

## EMPLOYABILITY IN DIFFERENT EDUCATION REGIMES: A TRADE-OFF BETWEEN FORMAL EDUCATION AND SKILLS?

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### Abstract

Employability and skills has been an increasingly relevant topic in several fields such as political economy, labour economics and psychology. This paper builds upon established theories and explores the relationships between employability, formal education, early cognitive skills, and problem solving skills in technology-rich environments. We use data from OECD's Programme for International Adults Assessment of Competences and through the application of structural equation models we explore direct and indirect effects of the key factors on employability in four different institutional settings: nordic welfare-state model of Sweden, post-communist Czech Republic, strongly corporatist South Korea and liberal United Kingdom. A novelty in our paper is the conceptualisation of employability as a share of a person's working life she spent in paid work. Our findings show that while formal education is strongly related to employability in the Czech Republic and South Korea, it is rather problem solving skills that increase employability in the UK. In Sweden both of factors contribute to better employability.

### Keywords

Problem solving, Employability, Varieties of Capitalism, Structural Equation Model

### I. Introduction

Due to demographic and organisational changes, employability is an increasingly relevant topic in today's research: on the one hand, the ageing population and the declining birth rate lead to shortages in skills and labour; on the other hand, the restructuring of organisations brings about a more dynamic employment model based on careers with multiple employees rather than a single lifetime employment (De Grip et al., 2004; Kenny et al., 2007; and Clarke, 2008). These trends make career management, and hence employability skills, essential.

Our study draws from the theoretical background and tests the influence of some carefully chosen factors on employability. Such factors are cognitive abilities (based on large scale assessment instruments measuring literacy and numeracy, problem solving skills in technologically rich environment) as well as measures of participation in training, mobility and task flexibility. Our research has an explorative connotation: we investigate how these generic skills relate to employability in four different contexts: Nordic welfare-state (Sweden), post-communist (Czech Republic), strongly corporatist (South Korea) and liberal (United Kingdom).

The major contribution and novelty of our analysis lies in the measure of employability: we build an index of employability based on information on the share of time a person has been employed, and investigate how this relates to the chosen factors. Taking a "backwards" approach on employability

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gives scope for a more evidence-based analysis. This way we take into account working status of a respondent during her whole work-life, and not only at one point in time.

The next chapter reviews the employability concept, its development and applications in current research. Employability is subsequently linked to various types of skills that, as shown by literature, should increase one's employability. Third and fourth sections of this paper introduce the data and methodology used to explore the suggested links. The fifth section presents the results of empirical analysis. The concluding section discusses the impact our findings might have on policies as well as individuals in their efforts to increase employability.

## II. Literature

Employability, defined as the “individual's ability to find a job, retain a job and move between jobs and/or industries should the need arise” (Clarke, 2008: 262), has been the topic of multidisciplinary research since the 1950s. Initially concerned with workers' attitude to employment, the focus of employability research has changed in time: in the 1970s it shifted away from attitudes and towards occupational knowledge and skills. In 1978 Hoyt highlighted the importance of “transferable skills”, including social and relational skills, which are valuable across jobs and industries. In the 1980s the concept of employability was further expanded: employability was seen as a meta-characteristic, a combination of attitudes, knowledge and skills that determined the performance on labour markets. Finally, from the 1990s the supply-side approach has been integrated with considerations on other dimensions, like context or knowledge of labour market and company policies (Sanders and De Grip, 2004; and Kenny et al, 2007). As a result, employability is now seen as “a shared responsibility of government, employers/companies, and the individual employee” (De Grip et al., 2004: 215).

There is, however, no agreement in the literature over a delimited set of skills, nor on what their effective relationship with employability is. There is general consent in the literature on skills like literacy, communication, numeracy, IT, problem solving, alongside technical and interpersonal skills, being of key importance in determining one's employability (Kenny et al., 2007; and Clarke, 2008). Such skills are often referred to as “key skills”. At the same time, participation in training, mobility and task flexibility are generally seen as powerful instruments, in that they are an indicator of one's willingness and capacity of finding and keeping a job (Van Loo et al., 2001; Sanders and De Grip, 2004; and De Grip et al., 2004). Apart from the labour-market-oriented view, there is also a broader approach that emphasizes social skills and social aspects of employability (Bowden et al., 2000). This approach highlights capabilities that, on the one hand, contribute to person's success of finding and maintaining a job, and, on the other hand, helps her to be a better citizen and contribute to the society's overall wellbeing. We admit that our approach is rather restricted in this way and focuses only on the job-finding and job-maintaining abilities. This is partly due to data limitation, which we discuss below.

