BEING AND BECOMING LOW-SKILLED: A COMPREHENSIVE APPROACH TO STUDYING LOW- SKILLNESS¹

Lucia Kureková - SGI, Bratislava & CEU, Budapest; Corina Haita -
Central European University, Budapest; Miroslav Beblavý - Center for European Policy
Studies, Brussels.

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Abstract

This study reviews theoretical, conceptual and empirical literature concerning the low-skilled and proposes more comprehensive and dynamic conceptualization of who the low-skilled are. Our conceptualization is based on analyzing the sources and processes of being and of becoming low-skilled by reviewing macro-structural external processes underlying changes in labour supply and labour demand and their demonstration at the micro-level. We argue that alternative conceptualization of low-skillness should be reflected in empirical studies as well as in policy guidelines by going beyond the measurement of the low-skilled through the lowest attained level of qualification (ISCED 0-2), which overlooks heterogeneity of the low-skilled labour market segment. A broader conceptualization and measurement of the low-skilled can better reveal the variety of causes of low-skillness and in turn allow designing better suited policies for the integration of the low-skilled into the labour market and society.

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I. INTRODUCTION

The integration of low-skilled workers into labour markets represents today one of the key policy challenges due to their higher risk of unemployment and social and economic exclusion. In view of existing labour shortages and projected aging of populations, integration of low-skilled into labour market is likely to gain on further importance. A relatively recent study forecasting the skill needs in Europe until 2020 predicts that Europe is to experience workforce shortage of about 12 million people by 2020 due to the increasing skills gap and the change in the occupational structure (Cedefop 2008). Researchers also forecast a skill polarization towards high and low-skilled occupations, i.e. the increase in employment at the extremes of the job quality distribution accompanied by a process of displacement of the low-skilled by the more educated workers who are being pushed out from the medium level jobs (Cedefop 2008; Mayer & Solga 2008; Autor & Dorn 2009; Manning 2004). At the same time, the skill requirements are rising within all occupational categories and skill levels, while the complexity of tasks required even at the lower end of the skills distribution is increasing (Brunello & Schlotter 2011; Autor, et al. 2003; Levy & Murnane 2005, Maxwell 2006). Undoubtedly, these forecasts look rather gloomy for the low-skilled and low-educated. The investigation of this work force is therefore an urgent task for the researchers and policy makers, as it appears to be the segment that will suffer the most due to the occupational polarization and the overall skills dynamics.

The core question that this report therefore addresses is ***who the low-skilled are across and within the EU member states***. Our approach towards the analysis of low-skillness consists of conceptual and empirical parts. We critique academic and policy discussions about low-skilled workers for being over-simplified and characterized by homogenization of low-skillness across as well as within countries. We aim to enrich existing research on sources and consequences of low-skillness and propose a broader and more complex definition and measurement of low-skillness than typically adopted in the literature by seeing low-skillness not only as a status but also as a process of ‘becoming’ low-skilled.

We begin our work by a thorough review of the academic and policy works to understand the state of the art with respect to definition and measurement of low-skillness. We find that the existing academic discussions as well as the empirical

investigations about low-skillness are underdeveloped. The quantitative literature typically equates the achieved official qualifications with the level of skills and measures low-skilled through ISCED 0-2 educational attainment (lower secondary or second stage of primary education). On the demand side, low-skillness is typically proxied by ISCO88 9th occupational category (elementary occupations). In our view, the measurement by educational attainment alone sterilizes the concept of low-skillness and obscures it from the sources of low-skillness that are important for a better understanding of the heterogeneity of the low-skilled workers within countries and across the EU states.

Generally, research is over-simplified, detached from acknowledgement of structural processes and changes that might affect low-skillness, and characterized by homogenization of the low-skilled. This simplification is also reflected in EU policy documents and in particular in those related to the European Employment Strategy (EES) aimed at developing policy measures for the social and labour market inclusion of the low-skilled. Apart from the problem of the fuzzy definition of the low-skilled, the majority of the EU policy documents seems to address the problem of the low-skillness only with regard to people and only a few of them take into discussion the problem of the match between the supply and the demand for skills.

In our work, it is exactly this direction towards “matching” which motivates us to consider low-skillness as a concept that should be studying both the people and the jobs jointly and in their interrelation and, thus, in a more dynamic nature. Conducting a broad review of macro-processes that have been driving the changes in labour demand and labour supply in the past decades enables us to identify mechanisms through which they impact labour market outcomes of workers employed in low-skilled jobs, found in unemployment or outside the labour market, in inactivity. In doing so, our understanding of low-skilled is concentrated on *de facto* utilization of skills rather than on equating it with the formally achieved qualification levels.

