA mean scores by fields assessed in the V4 and OECD-average, 2000-2014*



* 2000 data not available for Slovakia as it did not participate in PISA 2000

Source: Authors' own compilation based on OECD PISA results, incl.: OECD (2016), Mathematics performance (PISA) (indicator). doi: 10.1787/04711c74-en; OECD (2016), Reading performance (PISA) (indicator). doi: 10.1787/79913c69-en; OECD (2016), Science performance (PISA) (indicator). doi: 10.1787/91952204-en (accessed 2016-09-01).

worrying as well. As for the Czech Republic, after the fall-back from the 2006 levels, the country has started to show some improvement again. Based on the development of PISA scores, one can argue that Poland and the Czech Republic show comparable improvements while the other two V4 countries, Hungary and Slovakia represent exactly the opposite trends.

6. Extending the methodological framework: adding the GCI into the analysis

Partly due to the suspicion in relation to the limited usability of the PISA scores, partly because of the well elaborated and tested methodology of the WEF, in this study we were also interested in how the V4 countries performed along the Global Competitiveness Index (GCI) education indicators. From the many respective indicators used within the GCI composite index, we chose three: the quality of primary education, the quality of math and science education, and quality of management schools. The main reasons behind our choice were that, first of all, we intended to choose quality indicators. Second, that we wished to choose indicators that would cover the whole range of the education system: primary, secondary (including math and science education), and tertiary (there was no indicator available for quality of tertiary education as it was).

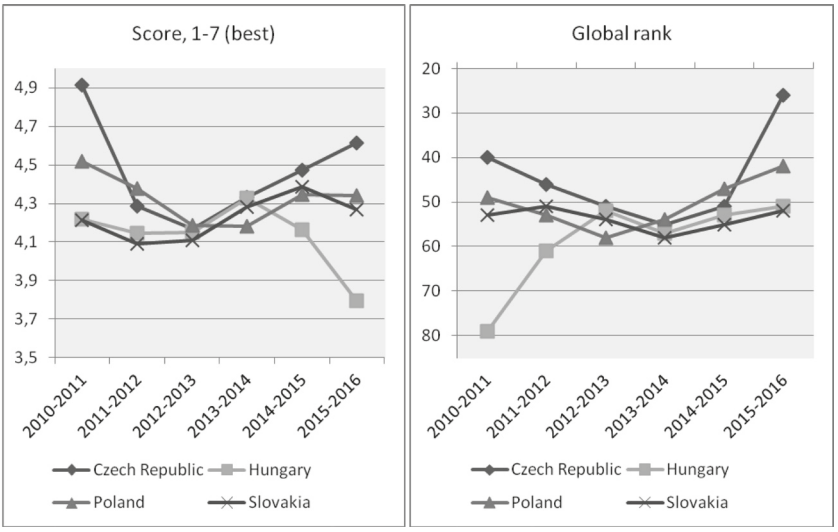
Moreover, the justification of choosing the indicator on the quality of management schools was that, later in our analysis, we were keen on finding relations between educational and economic performance. In this respect, management schools are essential. The quality-type indicators in the WEF methodology are based on answers from executive opinion surveys. That also implies that they provide a view on educational performance from the business community's perspective.

As for the time frame, we looked at the data from the latest six reports, starting with the 2010-2011 report, and ending with the 2015-2016 report. We looked at the four countries' scores along these indicators on the 1-7 scale, and also their positions in the global rank (Figures 4-6). We found it astonishing that the WEF data were largely in line with the other, evidence-based data we used.

As for the quality of primary education, the WEF data suggest that the Czech Republic has been recording a spectacular improvement recently, whereas Poland and Slovakia have not improved much, while Hungary has been showing an almost free-fall type fall-back since 2013.

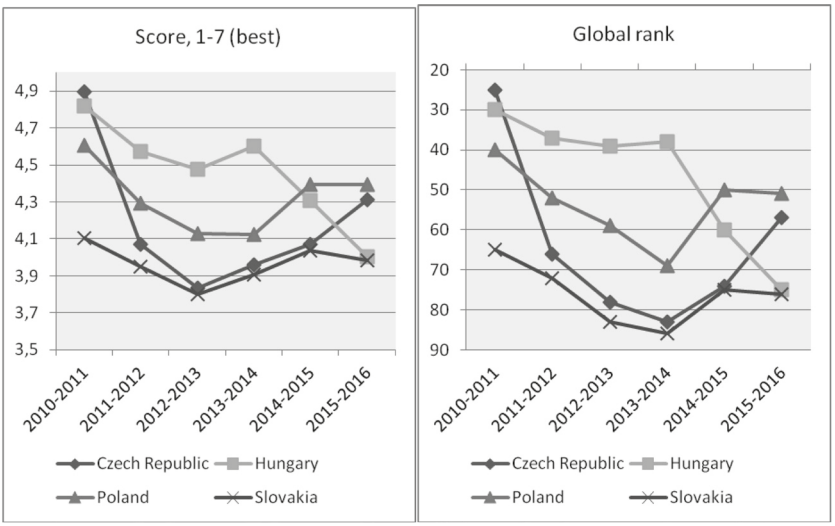
Of the indicators chosen from the WEF GCI, the one showing the quality of math and science education in the V4 countries is the most striking. That is, in the latest report (2015-2016), none of the four countries have reached performance levels recorded in 2010-2011. The worsening of the performance in the case of Hungary is almost shocking, both in terms of scores and global rank. The once so famous math and

Figure 4. Quality of primary education in the Visegrad countries, 2010-2016



Source: Authors' own compilation based on WEF GCI dataset, www3.weforum.org/docs/GCR2014-15/GCI_Dataset_2006-07-2014-15.xlsx (accessed 2016-09-01).

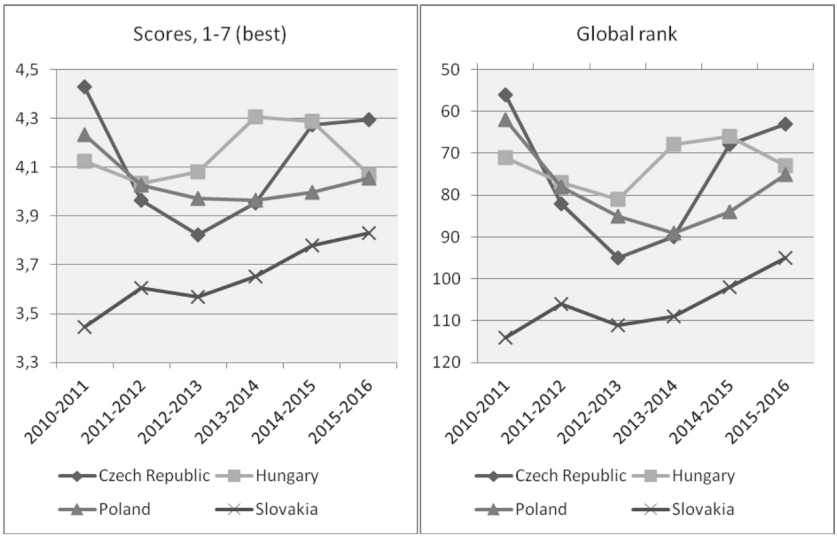
Figure 5. Quality of math and science education in the Visegrad countries, 2010-2016



Source: Authors' own compilation based on WEF GCI dataset, www3.weforum.org/docs/GCR2014-15/GCI_Dataset_2006-07-2014-15.xlsx (accessed 2016-09-01).

science education of Hungary seems to be history now. We can only speculate on the reasons behind this phenomenon. Firstly, the negative trends in the financing of education must have affected science education in particular as it has a relatively large financing need (amortizing machines, using substances, conducting experiments etc.). A second, very unfortunate explanation may be that, since the 1990s, with the expansion of students entering higher education, the quality of math and science higher education has not been secured. Even so, there has been a counter-selection among laureates in these fields: the least talented ones ended up in teaching positions while the better ones got employed by business. Third, learning math and science is difficult and the new generations appear less willing to make the effort. Therefore, a less and less prepared society of teachers attempts to teach less and less motivated and interested generations of students. More research is needed though to address this problem in detail.

Figure 6. Quality of management schools in the Visegrad countries, 2010-2016



Source: Authors' own compilation based on WEF GCI dataset, www3.weforum.org/docs/GCR2014-15/GCI_Dataset_2006-07-2014-15.xlsx (accessed 2016-09-01).

The quality of management schools has improved greatly in the V4 countries since the 1990s. Also in this respect, Slovakia has underperformed the group even though there is improvement in Slovakia as well. The other three countries' ranks in the 60-80 position range

globally seem absolutely realistic as they are all post-socialist emerging European countries where business school "traditions" started only in the 1990s.

7. Intertemporal correlations: education spending and educational performance

Having had a brief look at the selected indicators, we were tempted to find relations between them. To this end, we conducted some statistical analyses. We chose the method of intertemporal correlations. The value added of intertemporal correlations is that we can demonstrate how one factor is affecting another after a certain period of time. In fact, both academic literature and common sense suggest that education has a huge impact on future possibilities, both from an individual's and from a society's point of view. Three focused analyses were conducted. First, we examined the correlation between educational expenditures and employment rates, unemployment rates, the rate of NEET youth and GDP growth rates 2, 3, 4 and 10 years later than the given expenditure data (Appendix 1). Then, we examined intertemporal correlations between educational expenditures and employment and unemployment rates 10 years later (Appendix 2). Finally, we were interested to find intertemporal correlations between educational expenditures and GDP growth rates 4 years later (Appendix 3).