In our analysis we focus on two types of skills: cognitive skills and attitudinal skills. *Cognitive skills* are a result of the early environment and formal education, measured by the highest level of education completed. The literature suggests that cognitive skills are accumulated at a faster speed during the early stages of life (Kautz et al., 2014), and that the differences among individuals in their cognitive abilities can be considered to be relatively stable over the adult life (Mortensen and Kleven, 1993; Humphreys, 1989; Plassman et al., 1995). Saying that, we do not assume that the cognitive abilities within an individual do not change, quite the contrary. However, the deterioration seems to have the same pace among people, and thus the differences in cognitive skills are maintained to large extent. Deary et al. (2000) showed that “psychometric intelligence differences show high stability across most of the human lifespan” (Dary et al., 2000: 54). The authors followed

up on a validated test of psychometric intelligence taken by Scottish 11-years-old kids in 1932, by re-administering the same test to a sub-group of the original sample in 2008. The test had many items related to literacy (e.g. word classification, proverbs, and mixed sentences) and numeracy (e.g. arithmetic). The scores, 66 years apart, had an adjusted correlation of 0.73, which means that, in normal circumstances, the differences in psychometric abilities are indeed not strongly affected by time. Although there is still a scientific debate among cognitive psychologists on large scale assessment tests measuring either the general, fluid intelligence (g-factor) or instead domain-specific cognitive skills, it is widely accepted that individual differences remain stable over time (Rindermann, 2007; Gottfredson, 1997; and Brunner, 2008). We therefore take numeracy and literacy scores as measures of domain-specific cognitive ability. We acknowledge that this is not a perfect measure, but as the most recent score this is the best we can get. Additionally, we argue for the assumption of the stability of interpersonal differences in cognitive skills. Therefore, we believe that the most recent measure is a good proxy measure for interpersonal differences from earlier stages of life.

Problem solving skills, on the other hand, are more complex to approach and define. In PIAAC's specification, the core dimensions of problem solving skills in technology rich environments are the cognitive dimension, the technology and the tasks (OECD, 2009). The cognitive dimension includes skills to recognise the problem as difference between the current and the desirable status, and to identify proper actions and steps to be taken to achieve the desirable outcome (OECD, 2012), which makes problem solving skills identifiable as those "cognitive skills required in the information age" (OECD, 2016a.; 1). Problem solving skills, however, are rather malleable, at the very least in the technological dimension: a higher familiarity with the devices, which can be developed regardless of the age, has a positive impact on problem solving.

Problem solving skills is strongly related to numeracy and literacy skills. Despite problem solving skills in technology-rich environments obviously requiring cognitive abilities, there are reasons to treat them separately. Cognitive abilities are usually formed at early age and stable over time. However, the ability to understand a problem in technological environment, solve it, and translate the solution back into the language of technology (mostly computers) requires an upgrade in one's knowledge and skills as technology improves, regardless of the physical age. On the one hand, it takes general cognitive ability to recognize and understand the problem. On the other hand, additional knowledge (or training) is required to succeed. Therefore, we treat general cognitive abilities and problem solving in technology-rich environments separately in our analysis.

The last group of skills we explore are attitudinal or adaptability skill. They represent those non-cognitive skills that reflect a flexible mind-set. Such skills describe personal attitudes, and unlike cognitive skills like literacy or numeracy they are more malleable throughout the lifetime (Kautz et al., 2014). As De Grip et al. (2004) point out, "employability is about employees who are willing and able to be as pro-active as possible [...] to remain attractive for the labour market" (De Grip et al., 2004: 216). We therefore consider the following variables that can proxy for such willingness and ability: readiness to learn, participation in training, and degree of flexibility on the job. We believe that these skills reflect to some extent also willingness to participate in lifelong learning (for importance of lifelong learning see for example Boeren, 2017).

Furthermore, it must be noted that employability "depends on the sectoral intensity of various developments", namely technological, organisational, economic and demographic developments (De Grip et al., 2004: 220). Different sectors are affected by the aforementioned changes in different ways, and this affects employability. The needs of employability therefore are sector-specific. Weinert (2001) has shown that the domain-specific skills and knowledge are important, among others, for employment prospects and the lack thereof can hardly be compensated by general skills or intelligence. However, the sector-specific or profession-specific skills are difficult to

measure and they are usually not part of international large-scale assessment projects such as PIAAC. Allen and van der Velden explain that one of the reasons is that there is “no common assessment instrument that allows all different types of professional skills to be measured in a meaningful way for large populations.” (Allen and van der Velden, 2013: 358).