We find our approach fairly innovative in that we connect who the low-skilled are, i.e. being low-skilled, with the sources of low-skillness, i.e. becoming low-skilled, and thus point out the heterogeneity of the low-skilled workers. We are so able to capture a larger category of people who are at the risk of becoming low-skilled in view of various aspects under which low-skillness is not only a state but also a process. By addressing jobs and workers inter-relatedly and approaching low-skillness both as status and a process, we are able to provide a broader

conceptualization and measurement, and suggest a typology of low-skillness. In addition to the typically included ‘low-educated’, our typology includes categories of workers who might be formally well-educated, experienced and trained but have been drawn into low-skillness as an outcome of structural forces or institutional barriers. Examples include people with obsolete skills, displaced workers or ‘temporarily low-skilled’ migrant workers. Relatedly, we identify dimensions along which one can study the low-skilled empirically. While any cross-country comparative work will need to continue to rely on the available classifications and measures, such as ISCO and ISCED, we advocate their usage in a conceptually broader and richer manner. This in practice involves three aspects: a) a greater focus on ISCO measure, i.e. an actual job placement; b) an inclusion of higher ISCO and ISCED categories than typically used in empirical analysis, and c) measuring low-skillness both in and out of the labour market, i.e. looking at employment, unemployment as well as inactivity. This makes our framework both more encompassing and more precise and multifaceted.

We in particular highlight that structural processes that have been changing the character of the labour demand are not neutral with respect to individuals’ age, gender or ethnicity. Therefore, being low-skilled means different things in different countries since labour market outcomes of people with similar ISCED differ across countries. Even in the same labour market, a person with same education can have very different labour market outcomes (e.g. low-educated youth versus low-educated older workers). In addition, under the pressure of changing economies, formal qualifications, or even experience, might be in effect void of ‘demanded’ skills and materialize in skill obsolescence.

We argue that labour market outcomes are affected by the interaction of the individual characteristics and further shaped by structural macro-processes and changes that condition chances on the labour market differently across different countries. Our key insight is that low-skilled people differ across countries if we look at them through a range of more specific dimensions beyond formal education, such as gender, age, nationality or ethnicity. This variety is not fully reflected in the EU policy-level documents which aim to advice member states on labour market related issues. A broader conceptualization and measurement of the low-skilled that we propose can better reveal the diverse causes of low-skillness and in turn allow

designing better suited policies for the integration of low-skilled into the labour market and society.

While the categories of low-skillness we propose are certainly not new to the literature, our contribution consists of the emphasis we put on the different profile of low-skillness across the EU countries which are produced when contrasting the two measures of skills, i.e. ISCED and ISCO, as well as using them inter-relatedly with other dimensions like age, gender or nationality. This approach allows us to highlight, among other things, the differences among the educational systems among the EU countries as well as the different values attributed to the educational attainment across the EU labour markets. In sum, our contribution lies in pointing out deficiencies in research and potentially also policy-making on low-skillness, suggesting broader conceptualization and measurement and empirically prompting our approach to demonstrate the cross-country and within country variation in who the low-skilled are.

The study consists of seven sections. Section 2 reviews how low-skillness is conceptualized in academic and policy works and summarizes the most common empirical approaches to measuring low-skillness. Section 3 analyzes the policy discourse at the EU level. We analytically summarize how the EU institutions define and measure (low) skills. We also review what policy recommendations are given to individual countries in the EU guidelines related especially to the European Employment Strategy and the EU 2020 goals. Section 4 reviews structural changes and shifts impacting on economy and employment, particularly for the low-skilled. We then proceed to our own research contribution. In Section 5 we propose justification for a new approach to studying low-skillness leading to a categorization of low-skillness. Section 6, the longest element of this report, contains empirical data on a comparative basis. It presents detailed analysis of data to buttress the points on cross-country differences, but also demonstrates some of the common points on European low-skilled. The last part concludes and summarizes our findings.

II. STATE OF THE ART: CONCEPTUALIZATION AND MEASUREMENT OF LOW-SKILLNESS

In the literature, the low-skilled are mostly defined based on available and standardized measures whereby educational level, occupations, wages and job stability have traditionally been used as instruments for defining the low-skilled. In terms of education, the low-skilled are identified by ISCED0/1, that is those individuals whose schooling is below any level of secondary education (McIntosh 2002; Lyly-Yrjänäinen 2008). Alternatively, Steedman & McIntosh (2001), based on an analysis of the International Adult Literacy Survey (IALS) test data administered to a population 16 years of age or above, conclude that the ISCED0/1/2² is a valid working definition (and measure) of the low skilled, at least in the EU countries they considered. Their conclusion stems from the fact that those classified as ISCED0/1/2 capture three quarters of those whose IALS scores are considered to meet the requirements for the low-skilled jobs. However, their conclusion hinges considerably on the assumption that literacy skills, as measured by the IALS test, are the only skills to be considered, disregarding the non-cognitive and social skills as well as entrepreneurial and communication skills, which are increasingly required by employers (Bengtsson 1993; Nelson 2010). Maxwell (2006) defines low-skilled workers as having no more than high school education and no more than one year of work experience, effectively narrowing the definition to youth.