With regard to the correlation between educational expenditure and later employment rates, data show that education improves future employability. Changes in educational expenses trigger changes in the process and quality of education itself. For instance, taking away resources might make it impossible to use certain tools that lead to a decreased quality, which yields results years later.

Based on the available data, the largest effect of changes in educational expenditure can be observed in the Czech Republic. There is a strong, positive correlation between annual education expenditures and the employment data 2 years later. This positive connection may be misleading from the viewpoint that education is a long-term process, as the results can be seen more than 2 years later. Nevertheless, the logic behind this correlation is that those who entered the labour market in those 2 years had already spent long years in education. However, there is another interesting result in the same 2 years'

time span. Notably, increasing education expenditures decrease the rate of the youth not in employment, education or training (NEET), which seems to be a promising effect as it implies that more financial resources in education successfully decreases inactivity of the youth, which is crucial. The correlation between these two is negative, strong and significant (see Appendix 1).

In the case of Hungary, the effect of changes in educational expenses can be seen 4 years later, namely in the decreasing of the unemployment rate. This could be interpreted with increasing employment rates, too; however, the correlation between expenditures and employment rates is not significant. What is also surprising is that data suggest increasing educational expenses causing an increase in the rate of NEET youth 3 years later. We cannot interpret this result in itself; the phenomenon might have other influencing factors that are out of the scope of this examination.

As for Poland, the only significant correlation is again surprizing, i.e. it shows that any increase in educational expenses was followed by an increase in unemployment rates 2 years later. This, again, is a more complex phenomenon than is in our capacity to interpret. In the case of Slovakia, the analysis resulted in a logical conclusion, i.e. any increase in educational expenses decreases the rate of NEET youth 4 years later. Slow improvements in education might make it more attractive for the youth to re-enter education or to enter the labour market, which is also of great consequence.

With regard to the correlation between educational expenditures and future employment, we assumed that education influences people's future labour market status. In order to establish whether changes in education spending have an impact on labour market status in the longer term, we examined possible correlations between education expenses and employment and unemployment rates 10 years later (Appendix 2). Unfortunately, contrary to our expectations, we could not prove significant correlations, neither between expenses and employment rate, nor between expenses and unemployment rate. Nevertheless, according to our analysis, a strong positive correlation can in fact be observed between annual expenditures and GDP growth rates 4 years later (Appendix 3). This means that the effect of a given change in educational expenditures affects GDP growth in the same direction. That is, if we increase educational expenses relative to GDP, we can

expect a positive change in GDP growth rates as well, but a decrease in them might result in a decreased, or even negative GDP growth.

8. By means of conclusion: The V4's participation in the field of education on the OECD forum

The objective of this paper was to give an insight into the transition of education in the V4 countries following the systemic change, and to investigate what role the OECD has played in these processes. To this end, we overviewed the OECD's activities in the field, we examined the respective advancements in the Visegrad countries since the 1990s and, finally, we conducted a statistical analysis using the method of intertemporal correlations.

The value added of this paper is that it brings the notion of the impact of systemic transition on education in the V4 countries in the analysis. In this way, an important and yet so far under-researched aspect of the transition process is highlighted. At the methodological level, contrary to the prevailing practice in the field, in order to examine the correlations between educational policies, educational expenditures, and educational and economic performances, we drew from two sets of data, i.e. OECD and WEF, and assessed them individually in view of the V4's performance in the field of education. At the conceptual level, we matched our discussion on systemic transition in the CEEs and its impact on education with selected WEF indicators regarding levels of competitiveness. As a result, we established a direct link between economic and social transition, the transition of the education systems, and performance in education, with an implication on the economy.

In the course of our analysis, in order to acquire first-hand information on the subject of our discussion, we also carried out two interviews with two highly established Hungarian experts working with the OECD in the field of education in the past two decades, Gábor Halász and Benő Csapó. Halász is currently affiliated with the Eötvös Lóránd University. His first encounter with the OECD occurred with contributing to the country study on Hungary preceding the country's accession to the organization. He has also served as a member in the Governing Board of the OECD's Centre for Educational Research and Innovation (CERI). Our other interviewee, Csapó, is a professor at

the University of Szeged, a former member and, for a certain period, Vice President of the PISA Governing Board of the OECD. We were especially interested in their insights into the V4's participation in the OECD in the field of education, and whether their viewpoints supported our statistical findings.

They both emphasized that the OECD's impact in these countries has been manifold. There have been direct and indirect effects. The first input was the country review preceding membership that, among others, screened the acceding countries' education systems. In the initial period, national education policy makers were monitored and placed in an open communication space. It was a new situation which induced changes in language and debating style, and has gradually contributed to an objective discourse on the problems of education. Following the accession to the OECD, several discussions were organized within the organization on special topics that were relevant in these countries, e.g. teachers' training, school leadership, evaluation. Furthermore, there were thematic investigations which, by that time already OECD-members, the V4 countries could join. One of these was on the transition from school to work. In the course of such investigations, conducting the self-assessment based on the methodology of the OECD was already a complex learning process. It is difficult to assess the specific impacts that these activities have had on the education policy and performance of these countries but they have definitely contributed to the integration of national experts into the international community, and to the implementation of international good practices in these countries.

For example, as we also showed above, Poland performed rather poorly in the first PISA assessment in 2000. According to the interviewed experts, this has launched a long and consistent process of a system-level education reform overarching political cycles. In Poland, there was an exceptionally strong social consensus that this problem had to be tackled. The case of Germany had served as a benchmark for Poland because – similarly as in the case of Poland – the first PISA results were disappointing for Germany. As a result, Germany announced the ambition to become a 'Bildungsrepublik'.[1] Most lately, two Hungarian researchers, Drucker and Horn (2016) have investigated and robustly proved the positive labor market impacts of the Polish educational reforms. The main conclusion of their statistical analysis

is that, thanks to the reforms, two aspects have improved for Polish labor force: employability and wages. Most of the benefits were realized among the least educated employees, which has improved equity in the labor market overall.

As for the education sectors, higher education was the one that was most motivated to implement OECD recommendations and to participate in discussions. Primary and secondary education followed with delay. Actually, these latter actors were more worried than enthusiastic about the foreseen changes. For them, it was rather difficult to accept that, from the OECD accession onwards, education policy making was going to occur in this open communication space. It was very different from the closed systems of the socialist times. Another challenge was that the OECD had always encouraged direct dialogue among its members. It would have been plausible for the V4 countries as they share a lot in their history, culture, tradition, and even in their educational system. However, the opportunities lying in being members of such a community have yet to be explored to the full.

Education has taken an organic part in the changes in the Visegrad countries in the past 2-2.5 decades. Accession to the European Union and joining the OECD have both had a substantial impact on the educational policies and performance in these countries. As regards the OECD, it provides useful recipes, much information and evidence for policy-making, and ample room for learning and cooperation to its members. The V4 participation within the OECD is far from ideal though, unfortunately. There would be considerable opportunities for improvement in this respect. Poland and the Czech Republic are outperforming Hungary and Slovakia in almost all aspects of education. The V4, even within the OECD, could serve as a platform to share knowledge and experience, by which the former could serve as a benchmark to the latter ones. Historically, Hungary was developing at the fastest pace within the V4; not only in terms of education. The best performer's position has most lately been taken over by Poland. This can be seen in education performance data and in economic development data as well. There are many reasons behind these changes but educational expenditures belong to the decisive ones.

ENDNOTES

1 'Bildung' means training/education in German.

References

Auriol, L., Misu, M. & Freeman, R.A. (2013) 'Teachers for the 21st century: Using evaluation to improve teaching', *OECD Science, Technology and Industry Working Papers*, 2013/04, Paris: OECD Publishing.

Boda, G., Juhász, P. & Stocker, M. (2009) 'A tudás mint termelési tényező' [Knowledge as a factor of production], *Köz-gazdaság* [Economic Theory and Policy], 4(3): 117-132.

Csaba, L. (2007) *The New Political Economy of Emerging Europe*, 2nd edition, Budapest: Akadémiai Kiadó.

Csapó, B., Fejes, J.B., Kinyó, L. & Tóth, E. (2014) 'Az iskolai teljesítmények alakulása Magyarországon nemzetközi összehasonlításban' [Education performance in Hungary in an international comparison]. In: Kolosi, T. & Tóth, I. Gy. (eds.) *Társadalmi Riport 2014* [Social Report 2014], Budapest: TÁRKI: 110-136.

Drucker, L. F. & Horn, D. (2016) 'Kisebb szelekció – nagyobb kereset: Az 1999-es lengyel oktatási reform hatásának vizsgálata' [Narrower selection, wider demand: Examining the effects of the 1999 Polish education reform], *Közgazdasági Szemle* [Economic Review], 63(9): 944-965.

EC (2002) *Enlargement of the European Union: Guide to the Negotiations Chapter by Chapter*, Directorate-General Enlargement. Brussels: European Commission.

Eszes, I. (1997) 'Higher education in the Central and Eastern European Countries (CEECs)', *Conference paper*, BUSINET Conference, 24-27 September, Hannover, http://www.eszes.net/eTanulmanyok/highereducation_Eszes.pdf (accessed 2016-054-30).

Farkas, B. (2011) 'The Central and Eastern European model of capitalism', *Post-Communist Economies*, 23(1): 15-34.