### III. Data

In order to examine the links suggested by the literature and modelled above we need data that combines the selected areas of peoples working life. OECD’s Programme for the International Assessment of Adult Competencies (PIAAC) provides the necessary information for our study. The tests measured respondents’ competencies and skills, while the background questionnaire mapped their economic status, different aspects of work, participation in formal and informal learning, education, etc. Therefore we consider PIAAC to be the appropriate source of data.

Unlike previous studies, we define employability in a retrospective way. Instead of considering employability in probabilistic terms, as it is common, we choose to define it in an empirical way (as it is sometimes measured as self-assessed ability, e.g. Sora et al., 2010) as the share of person’s working life during which she has had a paid job. We believe this new approach better proxies for one’s ability to get and maintain a job during the whole working life. By applying certain age limit (discussed to a further detail below), our analysis covers years 1993-2012.

There is a strand of sociological and economic literature that applies life course perspective in studying populations and people’s lives. As highlighted by Mayer (2009), life course research has increasingly become interdisciplinary, and combines anthropology, psychology, economics, sociology and others. We acknowledge that life course approach would enrich also employability studies. As Meyer puts it, “a marriage of the new political economy and comparative life course research could be highly productive... But the comparison of only two or three countries and the focus on very specific institutions and policies might prove to be more promising” (2009: 7). We agree with Meyer in that the life-course interdisciplinary approach may provide advancement in studying socio-economic phenomena, including employability. As we do not have longitudinal data and have not followed people’s employment history over time, we decided to approximate life-course approach by constructing a retrospective indicator of employability.

Using the PIAAC microdata we construct the employability indicator based on information on: (i) when a respondent finished her studies (and hence, most likely, entered the labour market); (ii) how old she is at the time of interview; and (iii) how many years she has had a paid job in the past. By combining this information we are able to know the length of respondent’s working life, regardless of the economic activity status. Finally, having information on number of years spent in paid job we can calculate the share of person’s working life that person has had a paid job. We admit that this approach assumes person entering labour force (not necessarily employment!) after finishing her studies. However, we consider it a sustainable assumption that people either take on a job or are searching for one after finishing their studies.

This approach allows us to conduct a more evidence-based analysis on the effectiveness of the different factors that the literature indicates are likely to play a role in shaping one’s employability. A “backwards” perspective on employability may also be more effective at capturing the medium- to long-term effects: while the traditional probabilistic approach investigates, for example, the relationship between the current willingness to mobility and the likeliness of employment, our approach takes a broader view on the possible effects of actual mobility in the past 5 years on employability. The fact that the PIAAC dataset is relatively rich in information on trainings, skills

and education allows us to link them to the actual, continual ability of persons to get and maintain a paid job.

We use PIAAC's literacy and numeracy test scores as measures of cognitive skills. The literacy test is designed to capture one's ability of "*understanding, evaluating, using and engaging with written texts to participate in society, to achieve one's goals, and to develop one's knowledge and potential*" (OECD, 2012: 20). The test contained 58 tasks. The numeracy test, instead, consisted of 56 items and measured the ability to "*access, use, interpret and communicate mathematical information and ideas, in order to engage in and manage the mathematical demands of a range of situations in adult life*" (OECD, 2012: 34). In addition to numeracy and literacy skills we also consider problem solving skills. OECD's measure is rather specific and it is formally known as problem solving skills in technologically rich environment (PSTRE). PSTRE is defined as:

*"using digital technology, communication tools and networks to acquire and evaluate information, communicate with others and perform practical tasks. The first PIAAC problem-solving survey focuses on the abilities to solve problems for personal, work and civic purposes by setting up appropriate goals and plans, and accessing and making use of information through computers and computer networks"* (OECD, 2012: 47).

We use three variables to capture a person's attitudes towards her work and a flexible mindset: readiness to learn, flexibility on the job, and participation in learning activities. Firstly, we include PIAAC's derived index of readiness to learn, build upon six items (whether the respondent (i) relates new ideas into real life, (ii) likes learning new things, (iii) attributes something new, (iv) likes to get to the bottom of difficult things, (v) likes to figure out how different ideas fit together and (vi) looks for additional information for clarity). Secondly, we use the self-assessed measure of the degree of flexibility a person has in performing her job. Thirdly, we consider the number of learning activities the respondent has participated in during the past year. We believe these variables satisfactorily proxy for one's willingness to improve her skills.

In addition to the ones just described we take other variables containing background and demographic information, such as age, gender, education, parent's education, and number of children.

