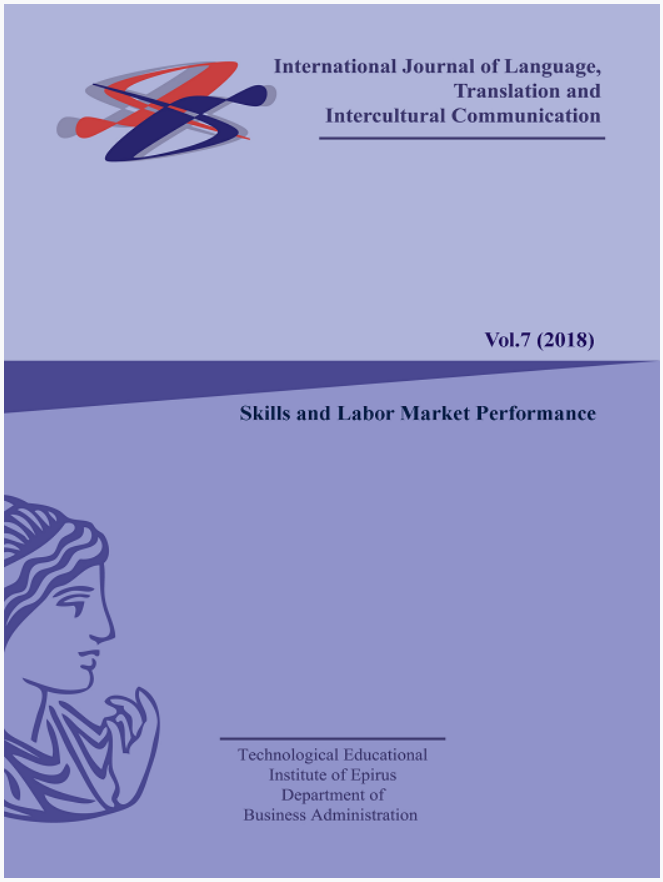
ePublishing

ΕΘΝΙΚΟ ΚΕΝΤΡΟ ΤΕΚΜΗΡΙΩΣΗΣ
EKT NATIONAL DOCUMENTATION CENTRE

International Journal of Language, Translation and Intercultural Communication

Vol 7 (2018)

Skills and Labor Market Performance



Skills and their impact on labor market performance using European cross-country evidence

GEORGIOS GIOTIS

doi: 10.12681/ijltic.16931

Copyright © 2018, GEORGIOS GIOTIS

This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0.

To cite this article:

GIOTIS, G. (2018). Skills and their impact on labor market performance using European cross-country evidence. *International Journal of Language, Translation and Intercultural Communication*, *7*, 45–63. https://doi.org/10.12681/ijltic.16931

https://epublishing.ekt.gr | **e-Publisher:** EKT | **Downloaded at:** 28/12/2025 05:54:14

Skills and their impact on labor market performance using European cross-country evidence

Giotis Georgios
TEI of Epirus
ggiotis@teiep.gr

Abstract

The impact of skills on labor market performance is a topic which has attracted a growing attention during the last years and has become a major concern among policy makers. In this paper, I discuss on the skill needs in Europe and skill shortages and surpluses as well. Moreover, I examine five important dimensions of skills: information skills, communication skills, problem solving skills, software skills and digital skills. For all of them I have found negative correlation with unemployment rates, findings which suggest that these skills can improve the employment prospects and reduce the skill mismatch in the workplace. Finally, I estimate the effect of three levels of education on unemployment rates across a sample of 28 European countries for the 1999-2016 time period. Both tertiary and elementary education seem to reduce unemployment for European countries, while secondary education is connected with increased unemployment rates.

***Keywords**: Skills, labor market performance, Europe, education*

1 Introduction

In modern labor market one of the major concerns is to facilitate the skill matching and to cope with the problem of skills mismatch. It is possible that having a degree of tertiary education does not necessarily guarantee that the forthcoming workers will acquire the skills and qualifications required by firms and businesses. In this spirit, the search for those skills that improve employment opportunities and career prospects is one of the most important issues.

Nowadays, in a changing work environment, people need to build up a broad range of skills to satisfy the business' needs contribute to a modern economy. Traditional skills such as education and mental abilities like teamwork and self-motivation are considered to be basic skills. However, other skills have also been incorporated into the labor required package. For instance, social skills, which include the ability to interact and communicate with colleagues, the ability to create and maintain strong relations with other companies or even to be able to communicate in the business language and solve the problems that arise, are some of the skills that the modern labor market requires.

Within this framework, researchers, international organizations and institutions such as the ILO, OECD and the World Bank are cooperating with governments to deal with the problem of the identification of the right skill needs demanded in the labor market. Additionally, on 10 June 2016 the European Commission adopted "The new Skills Agenda for Europe" and launched 10 actions to make the right training, skills and support available to people in the EU. Moreover, in 2017, the ILO initiated a programme of research, communications and product development that focuses on the issue of jobs and skills matches which is called "The ILO Global Product on Jobs and Skills Mismatch". Recently, in April 2018, EU countries adopted the Commission's proposal to revise the Europass framework to offer people better and easier-to-use tools to present their skills and obtain useful real-time information on skills needs.

In light of this recent growing attention on the skill mismatch, this paper aims to foster the debate on this issue. Research has shown that the skill mismatch and the shortage of proper skills can have adverse effects on labor market performance. In this paper I discuss on the skill needs in Europe and skill shortages and surpluses as well, with respect to basic, social, complex solving, technical, system, and resource management skills. Moreover, I examine five important dimensions of skills: information skills, communication skills, problem solving skills, software skills, and digital skills in general. For all of them negative correlation is found with unemployment rates, which suggests that these skills can improve the employment prospects of individuals. In addition, I use education controls as skill proxies to account for differences in unemployment rates across 28 European countries for the 1999-2016 time period. Both tertiary and elementary education appear to reduce unemployment for European countries, while secondary education is connected with increases in unemployment rates.

This work contributes to the existing literature in several ways. First of all, it presents a review of the literature regarding the effect of skills on labor market, not just on economy in general. Secondly, it uses up-to-date databases to make cross-country comparisons, which is a field of research that has been relatively neglected. Apart from official institutional reports, individual studies have not paid the appropriate attention to the very important issue of skill needs and its impact on labor market performance. Thirdly, to the best of my knowledge, it is the first study that uses data from the Eurostat Database, "Skills Related Statistics" to make cross-country comparisons and interactions with unemployment rates. Hopefully, this study can contribute a more detailed understanding of how important it is to tackle skill mismatch and skill shortages for labor markets and training policies in the context of rapid and substantial changes in skill needs that happen.

The layout of this paper is as follows: at first I present the previous literature on the relationship between skills and labor market. I then refer to the skill needs and skill shortages and surpluses in Europe and afterwards I discuss on the skill characteristics across European Union and their correlation with unemployment. I continue with the regression results on the impact of different levels of education on unemployment, using European cross-country evidence and, in the end, I present the concluding remarks of my analysis.