Field, S., Kuczera, M. & Pont, B. (2007) *No More Failures: Ten Steps to Equity in Education*. Paris: OECD Publishing.

Halász, G. (2002) 'New challenges and opportunities for education policy in Central and Eastern Europe', *Local Government Brief*, Fall 2002: 22-30.

Halász, G. (2015) 'Education and social transformation in Central and Eastern Europe', *European Journal of Education*, 50(3): 350-371.

Kopányi, M. (ed.) (1993) *Mikroökonómia* [Microeconomics]. Budapest: Műszaki Könyvkiadó.

Kornai, J. (2006) 'The great transformation of Central Eastern Europe: Success and disappointment', *Economics of Transition*, 14(2): 207-244.

Mihályi, P. (2014) 'Mérlegen a rendszerváltás 25 éve' [The transition in a 25-year perspective], *Közgazdasági Szemle* [Economic Review], 61(7-8): 898-922.

OECD (2012) *Education Today 2013: The OECD Perspective*. Paris: OECD Publishing.

OECD (2013b) *Careers of doctorate holders: Analysis of labour market and mobility indicators*. Paris: OECD Publishing.

OECD (2014) *PISA 2012 Results: Creative Problem Solving: Students' Skills in Tackling Real-Life Problems (Volume V)*. Paris: OECD Publishing.

OECD (2015) *Education at a Glance 2015*. Paris: OECD Publishing.

Pleśniarska, A. (2016) 'The potential of education: Poland compared to selected OECD countries', *Yearbook of the Institute of East-Central Europe* (Special Issue: Visvizi, A. (ed.) Re-thinking the OECD's role in global governance: members, policies, influence), 14(4): 209-225.

Sala-i-Martin, X. (2010) 'The Economics behind the World Economic Forum's Global Competitiveness Index'. In: De Grauwe, P. (ed.) *Dimensions of Competitiveness*. Cambridge, MA & London, UK: The MIT Press: 1-18.

Schwab, K. (ed.) (2015) *The Global Competitiveness Report 2015-2016*. Geneva: World Economic Forum.

WB (2001) *Hidden Challenges to Educational Systems in Transition Economies*, Washington, DC: World Bank.

Appendix 1. Intertemporal correlations between educational expenditures and employment rates, unemployment rates and the rate of NEET youth 2, 3, 4 and 10 years later

Correlations		Annual expenditure Czech Republic	Annual expenditure Hungary	Annual expenditure Poland	Annual expenditure Slovak Republic	Employment t+2 Czech Republic	Employment t+2 Hungary	Employment t+2 Poland	Employment t+2 Slovak Republic	Employment t+3 Czech Republic	Employment t+3 Hungary	Employment t+3 Poland	Employment t+3 Slovak Republic	Employment t+4 Czech Republic	Employment t+4 Hungary	Employment t+4 Poland	Employment t+4 Slovak Republic	Unemployment t+2 Czech Republic	Unemployment t+2 Hungary
Annual expenditure Czech Republic	Pearson Correlation	1	-,268	,784**	,820**	,902**	,868*	,557	-,140	,646	,776*	,603	-,434	,348	,392	,038	-,528	-,196	-,670
	Sig. (1-tailed)		,188	,001	0,000	,007	,013	,126	,396	,083	,035	,103	,195	,250	,221	,471	,141	,355	,073
	N	13	13	13	13	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Annual expenditure Hungary	Pearson Correlation	-,268	1	,058	-,013	-,226	-,126	,422	0,000	-,301	-,546	-,725	,485	,628	,500	,198	,555	,405	,582
	Sig. (1-tailed)	,188		,425	,483	,333	,406	,202	,500	,281	,131	,052	,164	,091	,156	,353	,127	,213	,113
	N	13	13	13	13	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Annual expenditure Poland	Pearson Correlation	,784**	,058	1	,865**	,572	,621	,442	-,601	,673	,630	,296	-,357	,777*	,821*	,487	-,395	,418	,090
	Sig. (1-tailed)	,001	,425		0,000	,118	,094	,190	,103	,071	,090	,284	,244	,035	,023	,164	,219	,205	,433
	N	13	13	13	13	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Annual expenditure Slovak Republic	Pearson Correlation	,820**	-,013	,865**	1	,640	,636	,533	-,398	,860*	,775*	,385	-,008	,798*	,713	,244	,135	,231	-,051
	Sig. (1-tailed)	0,000	,483	0,000		,086	,087	,138	,217	,014	,035	,225	,494	,028	,056	,321	,399	,330	,462
	N	13	13	13	13	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Employment t+2 Czech Republic	Pearson Correlation	,902**	-,226	,572	,640	1	,960**	,751*	,201	,499	,518	,322	,534	-,761	-,761	-,649	-,983	-,418	-,872*
	Sig. (1-tailed)	,007	,333	,118	,086		,001	,043	,352	,250	,241	,339	,233	,225	,225	,275	,058	,242	,027
	N	6	6	6	6	6	6	6	6	4	4	4	4	3	3	3	3	5	5
Employment t+2 Hungary	Pearson Correlation	,868*	-,126	,621	,636	,960**	1	,837*	,010	,522	,544	,342	,511	-,752	-,752	-,659	-,981	-,218	-,775
	Sig. (1-tailed)	,013	,406	,094	,087	,001		,019	,492	,239	,228	,329	,244	,229	,229	,271	,062	,363	,062
	N	6	6	6	6	6	6	6	6	4	4	4	4	3	3	3	3	5	5
Employment t+2 Poland	Pearson Correlation	,557	,422	,442	,533	,751*	,837*	1	,066	-,654	-,619	-,788	,198	,682	,682	-,731	,225	-,108	-,623
	Sig. (1-tailed)	,126	,202	,190	,138	,043	,019		,451	,173	,191	,106	,401	,261	,261	,239	,428	,432	,131
	N	6	6	6	6	6	6	6	6	4	4	4	4	3	3	3	3	5	5
Employment t+2 Slovak Republic	Pearson Correlation	-,140	0,000	-,601	-,398	,201	,010	,066	1	-,345	-,327	-,487	,503	-,981	-,981	-,195	-,947	-,861*	-,600
	Sig. (1-tailed)	,396	,500	,103	,217	,352	,492	,451		,328	,337	,256	,249	,062	,062	,438	,104	,031	,142
	N	6	6	6	6	6	6	6	6	4	4	4	4	3	3	3	3	5	5
Employment t+3 Czech Republic	Pearson Correlation	,646	-,301	,673	,860*	,499	,522	-,654	-,345	1	,960**	,751*	,201	,499	,518	,322	,534	,193	,405
	Sig. (1-tailed)	,083	,281	,071	,014	,250	,239	,173	,328		,001	,043	,352	,250	,241	,339	,233	,404	,298
	N	6	6	6	6	4	4	4	4	6	6	6	6	4	4	4	4	4	4
Employment t+3 Hungary	Pearson Correlation	,776*	-,546	,630	,775*	,518	,544	-,619	-,327	,960**	1	,837*	,010	,522	,544	,342	,511	,193	,405
	Sig. (1-tailed)	,035	,131	,090	,035	,241	,228	,191	,337	,001		,019	,492	,239	,228	,329	,244	,404	,298
	N	6	6	6	6	4	4	4	4	6	6	6	6	4	4	4	4	4	4
Employment t+3 Poland	Pearson Correlation	,603	-,725	,296	,385	,322	,342	-,788	-,487	,751*	,837*	1	,066	-,654	-,619	-,788	,198	-,198	,092
	Sig. (1-tailed)	,103	,052	,284	,225	,339	,329	,106	,256	,043	,019		,451	,173	,191	,106	,401	,401	,454
	N	6	6	6	6	4	4	4	4	6	6	6	6	4	4	4	4	4	4
Employment t+3 Slovak Republic	Pearson Correlation	-,434	,485	-,357	-,008	,534	,511	,198	,503	,201	,010	,066	1	-,345	-,327	-,487	,503	-,812	-,564
	Sig. (1-tailed)	,195	,164	,244	,494	,233	,244	,401	,249	,352	,492	,451		,328	,337	,256	,249	,094	,218
	N	6	6	6	6	4	4	4	4	6	6	6	6	4	4	4	4	4	4
Employment t+4 Czech Republic	Pearson Correlation	,348	,628	,777*	,798*	-,761	-,752	,682	-,981	,499	,522	-,654	-,345	1	,960**	,751*	,201	,722	,803
	Sig. (1-tailed)	,250	,091	,035	,028	,225	,229	,261	,062	,250	,239	,173	,328		,001	,043	,352	,139	,099
	N	6	6	6	6	3	3	3	3	4	4	4	4	6	6	6	6	4	4
Employment t+4 Hungary	Pearson Correlation	,392	,500	,821*	,713	-,761	-,752	,682	-,981	,518	,544	-,619	-,327	,960**	1	,837*	,010	,590	,647
	Sig. (1-tailed)	,221	,156	,023	,056	,225	,229	,261	,062	,241	,228	,191	,337	,001		,019	,492	,205	,176
	N	6	6	6	6	3	3	3	3	4	4	4	4	6	6	6	6	4	4
Employment t+4 Poland	Pearson Correlation	,038	,198	,487	,244	-,649	-,659	-,731	-,195	,322	,342	-,788	-,487	,751*	,837*	1	,066	,593	,436
	Sig. (1-tailed)	,471	,353	,164	,321	,275	,271	,239	,438	,339	,329	,106	,256	,043	,019		,451	,203	,282
	N	6	6	6	6	3	3	3	3	4	4	4	4	6	6	6	6	4	4
Employment t+4 Slovak Republic	Pearson Correlation	-,528	,555	-,395	,135	-,983	-,981	,225	-,947	,534	,511	,198	,503	,201	,010	,066	1	,996**	,935*
	Sig. (1-tailed)	,141	,127	,219	,399	,058	,062	,428	,104	,233	,244	,401	,249	,352	,492	,451		,002	,033
	N	6	6	6	6	3	3	3	3	4	4	4	4	6	6	6	6	4	4
Unemployment t+2 Czech Republic	Pearson Correlation	-,196	,405	,418	,231	-,418	-,218	-,108	-,861*	,193	,193	-,198	-,812	,722	,590	,593	,996**	1	,742*
	Sig. (1-tailed)	,355	,213	,205	,330	,242	,363	,432	,031	,404	,404	,401	,094	,139	,205	,203	,002		,046
	N	6	6	6	6	5	5	5	5	4	4	4	4	4	4	4	4	6	6
Unemployment t+2 Hungary	Pearson Correlation	-,670	,582	,090	-,051	-,872*	-,775	-,623	-,600	,405	,405	,092	-,564	,803	,647	,436	,935*	,742*	1
	Sig. (1-tailed)	,073	,113	,433	,462	,027	,062	,131	,142	,298	,298	,454	,218	,099	,176	,282	,033	,046	
	N	6	6	6	6	5	5	5	5	4	4	4	4	4	4	4	4	6	6
Unemployment t+2 Poland	Pearson Correlation	,094	,661	,794*	,637	-,159	,032	,147	-,954**	,723	,723	-,034	-,321	,948*	,852	,561	,786	,803*	,656
	Sig. (1-tailed)	,430	,076	,030	,087	,399	,480	,407	,006	,139	,139	,483	,339	,026	,074	,219	,107	,027	,078
	N	6	6	6	6	5	5	5	5	4	4	4	4	4	4	4	4	6	6
Unemployment t+2 Slovak Republic	Pearson Correlation	,159	,469	,747*	,577	-,105	,111	,186	-,980**	,525	,525	,008	-,509	,894	,770	,563	,908*	,876*	,588
	Sig. (1-tailed)	,382	,174	,044	,115	,433	,430	,382	,002	,238	,238	,496	,246	,053	,115	,218	,046	,011	,110
	N	6	6	6	6	5	5	5	5	4	4	4	4	4	4	4	4	6	6