Our purpose is to investigate if and how, controlling for background and demographic characteristics, different skills are related to employability in our novel definition. It must be noted that there are strong reasons to believe that the mechanisms that link certain types of education to skills and subsequently to labour market differ across countries. A recent approach that connects the described concepts together is the Varieties of Capitalism approach, VOC (Hall, 2001; and Amable, 2003), which states that history, culture and legal systems have shaped different types of capitalistic contexts. The authors argue that countries with a particular type of institution tend to develop the complementary institutions, hence allowing for a clear grouping. Hall (2001) distinguished between liberal market economies and coordinated market economies. Amable (2003) considered five types: market-based, social-democratic, continental European, Mediterranean, and Asian. Finally, a whole new stream of authors attempt to apply the VOC approach to post-communist European countries (Feldmann, 2006; Lane and Myant, 2007; Nölke and Vliegenthart, 2009; Baboš, 2014).

We argue that the different complementary institutional settings developed by the countries, and especially institutions in the education sector and labour markets, play an important role in the processes that rewards certain types of skills and education more than others. Therefore we cannot expect education and skills such as PSTRE to impact employability in the same way across different varieties of political economic regimes. Selecting specific countries for comparison, however, is no simple task. To start with, the already mentioned diverse and somewhat flexible

VOC application and testing by practitioners introduces the first set of issues. Although there is no consensus on which typology explains the labour market processes and outcomes the best, and there are several typologies based on various input factors, the position of selected countries vis-à-vis others is maintained in most cases.

Let us briefly review just few of the typologies. VOC approach by Hall (2001) looks at political economic regimes as continuum with two ideal types, represented by Germany and USA in the real world. Amable used advanced statistical techniques to cluster countries according to the outputs in areas such as vocational education, corporate governance, labour markets, and others. Amable found five groups of countries with distinct institutional settings regarding the education sector and labour markets: anglo-saxon, continental, social-democratic, post-communist, Asian, Mediterranean. In his classification, as well as in Hall and Soskice's book (2001), Germany and USA represent two different types of political economic regimes but in addition to that, Amable found three other ideal types. Busemeyer and Trampusch (2012) focused particularly on skill formation systems and developed a typology, arguing that the most important characteristic that distinguishes systems apart is the dominant venue of training, be it state, trade unions, markets, or others. Following this logic, Busemeyer and Trampusch based their typology on two distinguishing characteristics: intensity of firm involvement and public commitment in vocational training. The result is a typology with four ideal types:

High involvement of firms and low public commitment leading to “segmentalist skill formation system”, as in Japan.

High involvement of firms and high public commitment leading to “collective skill formation system”, as in Germany.

Low involvement of firms and high public commitment leading to “statist skill formation system”, as for instance in Sweden.

Low involvement of firms and low public commitment leading to “statist skill formation system”, as for instance in the US or Ireland.

Although criteria used to classify countries into different groups are to a certain extent different from Amable, we can see the same countries to be positioned against each other in both typologies. Put alternatively, Sweden, Germany, an Anglo-Saxon country and an Asian country present examples of distinct types, with an additional group of post-communist EU countries in Amable's typology. We decide to select a representative of each group, following Amable's classification for the following reasons. Firstly, his classification takes into account more factors and sectors, that are interdependent in real economies and likely to play a role in employability. Narrowing our view just to venue of training would omit too many possible factors that influence person's performance on the labour markets. Secondly, we would like to include a country from post-communist part of the EU, since these are still very often omitted from empirical analyses, despite being in the EU for more a decade and presenting a considerable part of the EU's population.

Data limitation was another important issue. Therefore the country selection was partially limited and resulted in the following four representatives of various models of capitalism: nordic welfare-state model Sweden, the post-communist Czech Republic, the Asian corporatist Republic of South Korea and the liberal United Kingdom. The liberal (Hall, 2001) or market-based (Amable, 2003) setting of the UK is characterised by low expenditure on education system, which puts emphasis on general education, but underestimates vocational system. This is likely to have an impact on how labour markets reflects formal education on the one hand and rewards those who are participating in further training and show higher capabilities in problem solving. The Asian type of capitalism instead puts more emphasis on intra-corporation trainings and quality of formal education (Amable,

2003). Compliance with corporatist culture, i.e. attitudinal skills might be therefore appreciated higher by the Korean labour market than other set of skills. The social democratic system is known for rather developed system of trainings and social and family policies. Therefore, the effects of peoples skills on their employability might be less profound, since developed institutions can soften the individual differences. Lastly, the post-communist states are the most difficult to predict, for two reasons. First, they are not part of the most analytical works, whether theoretical or empirical (Hall, 2001; Amable, 2003; Buschemeyer and Trampusch, 2012). Second, scholars focusing on Central Eastern Europe are rather skeptical about the region forming a homogeneous group (Bohle and Greskovits, 2007; Myant and Drahokoupil, 2011; Baboš, 2014). However, there are still few features common to the post-communist states of Central Europe (incl. the Czech Republic). The economic transition in 1990s brought about flexibilisation of the labour market and privatization of many, previously state-owned firms. As noted by Lane, “the initial policy of marketization and privatization was legitimated by a neo-liberal policy. Advisers from the West advocated a transition to an Anglo-American type of capitalism.” The product- and labour markets were the fastest sectors of economy to transform, while the education and skill formation sectors lagged behind. This is why we expect that formal education would not play a significant role in person’s employability, while the problem solving skills along with attitudinal skills will be significant.