2 Previous Literature on Skills and Labor Market Performance

The impact of skills on labor market performance is a topic which has attracted growing attention during the last years and has become a major concern among policy makers. The Fourth Industrial Revolution we live in is characterised by a highly technological and digital environment where new skills and interaction abilities play a fundamental role, as they directly affect our work and the way we relate to one another. A core element of this transition is the rapid change of skills required by the labor market. Within this framework, research on the role of skills on labor market performance is constantly gaining more attention. In this section I try to present a review of some of the studies on the relationship between skills mismatch and labor market performance.

Research has shown that the skill mismatch and the shortage of proper skills in the labor market can have adverse effect on employment, wages and job satisfaction. OECD (2012) suggests that skill mismatch is negatively associated with productivity within a business and can be harmful on the employment prospects of individuals because it increases the on-the-job search

and turnover. In addition skill shortages are found to increase the cost of hiring and are a hindrance to the adoption of new technologies. Moreover, OECD (2014) provides evidence that in the aftermath of the global financial crisis of 2008, the skills mismatch between the skills demanded and skills supplied in the labor market increased sharply, but has also tended to recede quickly as the labor market recovers. Montt (2015) using data from the PIACC, finds that although individuals may specialize in a particular field, a skill mismatch has a negative effect on both their wage and their job satisfaction.

Regarding the impact of skill mismatch on unemployment, the majority of the literature suggests that a higher skill mismatch is likely to cause an increase on structural unemployment and an increase in the unemployment persistence. Sattinger (1993) using data from the US economy investigates the impact of skill mismatch on unemployment rates and finds that skill mismatch is related to increases in structural unemployment. Sneessens (1995) gives some evidence that skill mismatch can explain the persistence of high unemployment rates. Thissé and Zebou (2000) suggest that job mismatch (apart from firm's market power) can cause an increase in the unemployment rate in equilibrium. According to Skott and Auerbach (2005), assuming that high-skill workers who fail to get high-skill jobs may accept low-skill positions, while low-skill workers would not have the analogous option of filling high-skill positions, this would cause an increase in unemployment, especially among low-skill workers. Olitsky (2008) using a matching model and US data finds a positive correlation between skill mismatch and unemployment.

However some part of the related literature provides mixed results on the effect of skill mismatch on unemployment. For example, Jackman et al. (1991) attempts to investigate the rise in European unemployment via the increased mismatch between labor supply and demand by skill (in addition to age and region). Using regional data for Britain and the US he found that skill mismatch cannot explain the overall rise in European unemployment. Manacorda and Petrongolo (1998) find that the rise in skill mismatch cannot explain much of the rise in unemployment in continental Europe, while it does explain a significant portion of the increase in the rate of joblessness in Britain.

Skills mismatch also affects wage levels and wage inequalities. Budría and Egido (2008) based on Spanish data for the period 1994-2001 find that skill mismatch is associated with higher wage inequalities. The majority of the empirical literature points at a negative impact of skill mismatch on average salaries of employees. For instance, McGuinness and Sloane (2011) using data for UK graduates find substantial pay penalties for over-skilling in the case of men, solely attributed to the fact that there may be real costs for men to become over-skilled. This wage penalty is also found by Quintini (2011a) who finds that being over-qualified is correlated with lower wages, result which is also found by Kelly et al. (2010), Quintini (2011b) and OECD (2014). Additionally, the skill mismatch may cause wage penalties also in the form of skills under-utilisation. Mavromaras et al. (2015) using data from the Australian economy find that skills under-utilization results in wage penalties, since they cause losses in productivity and damage competitiveness. However, evidence exists in literature suggesting that skills can be associated with higher wages. Robst (2008), for example, finds that skills of some workers may not be fully used due to inefficiencies in the labor market. The wage effects for workers mismatched due to demand-related reasons are particularly large, but to some degree reflect individual skills.

Apart from these individual studies, international organizations and institutions such as the ILO, OECD and the World Bank are cooperating with countries and policy makers to tackle the

problem of skill mismatch. Their aim is to investigate the skill mismatch in an effort to address skills mismatch and to narrow the gap between the supplied skills and the demand for skills. The collection and use of such information is one of the priorities listed in the employment plans of G20 countries and is a top priority in the European Union's New Skills Agenda for Europe (European Commission, 2015).

The ILO initiated in 2017 a programme of research, communications and product development that focuses on the issue of jobs and skills matches which is called "The ILO Global Product on Jobs and Skills Mismatch". Additionally, the OECD has undertaken a programme of work in close collaboration with the World Bank, ETF, ILO and UNESCO in order to provide information about labor market needs and skill gaps. This program, among others, sets up a database of skills needs indicators, which is called World Indicators of Skills for Employment (WISE) database, to examine the skills challenges and performance of 214 countries and contains 64 indicators in the following areas: a) contextual factors, b) skill acquisition, c) skill requirements, d) skill mismatch and e) economic and social outcomes; from a comparative perspective.

Closing this review, I should mention that there is a Survey of Adult Skills as part of the Programme for the International Assessment of Adult Competencies (PIAAC) which is an initiative of OECD. In 2011 and 2012 approximately 150,000 working age adults aging 16- 65 were surveyed from 24 countries in order to measure key cognitive and workplace skills that are needed in the labor market. This international survey is expected to be fulfilled in 2019 and is conducted in over 40 countries. The recent growing attention of the skill mismatch issue is also reflected by the fact that on 10 June 2016 the European Commission adopted "The new Skills Agenda for Europe" and launched 10 actions to make the right training, skills and support available to people in the EU. Finally, in April 2018, EU countries adopted the Commission's proposal to revise the Europass framework to offer people better and easier-to-use tools to present their skills and obtain useful real-time information on skills needs and trends to help them with career and learning choices.

3 Skill Needs and Skill Shortages and Surpluses in Europe

Skills are essential for employability in the modern workplace, as structural changes such as increased competitiveness, globalization and technological progress require even higher skills for productivity growth and secure jobs. As it was shown in the previous section, growing attention has been paid on the skill mismatch and the skill needs demanded by employers and business. In light of this challenge the OECD has undertaken an ambitious initiative to examine the level of skill needs across countries and to investigate skill shortages and surplus to use this information as a tool of dealing with the problem of unemployment and especially the structural one.

The aim of this "OECD Skills for Jobs Indicators" project is to provide information about skills shortages, surpluses and mismatch across countries. At this section I present some indicators with respect to skill needs across European countries in 2013 using data from this OECD database. Moreover, I show graphically the skill needs across European countries reporting the degree of the skills imbalance. These issues seem to be of great importance and luckily during the last years, especially since 2013, research has quantitative data to use to tackle skill mismatch and skill shortages.

Table 1 presents the descriptive statistics of seven dimensions of skills as they are reported by the OECD. The Skill Needs Indicators database that I use provides an overview of the shortages and surpluses of skills across countries. To my knowledge it is the first effort to categorize the definition of skills through 35 dimensions. Regarding the distinction between skills, abilities and knowledge, skills are developed capacities that facilitate learning or performance, including basic skills; abilities are considered enduring attributes of the individual that influence performance; knowledge is organized sets of principles and facts, applying in general domains and, lastly, skills. These 35 dimensions are grouped into 7 main categories:

1. Basic Skills Content (reading comprehension, active listening, writing, speaking, mathematical skills, and science).
2. Basic Skills Process (critical thinking, active learning, learning strategies, and monitoring).
3. Social Skills (social perceptiveness, coordination, persuasion, negotiation, instructing, and service orientation).
4. Complex Problem Solving Skills (complex problems solving).
5. Technical Skills (operations analysis, technology design, equipment selection, installation, programming, operation monitoring, operation and control, equipment maintenance, troubleshooting, repairing, and quality control analysis).
6. Systems Skills (judgment and decision making, systems analysis, and systems evaluation).
7. Resource Management Skills (time management, management of financial resources, management of material resources, and management of personnel resources).