Unemployment t+2 Poland	Unemployment t+2 Slovak Republic	Unemployment t+3 Czech Republic	Unemployment t+3 Hungary	Unemployment t+3 Poland	Unemployment t+3 Slovak Republic	Unemployment t+4 Czech Republic	Unemployment t+4 Hungary	Unemployment t+4 Poland	Unemployment t+4 Slovak Republic	NEET t+2 Czech Republic	NEET t+2 Hungary	NEET t+2 Poland	NEET t+2 Slovak Republic	NEET t+3 Czech Republic	NEET t+3 Hungary	NEET t+3 Poland	NEET t+3 Slovak Republic	NEET t+4 Czech Republic	NEET t+4 Hungary	NEET t+4 Poland	NEET t+4 Slovak Republic
,094	,159	,402	-,298	,366	,524	-,035	-,138	,356	,390	-,832*	-,896*	-,455	-,440	-,760	-,924*	-,561	-,761	-,280	-,341	-,533	,211
,430	,382	,215	,283	,238	,143	,474	,397	,245	,223	,040	,020	,221	,229	,068	,012	,162	,068	,324	,287	,177	,366
6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5
,661	,469	-,313	,226	-,174	-,416	-,573	-,872*	-,797*	-,663	,399	,482	,912*	,675	,915*	,838*	,830*	,614	-,709	-,773	-,618	-,998**
,076	,174	,273	,333	,371	,206	,117	,012	,029	,076	,253	,205	,015	,106	,015	,038	,041	,135	,090	,063	,133	0,000
6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5
,794*	,747*	,247	-,199	,576	,557	,194	-,421	,374	,477	-,254	-,349	,136	,197	-,458	-,580	-,004	-,134	-,720	-,876*	-,507	-,505
,030	,044	,319	,352	,116	,125	,356	,203	,233	,169	,340	,282	,413	,375	,219	,153	,497	,415	,085	,026	,192	,193
6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5
,637	,577	-,036	-,424	,278	,220	-,483	-,930**	-,440	-,310	-,413	-,416	,173	,143	-,312	-,523	,006	-,260	-,803	-,951**	-,779	-,819*
,087	,115	,473	,201	,297	,338	,166	,004	,191	,275	,245	,243	,391	,409	,304	,183	,496	,336	,051	,006	,060	,045
6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5
-,159	-,105	-,391	-,764	-,660	-,555	-,362	,941	-,867	-,362	-,991**	-,978*	-,539	-,603	-,457	-,651	-,602	-,933*	-,127	,153	-,965	,179
,399	,433	,257	,066	,113	,166	,382	,109	,166	,382	,004	,011	,231	,199	,220	,117	,141	,010	,459	,451	,084	,443
5	5	5	5	5	5	3	3	3	3	4	4	4	4	5	5	5	5	3	3	3	3
,032	,111	-,412	-,779	-,639	-,526	-,378	,947	-,876	-,378	-,971*	-,983**	-,623	-,595	-,469	-,668	-,614	-,929*	-,145	,135	-,960	,196
,480	,430	,245	,060	,123	,181	,377	,104	,160	,377	,015	,008	,188	,202	,213	,109	,135	,011	,454	,457	,090	,437
5	5	5	5	5	5	3	3	3	3	4	4	4	4	5	5	5	5	3	3	3	3
,147	,186	,777	,430	,172	-,011	-,735	,994*	-,998*	-,735	-,983**	-,894	-,295	-,483	,789	,568	,409	,165	-,550	-,297	-,752	,593
,407	,382	,061	,235	,391	,493	,237	,035	,021	,237	,009	,053	,353	,258	,056	,159	,247	,395	,315	,404	,229	,298
5	5	5	5	5	5	3	3	3	3	4	4	4	4	5	5	5	5	3	3	3	3
-,954**	-,980**	,283	-,063	-,789	-,805	-,488	,979	-,928	-,488	-,264	-,215	,238	-,682	,148	,060	-,300	-,561	-,264	,014	-,919	,314
,006	,002	,322	,460	,056	,050	,338	,065	,121	,338	,368	,392	,381	,159	,406	,462	,312	,162	,415	,496	,129	,398
5	5	5	5	5	5	3	3	3	3	4	4	4	4	5	5	5	5	3	3	3	3
,723	,525	-,418	-,872*	-,159	-,105	-,391	-,764	-,660	-,555	,982	,866	,676	,850	-,991**	-,978*	-,539	-,603	-,457	-,651	-,602	-,933*
,139	,238	,242	,027	,399	,433	,257	,066	,113	,166	,061	,167	,264	,177	,004	,011	,231	,199	,220	,117	,141	,010
4	4	5	5	5	5	5	5	5	5	3	3	3	3	4	4	4	4	5	5	5	5
,723	,525	-,218	-,775	,032	,111	-,412	-,779	-,639	-,526	,982	,866	,676	,850	-,971*	-,983**	-,623	-,595	-,469	-,668	-,614	-,929*
,139	,238	,363	,062	,480	,430	,245	,060	,123	,181	,061	,167	,264	,177	,015	,008	,188	,202	,213	,109	,135	,011
4	4	5	5	5	5	5	5	5	5	3	3	3	3	4	4	4	4	5	5	5	5
-,034	,008	-,108	-,623	,147	,186	,777	,430	,172	-,011	,189	,500	-,737	,527	-,983**	-,894	-,295	-,483	,789	,568	,409	,165
,483	,496	,432	,131	,407	,382	,061	,235	,391	,493	,439	,333	,236	,323	,009	,053	,353	,258	,056	,159	,247	,395
4	4	5	5	5	5	5	5	5	5	3	3	3	3	4	4	4	4	5	5	5	5
-,321	-,509	-,861*	-,600	-,954**	-,980**	,283	-,063	-,789	-,805	,945	1,000**	,217	1,000*	-,264	-,215	,238	-,682	,148	,060	-,300	-,561
,339	,246	,031	,142	,006	,002	,322	,460	,056	,050	,106	0,000	,430	,010	,368	,392	,381	,159	,406	,462	,312	,162
4	4	5	5	5	5	5	5	5	5	3	3	3	3	4	4	4	4	5	5	5	5
,948*	,894	,193	,405	,723	,525	-,418	-,872*	-,159	-,105	,893	,941	,849	,693	,982	,866	,676	,850	-,991**	-,978*	-,539	-,603
,026	,053	,404	,298	,139	,238	,242	,027	,399	,433	,148	,110	,177	,256	,061	,167	,264	,177	,004	,011	,231	,199
4	4	4	4	4	4	5	5	5	5	3	3	3	3	3	3	3	3	4	4	4	4
,852	,770	,193	,405	,723	,525	-,218	-,775	,032	,111	,959	,866	,742	,555	,982	,866	,676	,850	-,971*	-,983**	-,623	-,595
,074	,115	,404	,298	,139	,238	,363	,062	,480	,430	,092	,167	,234	,313	,061	,167	,264	,177	,015	,008	,188	,202
4	4	4	4	4	4	5	5	5	5	3	3	3	3	3	3	3	3	4	4	4	4
,561	,563	-,198	,092	-,034	,008	-,108	-,623	,147	,186	,924	,359	,156	-,091	,189	,500	-,737	,527	-,983**	-,894	-,295	-,483
,219	,218	,401	,454	,483	,496	,432	,131	,407	,382	,125	,383	,450	,471	,439	,333	,236	,323	,009	,053	,353	,258
4	4	4	4	4	4	5	5	5	5	3	3	3	3	3	3	3	3	4	4	4	4
,786	,908*	-,812	-,564	-,321	-,509	-,861*	-,600	-,954**	-,980**	.c	.c	.c	.c	,945	1,000**	,217	1,000*	-,264	-,215	,238	-,682
,107	,046	,094	,218	,339	,246	,031	,142	,006	,002	0,000	0,000	0,000	0,000	,106	0,000	,430	,010	,368	,392	,381	,159
4	4	4	4	4	4	5	5	5	5	3	3	3	3	3	3	3	3	4	4	4	4
,803*	,876*	-,044	,983**	,911*	,960*	-,360	-,433	,138	-,198	,966**	,948**	,686	,562	,421	,921*	,309	,998**	-,437	-,418	,343	-,362
,027	,011	,478	,008	,044	,020	,320	,284	,431	,401	,004	,007	,100	,162	,289	,039	,345	,001	,282	,291	,329	,319
6	6	4	4	4	4	4	4	4	4	5	5	5	5	4	4	4	4	4	4	4	4
,656	,588	-,029	,838	,939*	,891	-,276	-,474	,276	,092	,888*	,985**	,693	,840*	,312	,782	,667	,929*	-,311	-,415	,291	-,422
,078	,110	,486	,081	,030	,055	,362	,263	,362	,454	,022	,001	,097	,037	,344	,109	,166	,036	,345	,293	,355	,289
6	6	4	4	4	4	4	4	4	4	5	5	5	5	4	4	4	4	4	4	4	4
1	,959**	,042	,706	,912*	,816	-,554	-,764	-,035	-,034	,410	,358	,495	,797	,294	,685	,805	,832	-,547	-,704	-,106	-,733
	,001	,479	,147	,044	,092	,223	,118	,482	,483	,246	,277	,198	,053	,353	,157	,097	,084	,226	,148	,447	,133
6	6	4	4	4	4	4	4	4	4	5	5	5	5	4	4	4	4	4	4	4	4
,959**	1	-,054	,836	,930*	,881	-,410	-,604	,138	,008	,207	,137	,180	,684	,287	,769	,670	,927*	-,433	-,548	,140	-,557
,001		,473	,082	,035	,059	,295	,198	,431	,496	,369	,413	,386	,101	,356	,116	,165	,036	,283	,226	,430	,221
6	6	4	4	4	4	4	4	4	4	5	5	5	5	4	4	4	4	4	4	4	4