Finally, we had to make a choice on whether and how to limit the age of individuals in the analysis. The question is double-folded because there might be different reasons to impose the lower and upper age limits. As for the lower limit, we decided to include only people who are at least 24 years old in order to increase the comparability between individuals. Doing otherwise would have combine together people who started working right after secondary school with those who attended higher education, where the first group has more working years, therefore higher past employability at the same age, not necessarily due to skills. Secondly, imposing the upper age limit means setting the time-frame of our analysis. For the sake of avoiding the years of oil crisis in the west, and the times of the communism and planned economy in Eastern Europe, we set the age limit at 40. This means that our analytical timeframe is about 1993-2012.

#### IV. Methodology

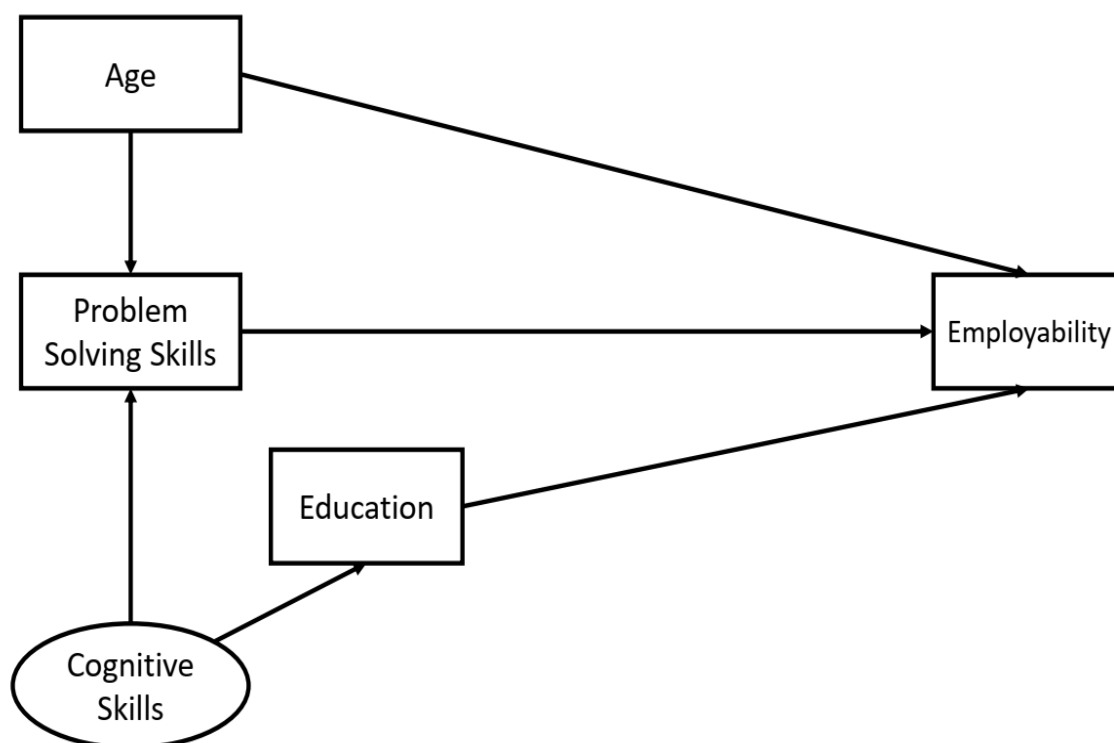
This study sets to explore relationships among out of which some are not directly observed, i.e. latent. As illustrated in our conceptual diagram (see below), the relationships we explore include direct and indirect effect which creates a complex, hierarchical structure. Therefore, we apply structural equation modelling (SEM), a method very well suited to estimate the effects in such a structure (Ullman et al., 2003; Kline, 2015).