According to table 1, countries with the highest values of basic skills (content and process) are Finland, Luxembourg, Ireland, Spain, the Netherlands and Estonia. The lowest values of these categories appear for Lithuania, Slovenia, Czech Republic, Hungary, Switzerland and Cyprus. With respect to social skills and complex problem solving skills Finland, Netherlands and Luxembourg report very high values, while Lithuania and Cyprus report values among the lowest ones. Regarding technical skills, France, Denmark and Slovak Republic have the highest values, while Romania, Cyprus and Estonia the lowest ones. Finland, Iceland, Luxembourg and Netherlands report the highest system skills, while Slovenia, Switzerland and Lithuania the lowest ones. Finally, concerning the highest resource management skills, the highest values appear for Ireland, Finland and Iceland and the lowest one are reported for Slovenia, Cyprus and Hungary.

Table 1: Skill Needs in Europe (2013)

Skills	Basic Skills Content	Basic Skills Process	Social Skills	Complex Problem Solving Skills	Technical Skills	Systems Skills	Resource Management Skills
Country							
Austria	0.015	0.014	0.006	0.013	-0.001	0.015	0.004
Belgium	0.018	0.018	0.013	0.014	0	0.014	0.004
Czech Republic	0.007	0.006	0.004	0.006	0.003	0.006	0.003
Denmark	0.010	0.012	0.002	0.012	0.007	0.015	0.006
Estonia	0.020	0.021	0.015	0.017	-0.006	0.019	0.009
Finland	0.035	0.030	0.022	0.031	-0.001	0.035	0.015
France	0.010	0.011	0.006	0.010	0.008	0.011	0.010
Germany	0.019	0.017	0.017	0.018	-0.002	0.018	0.007
Greece	0.015	0.011	0.009	0.014	0.002	0.011	0.006
Hungary	0.005	0.008	0.007	0.002	-0.005	0.003	0
Iceland	0.019	0.022	0.012	0.021	0.004	0.024	0.014
Ireland	0.021	0.026	0.024	0.020	-0.005	0.023	0.016
Italy	0.015	0.011	0.004	0.011	0.004	0.012	0.002
Latvia	0.012	0.008	0.010	0.008	-0.003	0.008	0.005
Luxembourg	0.029	0.024	0.017	0.022	-0.003	0.024	0.012
Netherlands	0.021	0.023	0.018	0.023	-0.003	0.024	0.012
Norway	0.009	0.010	0.005	0.010	-0.003	0.014	0.007
Poland	0.014	0.016	0.008	0.016	0.004	0.017	0.006
Portugal	0.008	0.011	0.005	0.008	0.003	0.009	0.001
Slovak Republic	0.015	0.015	0.011	0.014	0.005	0.015	0.009
Slovenia	0.007	0.002	0.005	0.001	-0.004	0	-0.003
Spain	0.025	0.023	0.018	0.018	-0.002	0.021	0.008
Sweden	0.015	0.018	0.010	0.014	-0.003	0.018	0.010
Switzerland	0.006	0.007	0.006	0.002	-0.003	0.002	0.002
United Kingdom	0.016	0.019	0.013	0.016	0.002	0.018	0.013
Bulgaria	0.016	0.014	0.011	0.013	0	0.013	0.007
Cyprus	0.009	0.006	0.003	0.005	-0.006	0.006	-0.001
Lithuania	0.001	-0.002	-0.003	0.004	0.002	0.003	0.003
Romania	0.010	0.009	0.008	0.006	-0.007	0.009	0.005

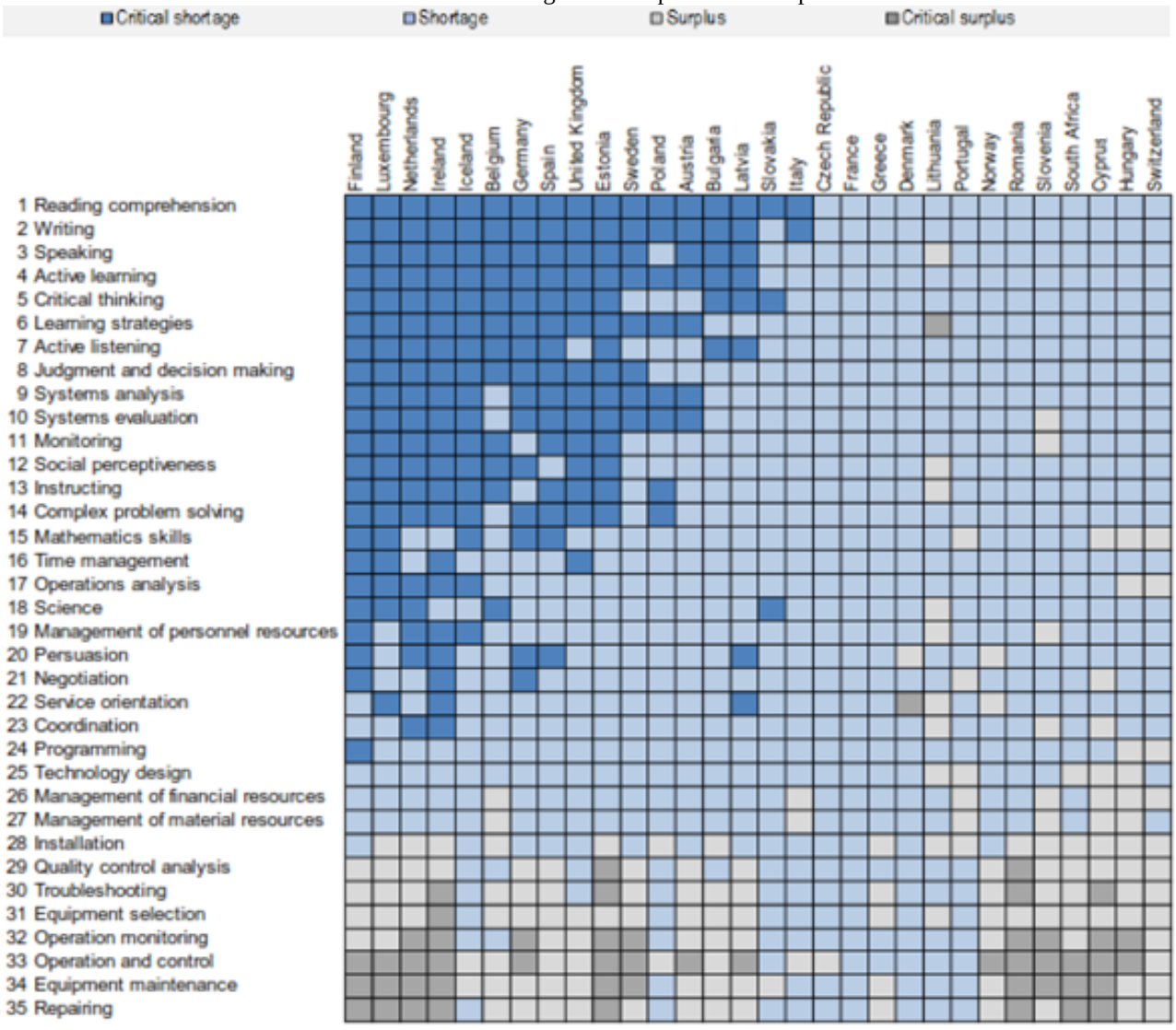
Source: OECD Skills for Jobs Database.