Correlations		Annual expenditure Czech Republic	Annual expenditure Hungary	Annual expenditure Poland	Annual expenditure Slovak Republic	Employment t+2 Czech Republic	Employment t+2 Hungary	Employment t+2 Poland	Employment t+2 Slovak Republic	Employment t+3 Czech Republic	Employment t+3 Hungary	Employment t+3 Poland	Employment t+3 Slovak Republic	Employment t+4 Czech Republic	Employment t+4 Hungary	Employment t+4 Poland	Employment t+4 Slovak Republic	Unemployment t+2 Czech Republic	Unemployment t+2 Hungary
Unemployment t+3 Czech Republic	Pearson Correlation	,402	-,313	,247	-,036	-,391	-,412	,777	,283	-,418	-,218	-,108	-,861*	,193	,193	-,198	-,812	-,044	-,029
	Sig. (1-tailed)	,215	,273	,319	,473	,257	,245	,061	,322	,242	,363	,432	,031	,404	,404	,401	,094	,478	,486
	N	6	6	6	6	5	5	5	5	5	5	5	5	4	4	4	4	4	4
Unemployment t+3 Hungary	Pearson Correlation	-,298	,226	-,199	-,424	-,764	-,779	,430	-,063	-,872*	-,775	-,623	-,600	,405	,405	,092	-,564	,983**	,838
	Sig. (1-tailed)	,283	,333	,352	,201	,066	,060	,235	,460	,027	,062	,131	,142	,298	,298	,454	,218	,008	,081
	N	6	6	6	6	5	5	5	5	5	5	5	5	4	4	4	4	4	4
Unemployment t+3 Poland	Pearson Correlation	,366	-,174	,576	,278	-,660	-,639	,172	-,789	-,159	,032	,147	-,954**	,723	,723	-,034	-,321	,911*	,939*
	Sig. (1-tailed)	,238	,371	,116	,297	,113	,123	,391	,056	,399	,480	,407	,006	,139	,139	,483	,339	,044	,030
	N	6	6	6	6	5	5	5	5	5	5	5	5	4	4	4	4	4	4
Unemployment t+3 Slovak Republic	Pearson Correlation	,524	-,416	,557	,220	-,555	-,526	-,011	-,805	-,105	,111	,186	-,980**	,525	,525	,008	-,509	,960*	,891
	Sig. (1-tailed)	,143	,206	,125	,338	,166	,181	,493	,050	,433	,430	,382	,002	,238	,238	,496	,246	,020	,055
	N	6	6	6	6	5	5	5	5	5	5	5	5	4	4	4	4	4	4
Unemployment t+4 Czech Republic	Pearson Correlation	-,035	-,573	,194	-,483	-,362	-,378	-,735	-,488	-,391	-,412	,777	,283	-,418	-,218	-,108	-,861*	-,360	-,276
	Sig. (1-tailed)	,474	,117	,356	,166	,382	,377	,237	,338	,257	,245	,061	,322	,242	,363	,432	,031	,320	,362
	N	6	6	6	6	3	3	3	3	5	5	5	5	5	5	5	5	4	4
Unemployment t+4 Hungary	Pearson Correlation	-,138	-,872*	-,421	-,930**	,941	,947	,994*	,979	-,764	-,779	,430	-,063	-,872*	-,775	-,623	-,600	-,433	-,474
	Sig. (1-tailed)	,397	,012	,203	,004	,109	,104	,035	,065	,066	,060	,235	,460	,027	,062	,131	,142	,284	,263
	N	6	6	6	6	3	3	3	3	5	5	5	5	5	5	5	5	4	4
Unemployment t+4 Poland	Pearson Correlation	,356	-,797*	,374	-,440	-,867	-,876	-,998*	-,928	-,660	-,639	,172	-,789	-,159	,032	,147	-,954**	,138	,276
	Sig. (1-tailed)	,245	,029	,233	,191	,166	,160	,021	,121	,113	,123	,391	,056	,399	,480	,407	,006	,431	,362
	N	6	6	6	6	3	3	3	3	5	5	5	5	5	5	5	5	4	4
Unemployment t+4 Slovak Republic	Pearson Correlation	,390	-,663	,477	-,310	-,362	-,378	-,735	-,488	-,555	-,526	-,011	-,805	-,105	,111	,186	-,980**	-,198	,092
	Sig. (1-tailed)	,223	,076	,169	,275	,382	,377	,237	,338	,166	,181	,493	,050	,433	,430	,382	,002	,401	,454
	N	6	6	6	6	3	3	3	3	5	5	5	5	5	5	5	5	4	4
NEET t+2 Czech Republic	Pearson Correlation	-,832*	,399	-,254	-,413	-,991**	-,971*	-,983**	-,264	,982	,982	,189	,945	,893	,959	,924	.c	,966**	,888*
	Sig. (1-tailed)	,040	,253	,340	,245	,004	,015	,009	,368	,061	,061	,439	,106	,148	,092	,125	0,000	,004	,022
	N	5	5	5	5	4	4	4	4	3	3	3	3	3	3	3	3	5	5
NEET t+2 Hungary	Pearson Correlation	-,896*	,482	-,349	-,416	-,978*	-,983**	-,894	-,215	,866	,866	,500	1,000**	,941	,866	,359	.c	,948**	,985**
	Sig. (1-tailed)	,020	,205	,282	,243	,011	,008	,053	,392	,167	,167	,333	0,000	,110	,167	,383	0,000	,007	,001
	N	5	5	5	5	4	4	4	4	3	3	3	3	3	3	3	3	5	5
NEET t+2 Poland	Pearson Correlation	-,455	,912*	,136	,173	-,539	-,623	-,295	,238	,676	,676	-,737	,217	,849	,742	,156	.c	,686	,693
	Sig. (1-tailed)	,221	,015	,413	,391	,231	,188	,353	,381	,264	,264	,236	,430	,177	,234	,450	0,000	,100	,097
	N	5	5	5	5	4	4	4	4	3	3	3	3	3	3	3	3	5	5
NEET t+2 Slovak Republic	Pearson Correlation	-,440	,675	,197	,143	-,603	-,595	-,483	-,682	,850	,850	,527	1,000*	,693	,555	-,091	.c	,562	,840*
	Sig. (1-tailed)	,229	,106	,375	,409	,199	,202	,258	,159	,177	,177	,323	,010	,256	,313	,471	0,000	,162	,037
	N	5	5	5	5	4	4	4	4	3	3	3	3	3	3	3	3	5	5
NEET t+3 Czech Republic	Pearson Correlation	-,760	,915*	-,458	-,312	-,457	-,469	,789	,148	-,991**	-,971*	-,983**	-,264	,982	,982	,189	,945	,421	,312
	Sig. (1-tailed)	,068	,015	,219	,304	,220	,213	,056	,406	,004	,015	,009	,368	,061	,061	,439	,106	,289	,344
	N	5	5	5	5	5	5	5	5	4	4	4	4	3	3	3	3	4	4
NEET t+3 Hungary	Pearson Correlation	-,924*	,838*	-,580	-,523	-,651	-,668	,568	,060	-,978*	-,983**	-,894	-,215	,866	,866	,500	1,000**	,921*	,782
	Sig. (1-tailed)	,012	,038	,153	,183	,117	,109	,159	,462	,011	,008	,053	,392	,167	,167	,333	0,000	,039	,109
	N	5	5	5	5	5	5	5	5	4	4	4	4	3	3	3	3	4	4
NEET t+3 Poland	Pearson Correlation	-,561	,830*	-,004	,006	-,602	-,614	,409	-,300	-,539	-,623	-,295	,238	,676	,676	-,737	,217	,309	,667
	Sig. (1-tailed)	,162	,041	,497	,496	,141	,135	,247	,312	,231	,188	,353	,381	,264	,264	,236	,430	,345	,166
	N	5	5	5	5	5	5	5	5	4	4	4	4	3	3	3	3	4	4
NEET t+3 Slovak Republic	Pearson Correlation	-,761	,614	-,134	-,260	-,933*	-,929*	,165	-,561	-,603	-,595	-,483	-,682	,850	,850	,527	1,000*	,998**	,929*
	Sig. (1-tailed)	,068	,135	,415	,336	,010	,011	,395	,162	,199	,202	,258	,159	,177	,177	,323	,010	,001	,036
	N	5	5	5	5	5	5	5	5	4	4	4	4	3	3	3	3	4	4
NEET t+4 Czech Republic	Pearson Correlation	-,280	-,709	-,720	-,803	-,127	-,145	-,550	-,264	-,457	-,469	,789	,148	-,991**	-,971*	-,983**	-,264	-,437	-,311
	Sig. (1-tailed)	,324	,090	,085	,051	,459	,454	,315	,415	,220	,213	,056	,406	,004	,015	,009	,368	,282	,345
	N	5	5	5	5	3	3	3	3	5	5	5	5	4	4	4	4	4	4
NEET t+4 Hungary	Pearson Correlation	-,341	-,773	-,876*	-,951**	,153	,135	-,297	,014	-,651	-,668	,568	,060	-,978*	-,983**	-,894	-,215	-,418	-,415
	Sig. (1-tailed)	,287	,063	,026	,006	,451	,457	,404	,496	,117	,109	,159	,462	,011	,008	,053	,392	,291	,293
	N	5	5	5	5	3	3	3	3	5	5	5	5	4	4	4	4	4	4
NEET t+4 Poland	Pearson Correlation	-,533	-,618	-,507	-,779	-,965	-,960	-,752	-,919	-,602	-,614	,409	-,300	-,539	-,623	-,295	,238	,343	,291
	Sig. (1-tailed)	,177	,133	,192	,060	,084	,090	,229	,129	,141	,135	,247	,312	,231	,188	,353	,381	,329	,355
	N	5	5	5	5	3	3	3	3	5	5	5	5	4	4	4	4	4	4
NEET t+4 Slovak Republic	Pearson Correlation	,211	-,998**	-,505	-,819*	,179	,196	,593	,314	-,933*	-,929*	,165	-,561	-,603	-,595	-,483	-,682	-,362	-,422
	Sig. (1-tailed)	,366	0,000	,193	,045	,443	,437	,298	,398	,010	,011	,395	,162	,199	,202	,258	,159	,319	,289
	N	5	5	5	5	3	3	3	3	5	5	5	5	4	4	4	4	4	4