SEM is a set of several techniques based on general linear models such as regression analysis. Our conceptual model combines one factor analysis and three regression analyses. The advantage of SEM over a set of separate analytical techniques performed step by step is twofold. Firstly, the causal networks of SEM “characterize real-world processes better than simple correlation-based models. Therefore, SEM is more suited for the mathematical modelling of complex processes to serve both theory and practice.” (Gefen et al., 2000; p. 4). Secondly, from computational point of view, the analysis is more rigorous and this technique provides “better methodological assessment tool“ (Gefen et al., 2000; 5, also in Bollen, 1989; Bullock et al., 1994; and Jöreskog and Sörbom, 1989).

The figure below presents our conceptual diagram and the relationships among the key variables we explore. Arrows are implicating the direction of influence. The diagram thus illustrates how cognitive skills have direct influence on employability, via increasing the problem solving skills and education. On the other hand, we explore also the possibility of a direct relationship between

problem solving skills and employability. Attitudinal skills are linked directly to employability in a similar fashion.

Figure 1: Conceptual Diagram



Source: Authors

## V. Empirical findings

Before estimating the effects suggested by our model we inspect the descriptive statistics of the key variables (presented in Table 1). Among the four examined countries, people in Sweden and the UK have relatively highest average employability, almost 78%. On the other hand, South Korea has considerably lower level of employability, 65% on average. This results is to a certain extent expected, as the female labour market participation is higher in Sweden and the UK than in South Korea. The two phenomena are related, i.e. if the average employability in one national economy is higher than in the other, than the overall employment rate is higher as well.

Regarding the literacy, numeracy and problem solving tests, Sweden, the Czech Republic and South Korea have very similar mean scores in all three variables. The UK shows consistently lower average score. Although the t-tests show that the difference between the UK mean and other countries means is statistically significant, bearing in mind the scale range we don't consider these differences substantial.



Concerning the attitudinal skills there are not large differences in average scores among the four countries. In order to examine which factors play a role in determining person's employability, we proceed to the results of structural equations estimations.

Table 1: Descriptive Statistics of the Key Variables by Country

		Obs	Mean	Std. Dev.	Min	Max
Employability	SWE	705	77.66	28.03	0	100
	CZE	1598	73.25	26.43	0	100
	KOR	1509	64.80	29.72	0	100
	UK	1483	77.88	26.26	0	100
Literacy	SWE	766	280.60	58.92	68.70	394.49
	CZE	1697	281.29	37.50	126.81	387.74
	KOR	1646	284.31	32.96	116.75	365.44
	UK	1786	271.15	47.31	114.10	385.74
Numeracy	SWE	766	277.86	64.26	71.05	410.98
	CZE	1697	280.73	41.59	121.86	395.13
	KOR	1646	275.41	36.82	111.73	373.29
	UK	1786	257.86	53.43	56.72	409.32
Problem Solving	SWE	671	301.06	38.02	168.01	397.39
	CZE	1458	288.27	40.77	159.83	471.68
	KOR	1449	285.86	30.72	190.24	382.00
	UK	1563	278.62	38.72	169.85	397.34
Training	SWE	764	1.03	0.90	0	2
	CZE	1691	0.84	0.91	0	2
	KOR	1643	0.90	0.92	0	2
	UK	1781	0.73	0.91	0	2
Flexibility	SWE	590	3.84	1.03	1	5
	CZE	1226	3.78	1.23	1	5
	KOR	1120	3.11	1.20	1	5

	UK	1186	3.18	1.27	1	5
Willingness	SWE	762	4.15	0.77	1	5
	CZE	1696	4.13	0.84	1	5
	KOR	1644	3.36	1.04	1	5
	UK	1782	3.92	0.96	1	5

Source: PIAAC, Authors' calculation

As mentioned, there is a strong theoretical argument claiming that the mechanisms translating education into problem solving skills, and subsequently the problem solving skills into employability work differently across countries and are dependent on policies and institutions. Our analysis therefore treats the selected countries separately and compares the individual level effects across representatives of different welfare and labour market institutions regimes. It is furthermore interesting to observe how the results vary across welfare and labour markets cultures. On the one hand, the variations in results may be an indicator of the processes of accumulation and utilisation of skills being influenced by the mentioned differences. On the other hand, they give ground for advice on labour market policies.

Table 2 presents the structural equations results in a form of unstandardised regression coefficients. The analysis shows that several links suggested by psychological literature hold, and the effect size is rather stable across countries. For instance we see that higher cognitive skills contribute to higher problem solving skills (although not with uniform intensity), and also that problem solving skills deteriorate with physical age. The fact that such results are in line with past empirical research corroborates the validity of our model and of its estimates, which extends to the previously unexplored links.