Concerning the skill mismatch across European countries using data from the OECD Skills for Jobs Database I present in table 2 an overview of skill shortages and surpluses across Europe. Skill shortages arise when employers are unable to recruit staff with the required skills in the accessible labor market and at the going rate of pay and working conditions due to a lack of an adequately skilled workforce. They can be broadly defined in terms of an inadequate supply of workers in high-demand occupations and/or an inadequate supply of skills required to perform the daily tasks associated to such occupations. On the other hand skill surpluses are characterized by a relatively high supply and low demand for a given skill. They can be identified by high unemployment (OECD, 2017: 29).

Blue cells at table 2 indicate skill shortages and grey cells surpluses. The darker the color the bigger the imbalance is. When the color is darker blue a critical shortage is defined produced from observations in the top quartile (above the 75th percentile) of all positive values across countries and skills. When the color is darker grey a critical surplus is defined represented by the observations in the bottom quartile (below the 25th percentile) of the negative values.

Countries which have higher economic growth and economic indicators seem to appear skill shortages among content skills (reading comprehension, writing, speaking and active listening), process skills (e.g. critical thinking, learning strategies, and active learning and monitoring), complex problem solving skills and social skills (especially instructing and social perceptiveness). The shortages are biggest in Finland, Luxembourg, the Netherlands, Ireland, Iceland, Belgium and Germany. Skill surpluses appear for technical skills (repairing, equipment maintenance, operation and control, operation monitoring). Finally, it has to be noted that while some skills are in shortage in all countries, there are no skills that are in surplus across all countries.

Table 2: Skill Shortages and Surpluses in Europe



Source: OECD Skills for Jobs Database

4 Skill Characteristics across European Union and Unemployment Rates

The analysis On 10 June 2016, the European Commission published the new "Skills Agenda for Europe" which is a package of measures in order to face concrete skills problems to ensure that European citizens will be better equipped with the right skills that are needed in a modern working environment. This agenda has a strong employment orientation and aims to tackle the skill mismatch in the European labor market and to accelerate the upskilling process. Currently, the new "Skills Agenda for Europe" includes 10 actions:

1. Upskilling Pathways: New Opportunities for Adults
2. European Qualifications Framework
3. Digital Skills and Jobs Coalition
4. Blueprint for Sectoral Cooperation on Skills
5. EU Skills Profile Tool Kit for Third-Country Nationals
6. Vocational education and training (VET)
7. Key competences
8. Europass
9. Graduate Tracking
10. Analyzing and sharing of best practice on brain flows

Indeed, skills are a basis for boosting the employment prospects and enhancing the career prospects. Within this framework, the quantification and the measurement of the skills required by the modern labor market is an issue that has gained growing attention and some international organizations cooperate with governments towards this direction. The OECD launched initiatives in the frame of the PIAAC, PISA, TIMMS and PIRLS surveys with data across countries. However, this data is not continuous and refer to a single year.

As far as I know, the only database which provides continuous data with respect to the skills' measurement is available by Eurostat. However, this database may be up-to-date, but it refers only to a three-year period from 2015 to 2017. Nevertheless, it is a remarkable and the first serious effort to quantify skills, during a continuous time period. Hopefully, this database will be of significant use in the years to come. In the light of the priority that has been given to the skill mismatch issue, the ability to measure a quality variable like skills will be of great benefit for related policy makers, governments and individuals.

In this section I discuss on five important dimensions of skills of individuals and present the conceptual framework on how they are measured and some descriptive statistics using European cross-country evidence. These dimensions are: a) information skills, b) communication skills, c) problem solving skills, d) software skills, and e) digital skills. According to the variety or complexity of activities performed, two levels of skills ("basic" and "above basic") are computed for each of these dimensions. It also has to be noted that the analysis regards only the supply side and not the demand size by the firms and reveals the role of some significant skills and how they are associated with the unemployment rates in European countries.

a) Information skills

According to the Eurostat Database, information skills are defined in a digital competence framework and are measured as the ability to identify, locate, retrieve, store, organize and analyze digital information, judging its relevance and purpose. The activities used for calculating the information skills are: i) copied or moved files or folders; ii) saved files on internet storage space; iii) obtained information from public authorities/services' websites; iv) finding information about goods or services; v) seeking health-related information. This variable is categorized into two levels, basic information skills when one activity is performed and above basic information skills when more than one activity is performed.

Theoretically, these skills help you to identify, find, evaluate and manage the information that you need so that you can effectively and efficiently find the right material for your work. These techniques obtained primarily though studying, mentoring and experience should play a key role in the modern workplace Table 1 depicts the statistics on the information level skills in the E.U. (28) across countries for the period 2015-17.

Table 3: Information Skills and Unemployment Rates across European Union

	Basic Information Skills			Above Basic Information Skills			Unemployment Rates		
GEO/TIME	2015	2016	2017	2015	2016	2017	2015	2016	2017
E. U. (28)	10	10	10	65	67	68	9.4	8.6	7.6
Euro area (19)	9	10	9	66	67	69	10.9	10.0	9.1
Austria	9	7	9	71	74	73	5.7	6.0	5.5
Belgium	11	11	11	70	72	72	8.5	7.8	7.1
Bulgaria	11	12	12	41	39	45	9.2	7.6	6.2
Croatia	6	4	5	61	67	60	16.1	13.4	11.1
Cyprus	9	9	9	56	60	65	15.0	13.0	11.1
Czech Republic	11	9	7	66	70	74	5.1	4.0	2.9
Denmark	6	6	5	87	88	88	6.2	6.2	5.7
Estonia	6	7	7	79	77	77	6.2	6.8	5.8
Finland	6	6	5	83	84	86	9.4	8.8	8.6
France	12	13	12	67	67	69	10.4	10.1	9.4
Germany	6	7	7	80	80	81	4.6	4.1	3.8
Greece	7	6	6	57	61	62	24.9	23.6	21.5
Hungary	6	7	7	65	70	67	6.8	5.1	4.2
Ireland	13	13	13	61	63	64	10.0	8.4	6.7
Italy	13	15		45	45		11.9	11.7	11.2
Latvia	7	6	6	70	71	73	9.9	9.6	8.7
Lithuania	7	9	8	62	63	67	9.1	7.9	7.1
Luxembourg	8	5	6	87	90	89	6.5	6.3	5.6
Malta	7	7	6	62	65	68	5.4	4.7	4.0
Netherlands	6	5	4	84	85	89	6.9	6.0	4.9
Poland	14	12	13	46	57	58	7.5	6.2	4.9
Portugal	8	7	7	56	59	61	12.6	11.2	9.0
Romania	12	13	16	42	45	46	6.8	5.9	4.9
Slovakia	10	10	9	66	67	69	11.5	9.7	8.1
Slovenia	8	7	7	62	64	68	9.0	8.0	6.6
Spain	9	8	9	64	67	69	22.1	19.6	17.2
Sweden	9	7	7	76	83	85	7.4	6.9	6.7
United Kingdom	11	11	10	75	78	77	5.3	4.8	4.4