** Correlation is significant at the 0.01 level (1-tailed).
* Correlation is significant at the 0.05 level (1-tailed).
c. Cannot be computed because at least one of the variables is constant.

Authors' own calculations based on OECD Data.

Correlations between indicators of different countries cannot be interpreted, the intertemporal correlation analysis aims at discovering the relation of indicators of the same country. Interpretable correlations are shown in grey cells, significant correlations are shown in yellow cells.

Unemployment t+2 Poland	Unemployment t+2 Slovak Republic	Unemployment t+3 Czech Republic	Unemployment t+3 Hungary	Unemployment t+3 Poland	Unemployment t+3 Slovak Republic	Unemployment t+4 Czech Republic	Unemployment t+4 Hungary	Unemployment t+4 Poland	Unemployment t+4 Slovak Republic	NEET t+2 Czech Republic	NEET t+2 Hungary	NEET t+2 Poland	NEET t+2 Slovak Republic	NEET t+3 Czech Republic	NEET t+3 Hungary	NEET t+3 Poland	NEET t+3 Slovak Republic	NEET t+4 Czech Republic	NEET t+4 Hungary	NEET t+4 Poland	NEET t+4 Slovak Republic
,042	-,054	1	,742*	,803*	,876*	-,044	,983**	,911*	,960*	-,945	-,359	,985	,060	,966**	,948**	,686	,562	,421	,921*	,309	,998**
,479	,473		,046	,027	,011	,478	,008	,044	,020	,106	,383	,055	,481	,004	,007	,100	,162	,289	,039	,345	,001
4	4	6	6	6	6	4	4	4	4	3	3	3	3	5	5	5	5	4	4	4	4
,706	,836	,742*	1	,656	,588	-,029	,838	,939*	,891	,371	-,470	-,776	-,794	,888*	,985**	,693	,840*	,312	,782	,667	,929*
,147	,082	,046		,078	,110	,486	,081	,030	,055	,379	,344	,217	,208	,022	,001	,097	,037	,344	,109	,166	,036
4	4	6	6	6	6	4	4	4	4	3	3	3	3	5	5	5	5	4	4	4	4
,912*	,930*	,803*	,656	1	,959**	,042	,706	,912*	,816	-,529	,307	,875	,674	,410	,358	,495	,797	,294	,685	,805	,832
,044	,035	,027	,078		,001	,479	,147	,044	,092	,323	,401	,161	,265	,246	,277	,198	,053	,353	,157	,097	,084
4	4	6	6	6	6	4	4	4	4	3	3	3	3	5	5	5	5	4	4	4	4
,816	,881	,876*	,588	,959**	1	-,054	,836	,930*	,881	-,945	-,359	,985	,060	,207	,137	,180	,684	,287	,769	,670	,927*
,092	,059	,011	,110	,001		,473	,082	,035	,059	,106	,383	,055	,481	,369	,413	,386	,101	,356	,116	,165	,036
4	4	6	6	6	6	4	4	4	4	3	3	3	3	5	5	5	5	4	4	4	4
-,554	-,410	-,044	-,029	,042	-,054	1	,742*	,803*	,876*	-,500	-,189	-1,000**	-,158	-,945	-,359	,985	,060	,966**	,948**	,686	,562
,223	,295	,478	,486	,479	,473		,046	,027	,011	,333	,439	,009	,450	,106	,383	,055	,481	,004	,007	,100	,162
4	4	4	4	4	4	6	6	6	6	3	3	3	3	3	3	3	3	5	5	5	5
-,764	-,604	,983**	,838	,706	,836	,742*	1	,656	,588	-,791	-,548	-,936	-,521	,371	-,470	-,776	-,794	,888*	,985**	,693	,840*
,118	,198	,008	,081	,147	,082	,046		,078	,110	,209	,316	,115	,326	,379	,344	,217	,208	,022	,001	,097	,037
4	4	4	4	4	4	6	6	6	6	3	3	3	3	3	3	3	3	5	5	5	5
-,035	,138	,911*	,939*	,912*	,930*	,803*	,656	1	,959**	-,266	,064	-,960	,095	-,529	,307	,875	,674	,410	,358	,495	,797
,482	,431	,044	,030	,044	,035	,027	,078		,001	,414	,480	,090	,470	,323	,401	,161	,265	,246	,277	,198	,053
4	4	4	4	4	4	6	6	6	6	3	3	3	3	3	3	3	3	5	5	5	5
-,034	,008	,960*	,891	,816	,881	,876*	,588	,959**	1	,189	,500	-,737	,527	-,945	-,359	,985	,060	,207	,137	,180	,684
,483	,496	,020	,055	,092	,059	,011	,110	,001		,439	,333	,236	,323	,106	,383	,055	,481	,369	,413	,386	,101
4	4	4	4	4	4	6	6	6	6	3	3	3	3	3	3	3	3	5	5	5	5
,410	,207	-,945	,371	-,529	-,945	-,500	-,791	-,266	,189	1	,942**	,631	,679	-,996*	-,982	,226	,990*	-,394	-,700	-,703	-,812
,246	,369	,106	,379	,323	,106	,333	,209	,414	,439		,008	,127	,104	,029	,061	,427	,046	,371	,253	,252	,198
5	5	3	3	3	3	3	3	3	3	5	5	5	5	3	3	3	3	3	3	3	3
,358	,137	-,359	-,470	,307	-,359	-,189	-,548	,064	,500	,942**	1	,707	,765	-,573	-,778	,890	,529	-,072	-,427	-,432	-,577
,277	,413	,383	,344	,401	,383	,439	,316	,480	,333	,008		,091	,066	,306	,216	,151	,323	,477	,360	,358	,304
5	5	3	3	3	3	3	3	3	3	5	5	5	5	3	3	3	3	3	3	3	3
,495	,180	,985	-,776	,875	,985	-1,000**	-,936	-,960	-,737	,631	,707	1	,621	,915	,766	,276	-,934	-,989*	-,975	-,974	-,923
,198	,386	,055	,217	,161	,055	,009	,115	,090	,236	,127	,091		,132	,133	,222	,411	,116	,047	,071	,072	,126
5	5	3	3	3	3	3	3	3	3	5	5	5	5	3	3	3	3	3	3	3	3
,797	,684	,060	-,794	,674	,060	-,158	-,521	,095	,527	,679	,765	,621	1	-,182	-,447	,999*	,130	-,041	-,398	-,403	-,551
,053	,101	,481	,208	,265	,481	,450	,326	,470	,323	,104	,066	,132		,442	,352	,015	,458	,487	,370	,368	,314
5	5	3	3	3	3	3	3	3	3	5	5	5	3	3	3	3	3	3	3	3	3
,294	,287	,966**	,888*	,410	,207	-,945	,371	-,529	-,945	-,996*	-,573	,915	-,182	1	,942**	,631	,679	-,996*	-,982	,226	,990*
,353	,356	,004	,022	,246	,369	,106	,379	,323	,106	,029	,306	,133	,442		,008	,127	,104	,029	,061	,427	,046
4	4	5	5	5	5	3	3	3	3	3	3	3	3	5	5	5	5	3	3	3	3
,685	,769	,948**	,985**	,358	,137	-,359	-,470	,307	-,359	-,982	-,778	,766	-,447	,942**	1	,707	,765	-,573	-,778	,890	,529
,157	,116	,007	,001	,277	,413	,383	,344	,401	,383	,061	,216	,222	,352	,008		,091	,066	,306	,216	,151	,323
4	4	5	5	5	5	3	3	3	3	3	3	3	3	5	5	5	5	3	3	3	3
,805	,670	,686	,693	,495	,180	,985	-,776	,875	,985	,226	,890	,276	,999*	,631	,707	1	,621	,915	,766	,276	-,934
,097	,165	,100	,097	,198	,386	,055	,217	,161	,055	,427	,151	,411	,015	,127	,091		,132	,133	,222	,411	,116
4	4	5	5	5	5	3	3	3	3	3	3	3	3	5	5	5	5	3	3	3	3
,832	,927*	,562	,840*	,797	,684	,060	-,794	,674	,060	,990*	,529	-,934	,130	,679	,765	,621	1	-,182	-,447	,999*	,130
,084	,036	,162	,037	,053	,101	,481	,208	,265	,481	,046	,323	,116	,458	,104	,066	,132		,442	,352	,015	,458
4	4	5	5	5	5	3	3	3	3	3	3	3	3	5	5	5	5	3	3	3	3
-,547	-,433	,421	,312	,294	,287	,966**	,888*	,410	,207	-,394	-,072	-,989*	-,041	-,996*	-,573	,915	-,182	1	,942**	,631	,679
,226	,283	,289	,344	,353	,356	,004	,022	,246	,369	,371	,477	,047	,487	,029	,306	,133	,442		,008	,127	,104
4	4	4	4	4	4	5	5	5	5	3	3	3	3	3	3	3	3	5	5	5	5
-,704	-,548	,921*	,782	,685	,769	,948**	,985**	,358	,137	-,700	-,427	-,975	-,398	-,982	-,778	,766	-,447	,942**	1	,707	,765
,148	,226	,039	,109	,157	,116	,007	,001	,277	,413	,253	,360	,071	,370	,061	,216	,222	,352	,008		,091	,066
4	4	4	4	4	4	5	5	5	5	3	3	3	3	3	3	3	3	5	5	5	5
-,106	,140	,309	,667	,805	,670	,686	,693	,495	,180	-,703	-,432	-,974	-,403	,226	,890	,276	,999*	,631	,707	1	,621
,447	,430	,345	,166	,097	,165	,100	,097	,198	,386	,252	,358	,072	,368	,427	,151	,411	,015	,127	,091		,132
4	4	4	4	4	4	5	5	5	5	3	3	3	3	3	3	3	3	5	5	5	5
-,733	-,557	,998**	,929*	,832	,927*	,562	,840*	,797	,684	-,812	-,577	-,923	-,551	,990*	,529	-,934	,130	,679	,765	,621	1
,133	,221	,001	,036	,084	,036	,162	,037	,053	,101	,198	,304	,126	,314	,046	,323	,116	,458	,104	,066	,132	
4	4	4	4	4	4	5	5	5	5	3	3	3	3	3	3	3	3	5	5	5	5