Table 2: Unstandardised Structural Equation Coefficients (by Country)

		Sweden	Czech	South Korea	United
Employability	Education	0.643*	1.070***	1.939***	0.080
	Problem Solving	0.104***	-0.013	0.032	0.084***
	Age	0.691**	1.238***	0.073	0.189
	Gender (b=female)	2.328	12.614***	4.988**	3.912**
	Children	-0.961	-4.974***	-1.299	-1.538**
	Flexibility	0.840	0.166	1.981**	0.521
	Training	-0.018	1.336	3.272***	1.744**
	Readiness to learn	-1.430	0.593	-0.037	0.174
Problem Solving	Age	-0.533**	-0.851***	-0.992***	-0.883***
	Cognitive skills	0.878***	1.030***	0.890***	0.832***
Education	Cognitive skills	0.035***	0.038***	0.048***	0.043***
N		533	1048	976	1019
BIC		31803.72	62704.77	57913.76	61777.59
CoD		0.953	0.957	0.952	0.960

Note: \* -  $p > 0.05$

\*\* -  $p > 0.01$

\*\*\* -  $p > 0.001$

Source: PIAAC, Authors' calculation

The main drive of our research is to explore the relationships between education, different types of skills and employability in countries with different labour market institutions. The findings show that the level of education has a positive direct effect on employability in Sweden, the Czech Republic and South Korea, but it does not have statistically significant impact on employability in the United Kingdom. Problem solving skills in technology-rich environments, instead, have an impact on employability in the UK and Sweden, but seem to play no role in the Czech Republic and South Korea. It is interesting to notice how the impact of problem solving skills is the strongest in Sweden, while education's role in Sweden is relatively weak. On the other hand, education plays the central role in Korea, while the problem solving impact is insignificant. Generally, on labour markets we observe what can be described as a trade-off, as countries with a stronger role of education tend to leave less space to problem solving, and vice versa.

An additional set of direct effects were investigated with regard to non-cognitive skills such as readiness to learn, participation in training and flexibility in moving between jobs. Our findings show that the between-job flexibility increases employability only in South Korea. In the other three countries we found no significant effect of flexibility on persons' employability. In South Korea, furthermore, the amount of training activities a person attended is significantly related to her employability. This factor plays a role also in the UK; however, with only slightly more than half a size. In Sweden and the Czech Republic number of training activities is not significantly related to employability. Lastly, we investigated a link between person's willingness to learn new things and employability. In all of the countries the link is insignificant. This suggests that one's willingness to understand new things does not improve her employability.

The advantage of structural equation model is that it allows us to estimate indirect effects in addition to the direct effects reported in a simple regression model. Table 2 presents the estimated indirect effects of early cognitive skills on employability via education and via problem solving skills.

Table 3: Indirect Effect of Early Cognitive Skills on Employability

	Sweden	Czech Republic	South Korea	United Kingdom
Indirect Path via	0.023*	0.041***	0.093***	0.003
Indirect Path via	0.091***	-0.013	0.028	0.070**
Total Indirect	0.114*	0.041***	0.093***	0.070**

Note: \* -  $p > 0.05$

\*\* -  $p > 0.01$

\*\*\* -  $p > 0.001$

Source: PIAAC, Authors' calculation

We did not explore a direct link from early cognitive skills to employability for the two reasons described in the sections above. However, this does not mean that the cognitive skills are not influencing employability indirectly, via increased level of education and also higher problem solving skills. The analysis shows that there is an indirect effect in all four countries. Only in Sweden this is exerted via both possible paths and the standardised coefficient amounts to 0.114. In the Czech Republic and South Korea we revealed the indirect effect of cognitive skills via education (0.041 and 0.093, respectively) and in the United Kingdom there is an indirect effect of cognitive skills via increased problem solving skills (0.070).

Lastly we inspect the coefficients of socio-demographic variables. Although these were not a primary objective of our study, the findings illustrate the differences of how various labour market operate. When comparing the effect number of children has on employability we see that the Czech and the UK labour market are "punishing" individuals with children in terms of lowering their employability (this effect is insignificant in Sweden and South Korea). In the Czech Republic the negative effect of having children is more than three times stronger than in the UK. Comparing the gender effect, three of the four examined countries show a lower employability for women than men. Only the social democratic labour market of Sweden does not negatively regard having

children, as shown by the insignificant impact of children on employability. On the other hand, having a child in the Czech Republic decreases one's employability by more than 12 percentage points. In South Korea the effect is almost 5 p.p. and in the liberal UK it is slightly under 4 p.p..

Generally we see that labour market institutions indeed function differently. The social democratic labour market of Sweden is the least negative to women and among 2 (of 4) labour markets that do not punish having children in terms of lower employability. On the other hand, the Czech labour market punishes people for having children the most and is also among those that creates relatively large gender differences. Although these results are not so new or surprising, the next section will discuss their possible reasons and relevance to the research of skills and employability.