Source: Eurostat Database, Skills Related Statistics

b) Communication Skills

Communication skills refer to the ability to communicate, share resources through online tools, link with others and collaborate through digital tools, interact with and participate in communities and networks, cross-cultural awareness. The activities used for calculating the communication skills include: i) sending/receiving emails; ii) participating in social networks; iii) telephoning/video calls over the internet; iv) uploading self-created content to any website to be shared. The levels of communication skills are: "basic communication skills" if one activity is performed and "above basic communication skills" if more than one activity is performed.

In the current labor market framework communication, as an act of transferring information from one place to another, seems to be an essential asset for an employee or a potential worker. More specifically, the ability to communicate effectively with superiors, colleagues, and staff is crucial, no matter what industry you work in.

Table 4: Communication Skills and Unemployment Rates across European Union

	Basic Communication Skills			Above Basic Communication Skills			Unemployment Rates		
GEO/TIME	2015	2016	2017	2015	2016	2017	2015	2016	2017
E. U. (28)	18	19	18	56	58	61	9.4	8.6	7.6
Euro area (19)	20	22	19	55	55	59	10.9	10.0	9.1
Austria	22	24	23	56	56	60	5.7	6.0	5.5
Belgium	14	13	13	69	71	73	8.5	7.8	7.1
Bulgaria	7	9	8	47	48	53	9.2	7.6	6.2
Croatia	14	12	11	48	53	50	16.1	13.4	11.1
Cyprus	9	9	9	57	62	66	15.0	13.0	11.1
Czech Republic	26	23	23	52	56	58	5.1	4.0	2.9
Denmark	16	14	15	71	81	80	6.2	6.2	5.7
Estonia	16	17	15	67	66	68	6.2	6.8	5.8
Finland	23	21	18	64	67	72	9.4	8.8	8.6
France	29	29	27	50	51	53	10.4	10.1	9.4
Germany	21	27	20	64	59	67	4.6	4.1	3.8
Greece	15	13	12	45	48	51	24.9	23.6	21.5
Hungary	8	10	8	63	67	67	6.8	5.1	4.2
Ireland	17	17	15	58	60	62	10.0	8.4	6.7
Italy	18	18	18	42	45	47	11.9	11.7	11.2
Latvia	11	13	14	62	62	64	9.9	9.6	8.7
Lithuania	11	11	11	55	58	61	9.1	7.9	7.1
Luxembourg	16	17	14	79	79	82	6.5	6.3	5.6
Malta	13	11	8	61	62	69	5.4	4.7	4.0
Netherlands	18	17	14	73	75	80	6.9	6.0	4.9
Poland	17	18	16	44	47	51	7.5	6.2	4.9
Portugal	12	12	12	52	54	58	12.6	11.2	9.0
Romania	10	14	12	42	41	49	6.8	5.9	4.9
Slovakia	15	15	14	59	62	64	11.5	9.7	8.1
Slovenia	21	21	20	46	49	54	9.0	8.0	6.6
Spain	18	18	17	54	55	60	22.1	19.6	17.2
Sweden	16	15	15	70	76	79	7.4	6.9	6.7
United Kingdom	16	14	14	73	77	78	5.3	4.8	4.4

Source: Eurostat Database, Skills Related Statistics

c) Problem Solving Skills

Eurostat Database defines problem solving system skills as the ability to identify digital needs and resources, make informed decisions as to which are the most appropriate digital tools according to the purpose or need, solve conceptual problems through digital means, creatively use technologies, solve technical problems, and update one's own and others' competences. Activities used for calculating the problem solving skills are listed into two categories-lists A and B.

List A includes: i) transferring files between computers or other devices; ii) installing software and applications (apps); and iii) changing settings of any software, including operational system or security programs. List B includes: i) online purchases (in the last 12 months); ii) selling online; iii) used online learning resources; and iv) internet banking. The Eurostat Database mentions two levels of this variable: a) basic when one or more activities only from A or only from B are answered, and b) above basic, if at least one activity from A and B is reported.

Table 5: Problem Solving Skills and Unemployment Rates across European Union

	Basic Problem Solving Skills			Above Basic Problem Solving Skills			Unemployment Rates		
GEO/TIME	2015	2016	2017	2015	2016	2017	2015	2016	2017
E. U. (28)	19	20	20	52	54	55	9.4	8.6	7.6
Euro area (19)	18	19	19	53	55	56	10.9	10.0	9.1
Austria	17	15	16	58	61	63	5.7	6.0	5.5
Belgium	21	21	22	57	57	57	8.5	7.8	7.1
Bulgaria	21	22	26	24	19	22	9.2	7.6	6.2
Croatia	16	16	17	47	50	40	16.1	13.4	11.1
Cyprus	25	22	24	28	38	38	15.0	13.0	11.1
Czech Republic	22	23	17	48	49	60	5.1	4.0	2.9
Denmark	14	17	25	79	77	70	6.2	6.2	5.7
Estonia	22	24	22	63	59	62	6.2	6.8	5.8
Finland	18	16	16	72	75	76	9.4	8.8	8.6
France	19	21	20	60	58	60	10.4	10.1	9.4
Germany	17	17	17	65	68	67	4.6	4.1	3.8
Greece	24	21	21	30	34	35	24.9	23.6	21.5
Hungary	20	24	21	43	43	43	6.8	5.1	4.2
Ireland	26	28	25	42	45	46	10.0	8.4	6.7
Italy	20	21		34	35		11.9	11.7	11.2
Latvia	19	15	12	53	60	64	9.9	9.6	8.7
Lithuania	14	15	16	49	50	53	9.1	7.9	7.1
Luxembourg	15	12	13	80	81	81	6.5	6.3	5.6
Malta	15	15	16	50	49	53	5.4	4.7	4.0
Netherlands	16	14	14	74	76	78	6.9	6.0	4.9
Poland	20	20	19	36	41	44	7.5	6.2	4.9
Portugal	17	17	17	38	40	41	12.6	11.2	9.0
Romania	29	37	35	27	23	28	6.8	5.9	4.9
Slovakia	17	18	17	50	53	57	11.5	9.7	8.1
Slovenia	20	17	18	43	44	49	9.0	8.0	6.6
Spain	18	18	17	49	51	54	22.1	19.6	17.2
Sweden	13	15	16	74	76	77	7.4	6.9	6.7
United Kingdom	22	21	19	65	68	70	5.3	4.8	4.4

Source: Eurostat Database, Skills Related Statistics

d) Software Skills

From a theoretical perspective, software skills mainly refer to highly skilled developers and other IT experts with challenging jobs or better employment opportunities. The Eurostat Database defines this skill as the ability to create and edit new content (from word processing to images and video); integrate and re-elaborate previous knowledge and content; produce creative expressions, media outputs and programming; deal with and apply intellectual property rights and licenses.