Source: OECD (2015) *Education at a Glance*. Paris: OECD Publishing. Stat Links: http://dx.doi.org/10.1787/888933285378; http://dx.doi.org/10.1787/888933284983; http://dx.doi.org/10.1787/888933284991; http://dx.doi.org/10.1787/888933285997.

Appendix 2. Intertemporal correlations between educational expenditures and employment and unemployment rates 10 years later

Correlations		Annual expenditure Czech Republic	Annual expenditure Hungary	Annual expenditure Poland	Annual expenditure Slovak Republic	Employment t+10 Czech Republic	Employment t+10 Hungary	Employment t+10 Poland	Employment t+10 Slovak Republic	Unemployment t+10 Czech Republic	Unemployment t+10 Hungary	Unemployment t+10 Poland	Unemployment t+10 Slovak Republic
Annual expenditure Czech Republic	Pearson Correlation	1	-,268	,784**	,820**	,663	,616	,091	,174	-,827	-,838	-,837	-,455
	Sig. (1-tailed)		,188	,001	0,000	,169	,192	,455	,413	,086	,081	,081	,273
	N	13	13	13	13	4	4	4	4	4	4	4	4
Annual expenditure Hungary	Pearson Correlation	-,268	1	,058	-,013	,452	,248	-,161	,617	-,049	-,333	,483	,405
	Sig. (1-tailed)	,188		,425	,483	,274	,376	,419	,191	,475	,333	,258	,298
	N	13	13	13	13	4	4	4	4	4	4	4	4
Annual expenditure Poland	Pearson Correlation	,784**	,058	1	,865**	,402	,182	-,127	,728	-,025	-,204	,496	,208
	Sig. (1-tailed)	,001	,425		0,000	,299	,409	,437	,136	,487	,398	,252	,396
	N	13	13	13	13	4	4	4	4	4	4	4	4
Annual expenditure Slovak Republic	Pearson Correlation	,820**	-,013	,865**	1	,943*	,893	,522	,556	-,951*	-,997**	-,713	-,522
	Sig. (1-tailed)	0,000	,483	0,000		,028	,053	,239	,222	,025	,002	,144	,239
	N	13	13	13	13	4	4	4	4	4	4	4	4
Employment t+10 Czech Republic	Pearson Correlation	,663	,452	,402	,943*	1	,960**	,751*	,201	-,418	-,872*	-,159	-,105
	Sig. (1-tailed)	,169	,274	,299	,028		,001	,043	,352	,242	,027	,399	,433
	N	4	4	4	4	6	6	6	6	5	5	5	5

Employment t+10 Hungary	Pearson Correlation	,616	,248	,182	,893	,960**	1	,837*	,010	-,218	-,775	,032	,111
	Sig. (1-tailed)	,192	,376	,409	,053	,001		,019	,492	,363	,062	,480	,430
	N	4	4	4	4	6	6	6	6	5	5	5	5
Employment t+10 Poland	Pearson Correlation	,091	-,161	-,127	,522	,751*	,837*	1	,066	-,108	-,623	,147	,186
	Sig. (1-tailed)	,455	,419	,437	,239	,043	,019		,451	,432	,131	,407	,382
	N	4	4	4	4	6	6	6	6	5	5	5	5
Employment t+10 Slovak Republic	Pearson Correlation	,174	,617	,728	,556	,201	,010	,066	1	-,861*	-,600	-,954**	-,980**
	Sig. (1-tailed)	,413	,191	,136	,222	,352	,492	,451		,031	,142	,006	,002
	N	4	4	4	4	6	6	6	6	5	5	5	5
Unemployment t+10 Czech Republic	Pearson Correlation	-,827	-,049	-,025	-,951*	-,418	-,218	-,108	-,861*	1	,742*	,803*	,876*
	Sig. (1-tailed)	,086	,475	,487	,025	,242	,363	,432	,031		,046	,027	,011
	N	4	4	4	4	5	5	5	5	6	6	6	6
Unemployment t+10 Hungary	Pearson Correlation	-,838	-,333	-,204	-,997**	-,872*	-,775	-,623	-,600	,742*	1	,656	,588
	Sig. (1-tailed)	,081	,333	,398	,002	,027	,062	,131	,142	,046		,078	,110
	N	4	4	4	4	5	5	5	5	6	6	6	6
Unemployment t+10 Poland	Pearson Correlation	-,837	,483	,496	-,713	-,159	,032	,147	-,954**	,803*	,656	1	,959**
	Sig. (1-tailed)	,081	,258	,252	,144	,399	,480	,407	,006	,027	,078		,001
	N	4	4	4	4	5	5	5	5	6	6	6	6
Unemployment t+10 Slovak Republic	Pearson Correlation	-,455	,405	,208	-,522	-,105	,111	,186	-,980**	,876*	,588	,959**	1
	Sig. (1-tailed)	,273	,298	,396	,239	,433	,430	,382	,002	,011	,110	,001	
	N	4	4	4	4	5	5	5	5	6	6	6	6

** Correlation is significant at the 0.01 level (1-tailed).
* Correlation is significant at the 0.05 level (1-tailed).

Authors' own calculations based on OECD Data.
Correlations between indicators of different countries cannot be interpreted, the intertemporal correlation analysis aims at discovering the relation of indicators of the same country. Interpretable correlations are shown in grey cells, significant correlations are shown in yellow cells.
Source: OECD (2015) *Education at a Glance*. Paris: OECD Publishing. Stat Links: http://dx.doi.org/10.1787/888933285378; http://dx.doi.org/10.1787/888933284983; http://dx.doi.org/10.1787/888933284991.