## VI. Discussion and conclusion

This research investigated relationships between education, various types of skills and employability. By combining different types of skills and exploring the relationships in several countries we positioned our paper between two major debates. Firstly, we built on the research of returns of skills and education to employability on individual level. Secondly, our examination of individual relationships in different labour markets contributes also to institutional tradition in studying employment.

Our findings show that there are indeed different types of skills and they contribute to one's employability in various ways. In line with previous research our analysis confirms that IT and problem solving skills (Kenny et al., 2007; and Clarke, 2008) as well as attitudes and non-cognitive skills (Van Loo et al., 2001; Sanders and De Grip, 2004) increase a person's ability to get and maintain a job. The novelty of our paper is not so much in proving the link that has been suggested and argued for a longer while, rather than in showing the strength of the relationship even when looking at employability in a retrospective way that covers several years or decades of a person's work life. Furthermore, the analysis shows that the role of skills and education varies across countries.

In order to capture and explain this variability we took countries with different institutional setting of their education system, labour markets, social policies, and relationships between firms and state. As a result, we compared different types of capitalist countries. The liberal (Hall, 2001) or market-based (Amable, 2003) setting of the UK is characteristic of low expenditures on education system, which puts emphasis on general education, but underestimates vocational system. This could explain why firms in such setting are rewarding those who are participating in further training and show higher capabilities in problem solving. Furthermore, the UK Labour government (1997-2010) has made of the promotion of skills one of its key policy levers, advertising them as a milestone of economic growth and social inclusion for the deregulated British labour markets. Such governmental emphasis on skills has contributed to their popularity in terms of an employment asset (Payne and Keep, 2011; in OECD, 2015).

The Asian type of capitalism instead puts more emphasis on intra-corporation trainings and quality of formal education (Amable, 2003). This explains a relatively high impact of educational level and also training and flexibility on employability in South Korea. The negative effect found for women might be explained by the fact that women labour market participation is considerably lower in South Korea. In fact, OECD reported that although there is almost no difference in the cognitive abilities between genders (based on PISA scores), the female participation on labour market is low, which contributes to wage dispersion and relative poverty. A higher female participation, instead, would improve social cohesion and well-being. (OECD, 2014a, 2016b). Generally, it appears that employability in South Korea is dependent on compliance with strongly corporative institutions rather than on a person's own problem solving skills.

The Czech Republic, according to our findings, rewards educational level relatively high; however, problem solving does not seem to increase employability. This finding goes against our expectations. Most likely there is still a legacy of post-communism in terms of a highly discriminating labour market, dependent on formal signals and under-developed on social policy (OECD, 2014b). The findings of highly negative effect of having children, considerably lower employability for women (comparing to men) and also highly positive effect of educational level on employability support our argument of post-communist legacy.

Finally, the effects we found in Sweden comply with expectations of social democratic labour market. Due to the “important family services” (Amable, 2003: 175) Swedish labour market institutions do not seem to punish women or people having children by decreasing their employability. Sweden, as a representative of the most developed social policy system and the least dualised labour market, seems to be the only institutional mix that rewards both educational degree and problem solving skills with higher employability.

The present analysis paths the way to further research on the topic of employability in different capitalist regimes. As already mentioned, due to data limitation we were not able to include a continental type of capitalist country (such as Austria or Germany) in the comparison. Furthermore, the decision not to take problem solving test prevented us from including Mediterranean countries. There is then, scope for an extended analysis, provided that more data becomes available. However, we believe that our approach to employability from a lifetime perspective is worth examining, in that it gives more depth to the debate on career management and employability skills or assets.

The most important lessons of our research, we would argue, is that using new type of data and new operationalisation of employability we proved that various sets of skills are rewarded differently, according to labour market conditions and social institutions.

Admittedly, our study is not without limitations and we are not hiding it. Already discussed were data limitations that prevented us from including a continental or Mediterranean country into the analysis. Secondly, several of our indicators are proxies (especially for attitudinal skills) and thus it is possible that future research will bring more precise measurements, and thus more exact estimates. Finally, we recognise that the life course approach we argued for would benefit from longitudinal data. However, we are not aware of any such longitudinal datasets that would measure such a variety of respondents’ skills as PIAAC does, and simultaneously link it to job characteristics and history, and allow for international comparison. Therefore the best we could do is to use retrospective measures and proxy measures.

To conclude, our research shows that employability is indeed “a shared responsibility” of the state and individuals. (De Grip et al., 2004: 215). Adaptability of the latter and mindful policy making of the former are equally important in achieving a more efficient labour market, one that leads to economic growth as well as social cohesion.

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