To calculate the software skills Eurostat Database uses two lists. List A includes these activities: i) used word processing software; ii) used spreadsheet software; iii) used software to edit photos, video or audio files, while list B those ones: i) created presentation or document integrating text, pictures, tables or charts; ii) used advanced functions of spreadsheet to organize and analyze data (sorting, filtering, using formulas, creating charts); iii) have written a code in a programming language. Two levels of software skills are reported, basic if one or more activities form list A and none from list B, and above basic if at least one activity from list B.

Table 6: Software Skills and Unemployment Rates across European Union (28)

	Basic Software Skills			Above Basic Software Skills			Unemployment Rates		
GEO/TIME	2015	2016	2017	2015	2016	2017	2015	2016	2017
E. U. (28)	19	19	19	39	40	41	9.4	8.6	7.6
Euro area (19)	19	19	19	41	41	42	10.9	10.0	9.1
Austria	21	20	21	48	49	50	5.7	6.0	5.5
Belgium	25	26	25	38	38	38	8.5	7.8	7.1
Bulgaria	13	13	14	20	16	17	9.2	7.6	6.2
Croatia	10	16	17	45	43	27	16.1	13.4	11.1
Cyprus	24	19	31	25	28	24	15.0	13.0	11.1
Czech Republic	27	28	32	33	28	30	5.1	4.0	2.9
Denmark	19	17	18	61	61	55	6.2	6.2	5.7
Estonia	19	18	20	46	43	41	6.2	6.8	5.8
Finland	24	24	25	52	52	51	9.4	8.8	8.6
France	20	18	19	41	41	42	10.4	10.1	9.4
Germany	22	23	22	47	47	48	4.6	4.1	3.8
Greece	23	24	21	28	30	32	24.9	23.6	21.5
Hungary	24	23	20	28	31	32	6.8	5.1	4.2
Ireland	14	14	15	33	32	34	10.0	8.4	6.7
Italy	14	14		34	34		11.9	11.7	11.2
Latvia	20	21	17	30	31	32	9.9	9.6	8.7
Lithuania	17	20	21	36	34	36	9.1	7.9	7.1
Luxembourg	17	21	20	72	67	67	6.5	6.3	5.6
Malta	13	14	14	42	37	42	5.4	4.7	4.0
Netherlands	23	25	26	50	53	55	6.9	6.0	4.9
Poland	20	20	20	23	27	29	7.5	6.2	4.9
Portugal	12	12	12	41	40	43	12.6	11.2	9.0
Romania	14	15	16	15	15	16	6.8	5.9	4.9
Slovakia	23	22	22	34	35	41	11.5	9.7	8.1
Slovenia	14	17	16	40	41	41	9.0	8.0	6.6
Spain	15	15	16	43	42	42	22.1	19.6	17.2
Sweden	32	24	26	41	45	53	7.4	6.9	6.7
United Kingdom	20	19	18	50	51	55	5.3	4.8	4.4

Source: Eurostat Database, Skills Related Statistics

e) Digital skills

In modern labor market, digital skills are highly valued and required. Indeed, in the forthcoming years, digital skills will be vital part of the skill-package for future employees. Within the framework of a constantly changing working environment, the European Commission is promoting various initiatives aimed at increasing training in digital skills for the workforce which have been previously discussed at sections 1 and 2. Digital skills are a key skill for competitiveness and comparative advantage in the workplace.

The variable "digital skills" that is used in this part also comes from the Eurostat Database. It relates to internet or software use and combines all previous four skills. Once again I use the variables "basic" and "above basic" generated by the same Eurostat Database. Individuals with a "basic" level of skills are those who generated at least one "basic" but no "no skills" in all 4 domains, while those with "above basic" digital skills are considered those who provided the "above basic" answer through the activities they performed in all 4 domains.

Table 7: Digital Skills and Unemployment Rates across European Union (28)

	Basic Digital Skills			Above Basic Digital Skills			Unemployment Rates		
GEO/TIME	2015	2016	2017	2015	2016	2017	2015	2016	2017
E. U. (28)	27	27	26	28	29	31	9.4	8.6	7.6
Euro area (19)	28	28	27	29	29	31	10.9	10.0	9.1
Austria	31	31	31	33	35	36	5.7	6.0	5.5
Belgium	29	29	30	31	32	31	8.5	7.8	7.1
Bulgaria	18	16	18	13	10	11	9.2	7.6	6.2
Croatia	21	21	20	30	33	21	16.1	13.4	11.1
Cyprus	27	22	32	15	20	19	15.0	13.0	11.1
Czech Republic	34	33	36	23	20	24	5.1	4.0	2.9
Denmark	26	25	24	48	53	47	6.2	6.2	5.7
Estonia	27	26	25	37	35	35	6.2	6.8	5.8
Finland	33	29	30	41	44	45	9.4	8.8	8.6
France	30	28	28	27	28	29	10.4	10.1	9.4
Germany	31	34	31	35	33	37	4.6	4.1	3.8
Greece	28	26	24	16	19	22	24.9	23.6	21.5
Hungary	27	28	24	22	24	26	6.8	5.1	4.2
Ireland	19	19	20	25	25	28	10.0	8.4	6.7
Italy	24	24		19	19		11.9	11.7	11.2
Latvia	24	24	21	26	27	27	9.9	9.6	8.7
Lithuania	21	22	23	30	29	32	9.1	7.9	7.1
Luxembourg	30	32	30	56	54	55	6.5	6.3	5.6
Malta	18	18	18	34	31	38	5.4	4.7	4.0
Netherlands	30	32	32	43	45	48	6.9	6.0	4.9
Poland	25	25	25	15	19	21	7.5	6.2	4.9
Portugal	20	19	20	28	28	31	12.6	11.2	9.0
Romania	17	19	19	9	9	10	6.8	5.9	4.9
Slovakia	27	26	26	26	29	33	11.5	9.7	8.1
Slovenia	25	25	24	26	28	30	9.0	8.0	6.6
Spain	24	23	23	30	31	32	22.1	19.6	17.2
Sweden	36	30	31	35	39	46	7.4	6.9	6.7
United Kingdom	27	26	25	40	43	46	5.3	4.8	4.4

Source: Eurostat Database, Skills Related Statistics

According to table 3, Luxembourg, Netherlands, Denmark, Finland, Sweden and Germany appear to have the highest (above basic) levels of information skills. At the same time, these countries report very low unemployment rates. Through the whole sample, the correlations between "basic information skills" and "unemployment rates" variables are -0.0371, -0.0764 and -0.107 for 2015, 2016 and 2017, respectively. Similarly, correlations between "above basic information skills" and "unemployment rates" are -0.334, -0.2772 and -0.205. In all cases information skills are associated with lower unemployment rates. The relationship becomes more negative in the above basic information skills measure, implying that information skills is an important tool to reduce unemployment in the European Union.