Appendix 3. Intertemporal correlations between educational expenditures and GDP growth rates3, 4 and 10 years later

Correlations		Annual expenditure Czech Republic	Annual expenditure Hungary	Annual expenditure Poland	Annual expenditure Slovak Republic	GDP growth rate t+3 Czech Republic	GDP growth rate t+3 Hungary
Annual expenditure Czech Republic	Pearson Correlation	1	-,268	,784**	,820**	,390	,388
	Sig. (1-tailed)		,188	,001	0,000	,193	,195
	N	13	13	13	13	7	7
Annual expenditure Hungary	Pearson Correlation	-,268	1	,058	-,013	-,328	-,266
	Sig. (1-tailed)	,188		,425	,483	,236	,282
	N	13	13	13	13	7	7
Annual expenditure Poland	Pearson Correlation	,784**	,058	1	,865**	,396	,633
	Sig. (1-tailed)	,001	,425		0,000	,189	,064
	N	13	13	13	13	7	7
Annual expenditure Slovak Republic	Pearson Correlation	,820**	-,013	,865**	1	,255	,439
	Sig. (1-tailed)	0,000	,483	0,000		,291	,162
	N	13	13	13	13	7	7
GDP growth rate t+3 Czech Republic	Pearson Correlation	,390	-,328	,396	,255	1	,885**
	Sig. (1-tailed)	,193	,236	,189	,291		,004
	N	7	7	7	7	7	7
GDP growth rate t+3 Hungary	Pearson Correlation	,388	-,266	,633	,439	,885**	1
	Sig. (1-tailed)	,195	,282	,064	,162	,004	
	N	7	7	7	7	7	7
GDP growth rate t+3 Poland	Pearson Correlation	-,029	-,640	-,346	-,473	,556	,319
	Sig. (1-tailed)	,475	,061	,223	,142	,097	,243
	N	7	7	7	7	7	7
GDP growth rate t+3 Slovak Republic	Pearson Correlation	,098	-,088	,311	,166	,912**	,840**
	Sig. (1-tailed)	,417	,426	,248	,361	,002	,009
	N	7	7	7	7	7	7
GDP growth rate t+4 Czech Republic	Pearson Correlation	,816*	-,651	,411	,220	-,021	,145
	Sig. (1-tailed)	,013	,057	,180	,318	,484	,392
	N	7	7	7	7	6	6

GDP growth rate t+3 Poland	GDP growth rate t+3 Slovak Republic	GDP growth rate t+4 Czech Republic	GDP growth rate t+4 Hungary	GDP growth rate t+4 Poland	GDP growth rate t+4 Slovak Republic	GDP growth rate t+10 Czech Republic	GDP growth rate t+10 Hungary	GDP growth rate t+10 Poland	GDP growth rate t+10 Slovak Republic
-,029	,098	,816*	,740*	,148	,673*	,047	,650	-,320	-,064
,475	,417	,013	,028	,376	,049	,465	,081	,268	,452
7	7	7	7	7	7	6	6	6	6
-,640	-,088	-,651	-,292	-,416	-,550	-,640	-,046	-,830*	-,845*
,061	,426	,057	,263	,177	,100	,085	,466	,020	,017
7	7	7	7	7	7	6	6	6	6
-,346	,311	,411	,630	-,254	,266	-,469	,055	-,658	-,818*
,223	,248	,180	,065	,292	,282	,174	,459	,078	,023
7	7	7	7	7	7	6	6	6	6
-,473	,166	,220	,447	-,337	,048	,220	,783*	-,203	-,240
,142	,361	,318	,157	,230	,459	,338	,033	,350	,324
7	7	7	7	7	7	6	6	6	6
,556	,912**	-,021	-,021	,053	-,559	.c	.c	.c	.c
,097	,002	,484	,484	,460	,124				
7	7	6	6	6	6	0	0	0	0
,319	,840**	,145	,242	-,002	-,499	.c	.c	.c	.c
,243	,009	,392	,322	,499	,157				
7	7	6	6	6	6	0	0	0	0
1	,368	-,152	-,744*	,043	-,083	.c	.c	.c	.c
	,208	,387	,045	,468	,438				
7	7	6	6	6	6	0	0	0	0
,368	1	-,124	,111	,046	-,679	.c	.c	.c	.c
,208		,407	,417	,466	,069				
7	7	6	6	6	6	0	0	0	0
-,152	-,124	1	,885**	,556	,912**	.c	.c	.c	.c
,387	,407		,004	,097	,002				
6	6	7	7	7	7	1	1	1	1

Correlations		Annual expenditure Czech Republic	Annual expenditure Hungary	Annual expenditure Poland	Annual expenditure Slovak Republic	GDP growth rate t+3 Czech Republic	GDP growth rate t+3 Hungary
GDP growth rate t+4 Hungary	Pearson Correlation	,740*	-,292	,630	,447	-,021	,242
	Sig. (1-tailed)	,028	,263	,065	,157	,484	,322
	N	7	7	7	7	6	6
GDP growth rate t+4 Poland	Pearson Correlation	,148	-,416	-,254	-,337	,053	-,002
	Sig. (1-tailed)	,376	,177	,292	,230	,460	,499
	N	7	7	7	7	6	6
GDP growth rate t+4 Slovak Republic	Pearson Correlation	,673*	-,550	,266	,048	-,559	-,499
	Sig. (1-tailed)	,049	,100	,282	,459	,124	,157
	N	7	7	7	7	6	6
GDP growth rate t+10 Czech Republic	Pearson Correlation	,047	-,640	-,469	,220	.c	.c
	Sig. (1-tailed)	,465	,085	,174	,338		
	N	6	6	6	6	0	0
GDP growth rate t+10 Hungary	Pearson Correlation	,650	-,046	,055	,783*	.c	.c
	Sig. (1-tailed)	,081	,466	,459	,033		
	N	6	6	6	6	0	0
GDP growth rate t+10 Poland	Pearson Correlation	-,320	-,830*	-,658	-,203	.c	.c
	Sig. (1-tailed)	,268	,020	,078	,350		
	N	6	6	6	6	0	0
GDP growth rate t+10 Slovak Republic	Pearson Correlation	-,064	-,845*	-,818*	-,240	.c	.c
	Sig. (1-tailed)	,452	,017	,023	,324		
	N	6	6	6	6	0	0

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

c. Cannot be computed because at least one of the variables is constant.

GDP growth rate t+3 Poland	GDP growth rate t+3 Slovak Republic	GDP growth rate t+4 Czech Republic	GDP growth rate t+4 Hungary	GDP growth rate t+4 Poland	GDP growth rate t+4 Slovak Republic	GDP growth rate t+10 Czech Republic	GDP growth rate t+10 Hungary	GDP growth rate t+10 Poland	GDP growth rate t+10 Slovak Republic
-,744*	,111	,885**	1	,319	,840**	.c	.c	.c	.c
,045	,417	,004		,243	,009				
6	6	7	7	7	7	1	1	1	1
,043	,046	,556	,319	1	,368	.c	.c	.c	.c
,468	,466	,097	,243		,208				
6	6	7	7	7	7	1	1	1	1
-,083	-,679	,912**	,840**	,368	1	.c	.c	.c	.c
,438	,069	,002	,009	,208					
6	6	7	7	7	7	1	1	1	1
.c	.c	.c	.c	.c	.c	1	,885**	,556	,912**
							,004	,097	,002
0	0	1	1	1	1	7	7	7	7
.c	.c	.c	.c	.c	.c	,885**	1	,319	,840**
						,004		,243	,009
0	0	1	1	1	1	7	7	7	7
.c	.c	.c	.c	.c	.c	,556	,319	1	,368
						,097	,243		,208
0	0	1	1	1	1	7	7	7	7
.c	.c	.c	.c	.c	.c	,912**	,840**	,368	1
						,002	,009	,208	
0	0	1	1	1	1	7	7	7	7

Authors' own calculations based on OECD Data.
Correlations between indicators of different countries can not be interpreted, the intertemporal correlation analysis aims at discovering the relation of indicators of the same country. Interpretable correlations are shown in grey cells, significant correlations are shown in yellow cells.
Source: OECD (2015) *Education at a Glance*. Paris: OECD Publishing. Stat Link: http://dx.doi.org/10.1787/888933285378. OECD.Stat, Data extracted on 22 June 2016 16:56 UTC (GMT) from OECD.Stat, dataset: 1. Gross domestic product (GDP).