Regarding table 4, I would say that Greece, Spain and Italy which exhibit the highest unemployment rates report relatively low values of communication skills. On the other hand Luxembourg, Netherlands and Denmark appear the highest values of "above basic communication skills" accompanied by very low unemployment rates. Statistically, correlations between "basic communication skills" and "unemployment rates" variables are -0.1178, -0.1531 and -0.0482 for 2015, 2016 and 2017, respectively. Correlations between "above basic communication skills" and "unemployment rates" are higher with values -0.4345, -0.3598 and -0.3699, respectively. Once again, in all cases communication skills are associated with lower unemployment rates.

Table 5 reports the statistics with respect to Problem Solving Skills and its interaction with unemployment rates. Once again Luxembourg, Netherlands and Sweden have the highest values while countries with high unemploysment rates like Greece, Italy, Croatia and Cyprus report very low values of this skill. Spain which has high unemployment rate reports medium values regarding this skill, though. With the exception of 2015, correlations depict a negative relationship between "Basic Problem Solving Skills" and "Unemployment Rates" with values 0.1675, -0.0254 and -0.0231 for the years 2015, 2016 and 2017, respectively. Correlations between "Above Basic Problem Solving Skills" and "Unemployment Rates" are -0.4329, -0.3127 and -0.2874 for 2015, 2016 and 2017. Once again the higher the level of problem solving ability the stronger the negative connection with unemployment is.

With respect to table 6, I observe that countries with the highest values are Luxembourg, Denmark, Netherlands, UK, and Sweden which have low unemployment rates. The lowest values of software skills are reported for Romania and Bulgaria. As one would expect, all correlations are negative. Correlations between "basic software skills" and "unemployment rates" are -0.1759, -0.1575 and -0.075 for 2015, 2016 and 2017, respectively. Correlations between "above basic software skills" and "unemployment rates" are a little higher with values -0.2309, -0.1521 and -0.1658 for 2015, 2016 and 2017, respectively.

Finally, table 7 shows the statistics regarding the digital skills and the their negative relationship with unemployment. All correlations are negative with values -0.1706, -0.2552 and -0.1578 for the variable "basic digital skills" for 2015, 2016 and 2017, respectively and values being -0.3461, -0.2313 and -0.2281 for 2015, 2016 and 2017 for the "above basic digital skills" variable.

Summarizing, I would say that for all five dimensions of skills I have found negative correlation between skills and unemployment rates. Remarkably, in the case of "above basic" measurement the correlations become even higher. It is clearly an indication that information, communication, problem solving, software and digital skills in general can be used as a useful tool to tackle the problem of unemployment in Europe. Obtaining these skills can reduce the skill mismatch in the workplace and improve the employment prospects. However, it is simply a correlation analysis and one cannot draw secure conclusions. Nevertheless, the Eurostat statistics

database with respect to the Skills in Europe has a lot to offer and hopefully will be used by governments and labor market policy makers. In the following section I perform a regression analysis to investigate the factors which affect unemployment rates using European cross-country evidence. I include different levels of education, since it is a key element in the skill-obtaining process.

5 Estimates of the Effect of Education on Unemployment in Europe

It would be ideal if researchers had data on skills characteristics across countries for many consecutive years to work with. However, as far as I know, the databases by Eurostat and OECD which are the only databases that provide data on skill mismatches and skills needs as part of programs they perform. OECD data for skill needs refer to a single year (2013) while data from PIAAC, even though really interesting especially, since they are micro-data, they are not continuous. On the other hand data from Eurostat cover the 2015-17 period. In this section I use education controls as skill proxies to account for differences in unemployment rates across 28 European countries from 1999 to 2016.

Generally, studies which investigate the effect of various variables on unemployment use various methods and equations. However, there is an empirical study and the model in its basic form is:

$$UR_t = a_0 + a_1 GDPgrowth_t + X_t + \varepsilon_t \qquad (1)$$

Where, UR is the dependent variable that corresponds to the unemployment rates.

GDP growth represents the annual GDP growth rates in percentage, and

X is a set of control variables to capture all the other factors which have an impact on unemployment.

In my analysis, I use three different measurements of education i) share of labor force with elementary education, ii) share of labor force with secondary education and, iii) share of labor force with tertiary elementary education, all expressed in percentage of labor force. In what follows I estimate the effect of these three levels of education on unemployment rates across a sample of 28 European countries for the 1999-2016 time period.

These countries are Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, Bulgaria, Lithuania and, Romania. Data for unemployment rates were extracted from OECD.stat. → LFS by sex and age - indicators, for GDP Growth from OECD.stat. → GDP, volume – annual growth rates in percentage, and for the three measurements of education from OECD.stat. → "Educational Attainments of the Labour Force".

GDP Growth is used as a demand side control and as a business cycle control as well. Additionally, I include *(fixed) country effects* in order to lessen the biases stemming from persistent differences in unemployment rates that are associated with long-standing characteristics of a country's labor market. The *country fixed effects* are used to control for the factors which explain differences in unemployment rates across countries. Moreover, I add *year effects* to control for global shock or policies that might influence unemployment rates in all countries.

Therefore, the econometric specification that I use complies with the general form above and is as follows:

$$Y_{it} = \alpha_i + \beta_t + a_1 GDPgrowth_t + EDUC_{it} + u_{it} \qquad (2)$$

Where, i (country) =1,2,…,28

t (time) =1,2,…,18 and:

Y_{it} is the unemployment rate;

$GDPgrowth_t$ is the Gross Domestic Product;

α_i are the country effects;

β_t are the year effects;

$EDUC_{it}$ is this time-varying vector referring to the three alternative education levels i.e elementary, secondary, tertiary;

u_{it} is the error term.

All regressions have been carried out on the econometric program STATA and the standards errors are robust to heteroskedasticity.

Table 8: Estimates of the Effect of Education Level on Unemployment in Europe

	Unemployment Rate (UR)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Corr. with UR	OLS (robust)	OLS (robust)	OLS (robust)	YE OLS (robust)	YE OLS (robust)	YE OLS (robust)	FE OLS (robust)
GDP Growth	-0.075	-0.149** (0.061)	-0.158** (0.061)	-0.151** (0.062)	-0.118 (0.083)	-0.135 (0.084)	-0.106 (0.084)	-0.182*** (0.042)
Elementary Education	-0.032	-0.013 (0.013)			-0.006 (0.016)			-0.248*** (0.049)
Secondary Education	0.054		0.022 (0.017)			0.023 (0.016)		
Tertiary Education	-0.040			-0.027 (0.023)			-0.068 (0.024)	-0.098** (0.045)
Constant		9.035*** (0.381)	7.601*** (0.933)	9.456*** (0.682)	8.451*** (1.042)	6.689*** (1.224)	9.678*** (1.065)	11.545*** (1.716)
Fixed Effects (FE)	-	No	No	No	No	No	No	Yes
Year Effects (YE)	-	No	No	No	Yes	Yes	Yes	No
R-squared	-	0.0152	0.0186	0.0160	0.0765	0.0817	0.0885	0.6321
Prob > F	-	0.0242	0.0132	0.0272	0.0000	0.0000	0.0000	0.0000
Hausman	-	-	-	-	-	-	-	0.0000
Observations	499	499	499	499	499	499	499	499
Countries	28	28	28	28	28	28	28	28

Notes: The sample period is from 1999-2016 for all countries apart for 1999 for Bulgaria.
Hubert-White robust standard errors are given in parenthesis.
*Statistically significant at the 0.10 level, ** at the 0.05 level, *** at the 0.01 level.

Column (1) of table 8 depicts that tertiary and elementary education are both negatively correlated with unemployment rates across the 28 European countries of the sample, while secondary education is positively connected with unemployment. This inverted u-shaped relationship between education and unemployment remains when OLS (Ordinary Least Squares) estimation method is applied, in columns (2)-(4), and when year effects are incorporated to capture the influence of aggregate (time- series) trends, in columns (5)-(7). The magnitudes may be negative for elementary and tertiary education and positive for secondary education, but are not statistically significant. The preferable and robust estimations of table 8 are presented in column (8). The sample consists of a group of European countries which have different characteristics regarding their labor markets. Therefore, country fixed effects should be included

to account for these differences. Indeed, in column (8) the value of R-square increases to 0.6321 and the value of the Hausman test is 0.000, which both point to the addition of fixed effects into the model.

Estimations of table 8 reveal that being a graduate of tertiary education increases employment prospects. Nevertheless, having a low level of education (elementary) is also positively connected with employment. On the other hand, obtaining a medium level of education (secondary) is associated with higher unemployment rates. These findings indicate that there is not a positive and linear relationship between educational attainment and unemployment. This inverted u-shaped connection can be explained by the fact that in some industries, employers seek to hire low-skilled employees in order to avoid paying high salaries. For instance, countries that are more industrized or labor intensive, may not need highly educated workforce so that firms will have lower salary costs. In this case a large amount of labor is required to produce goods or services, even if workforce is low-skilled.

Conclusions

One of the major concerns in modern labor market is to facilitate the skill matching and to cope with the problem of skills mismatch. In this framework, the search for those skills that improve employment opportunities and career prospects, is one of the most important issues. In this paper, initially, I present a review of the literature regarding the impact of skills on labor market. Research has shown that the skill mismatch and the shortage of proper skills can have adverse effects on labor market performance. Secondly, I discuss on the skill needs in Europe and skill shortages and surpluses as well, with respect to basic, social, complex solving, technical, system and resource management skills. In general, Luxembourg, Finland and the Netherlands reported the highest values, while Lithuania, Cyprus and Hungary the lowest ones.

Moreover, I examine five important dimensions of skills: information skills, communication skills, problem solving skills, software skills and digital skills in general. For all of them I have found negative correlation between them and unemployment rates, findings which suggest that these skills can reduce the skill mismatch in the workplace and improve the employment prospects. Finally, I estimate the effect of three levels of education on unemployment rates across a sample of 28 European countries for the 1999-2016 time period. Both tertiary and elementary education seem to reduce unemployment for European countries, while secondary education is connected with increases in unemployment rates.

References

Budría, S. & Moro-Egido, A. (2005). Education, Over-education, and Wage Inequality: Evidence for Spain, Studies on the Spanish Economy 211, FEDEA.

European Commission (2015). Measuring Skills Mismatch, Analytical Web Note, No. 7/2015.

ILO, OECD & World Bank (2014). G20 Labour Markets: Outlook, Key Challenges and Policy Responses, Report prepared for the G20 Labour and Employment Ministerial Meeting, Melbourne, Australia, 10-11 September 2014.

Jackman, R., Layard, R. & Savouri, S. (1991). Mismatch: a Framework for Thought, in F. Padoa-Schioppa (ed.) *Mismatch and labour mobility*, Cambridge University Press, Cambridge, UK.

Kelly, E., O'Connell, P.J. & Smyth, E. (2010). The Economic Returns to field-of-study and Competencies among Higher Education Graduates in Ireland, *Economics of Education Review*, 29 (4), pp. 650-657.

Manacorda, M. & Petrongolo, B. (1998). Skill Mismatch and Unemployment in OECD Countries, *Economica*, 66, pp. 181-207.

Mavromaras, K. P., Sloane, P & Z. Wei (2015). The Scarring Effects of Unemployment, Low Pay and Skills Under-utilization in Australia Compared, *Applied Economics*, 47 (23), pp. 2413-2429.

McGuinness, S. & Sloane, P. (2011). Labour Market Mismatch Among UK Graduates: An Analysis Using REFLEX Data, *Economics of Education Review*, 30 (1), pp. 130-145.

Montt, G. (2015). The Causes and Consequences of Field-of-study Mismatch: An Analysis Using PIAAC, OECD Social, Employment and Migration Working Papers, No. 167, OECD Publishing, Paris.

OECD (2017). Getting Skills Right: Skills for Jobs Indicators, OECD Publishing, Paris.

OECD (2016). Health Workforce Policies in OECD Countries: Right Jobs, Right Skills, Right Place, OECD Health Policy Studies, OECD Publishing, Paris.

OECD (2014). OECD Employment Outlook 2014, OECD Publishing, Paris.

OECD (2012). Better Skills, Better Jobs, Better Lives: A Strategic Approach to Skills Policies, OECD Publishing, Paris.

Olitsky, N. (2008). The Procyclicality of Mismatches, University of Massachusetts-Dartmouth, mimeo.

Quintini, G. (2011a). Over-Qualified or Under-Skilled: A Review of Existing Literature, OECD Social, Employment and Migration Working Papers, No. 121, OECD Publishing, Paris.

Quintini, G. (2011b). Right for the Job: Over-Qualified or Under-Skilled?, OECD Social, Employment and Migration Working Papers, No. 120, OECD Publishing, Paris.

Robst, J. (2008). Overeducation and College Major: Expanding the Definition of Mismatch Between Schooling and Job, *Manchester School*, 76, pp. 349-368.

Sattinger, M. (1993). Assignment Models of the Distribution of Earnings, *Journal of Economic Literature*, 31 (2), pp. 831-880.

Skott, P. & Auerbach, P. (2005). Wage Inequality and Skill Asymmetries, in M. Setterfield (ed.) *Interactions in analytical political economy: theory, policy and applications*, Armonk, New York.

Sneessens, H. (1995). Asymmetric Growth Effects, Skill Mismatch and Unemployment Persistence, Université Catholique de Louvain, Institut de Recherches Economiques et Sociales, Discussion Paper No. 25.

Thisse, J. & Zenou, Y. (2000). Skill Mismatch and Unemployment, *Economics Letters*, 69, pp. 415-420.

About the Author

Georgios GIOTIS is an Adjunct Lecturer at the Department of Business Administration, TEI of Epirus since 2015. He holds a PhD degree in Labor Economics. He has taught at the Department of Economics, University of Ioannina and at the Department of Accounting and Finance, TEI of Epirus. He has worked for various European Projects since 2004. He has also written a book and several scientific papers. He has participated in many international conferences regarding the economic science and meta-analysis techniques. He is a member of MAER-Net and TRN. His interests lie in Labor economics, Minimum Wage, Economics of Social Policy and Meta-Analysis.