When it comes to the occupational classification by ISCO, the identification of the low-skilled is somewhat blurred as there is less consensus. Manuals and research practices of international organizations, such as ILO or OECD, equate the last ISCO category, elementary occupations, with the low-skilled level (e.g. Hoffmann 1999). Other works, however, have applied a much broader approach to the measurement of the low-skilled, but their decision to deviate from the above praxis is seldom justified. For example, (Lyly-Yrjänäinen 2008) defines the low-skilled people as those with occupations classified in ISCO 5-9 and considers the 4th ISCO category as highly skilled. In a slightly different view, (Dieckhoff 2008), looking at the effect of the vocational training on the labour market outcome in three EU countries, defines low-skilled workers as belonging to the occupational groups 81

² This category comprises people with lower secondary education and below.

to 93 in the ISCO88 classification. Finally, many economics papers, searching for various causalities, define the low-skilled in terms of wages using rather arbitrary thresholds at the bottom of the wage distribution or absolute levels of pay (Manning 2004, Autor & Dorn 2009, (Bassi & Ashenfelter 1985). A relatively frequent measure of low-skilled jobs (rather than workers) links it to job quality and uses job tenure and job stability as proxies for the job skill level.

Drawing on the most common measures for skills, ISCED and ISCO classifications, the literature has already identified the location of the low-skilled workers geographically, sector and occupation-wise. Regarding the geographical location, Lyly-Yrjänäinen (2008), based on the EU LFS 2005/3 data, finds that the Mediterranean countries have the highest proportion of the low-qualified workers (ISCED 0-2) in the working population among the EU countries, while the Eastern European countries have the smallest. However, when looking at the occupations, the picture is considerably different. The low-skilled workers (ISCO 5-9), as labelled by Lyly-Yrjänäinen (2008), are in a high proportion in the Eastern European countries, with Romania taking the lead. Sector-wise, Lyly-Yrjänäinen (2008) locates the low-qualified workers in the manufacturing, trade, agriculture and constructions sectors. Based on a theoretical model, which is confirmed by an empirical exercise on US and UK data, (Manning 2004) predicts that the low-skilled will migrate towards the non-traded sector and to cities where there are more skilled workers. To the extent that the incidence of the low-pay in the low-skill is high, (Lucifora et al. 2005) find the low-skilled in retail, hotel and catering, agriculture and personal services. According to occupations, the low-qualified are in elementary occupations, crafts and related trade, and service and sales sectors (Lyly-Yrjänäinen 2008). Maxwell (2008) finds that they fall into the following occupations: food preparation and serving, building maintenance, sales, office/administrative support, production, and transportation occupations.

The question that we would like to raise with respect to these measures and the way they are utilized is whether they appropriately identify the low-skilled and the underlying 'reason' for their status. In our view, the above use of these measurements is characterized by several deficiencies, which, in essence, highlight the need for better conceptual grasping of who the low-skilled are.

Firstly, frequently there is confusion in the terminology used by various authors when designating the work force belonging to the lower tail of the skills

distribution. For instance, terms like *low-skilled*, *low-wage* or *unskilled* are often used interchangeably, especially in the economics literature (Goux & Maurin 2000; Manning 2004). Likewise, some of the EU policy documents mention the term *unskilled* together with that of *low-skilled*, without further specifications regarding the similarities and/or differences between these two categories (Council of the European Union 1999). Such use of the terms is yet another illustration of the fuzziness and deficiency in the conceptualization of low-skillness. In our opinion, the concept of low-skilled is broader than both that identified by *low-wage* and by *unskilled*. First, the *low-wage* definition and measure of low-skillness fails to capture the unemployed and other vulnerable categories which are not wage recipients. Second, the concept of *unskilled* is merely a subset of the low-skilled as it only captures those without any sort of skills and at most it only incorporates the unskilled manual workers. Contrary to this notion, studying the task content of low-skilled jobs (Maxwell 2006) persuasively demonstrates that low-skilled jobs require a fair share of skills.

Secondly, in light of the EU-wide policy attempts, it is important to point out that in the mapping of workforce along ISCED versus ISCO classifications for different countries, inconsistencies emerge between the low-educated (ISCED) and the low-skilled (ISCO, wage or job stability). For instance, countries with the lowest share of low-qualified workers (ISCED 0-2), such as Slovakia, also have a relatively high share of low-skilled jobs and, most importantly, suffer from high and persistent unemployment. The shares of low-qualified (ISCED 0-2) and medium-qualified (ISCED 3-4) workers in the EU countries are substitutes (Figure 4) but no such relationship is transposed to the comparison of the low-skilled (ISCO 9) and medium-skilled (ISCO 4-8) jobs (Figure 5). In effect this implies that the meaning of education is not read uniformly in the labour markets across the EU countries and that being low-qualified in one country might offer very different labour market prospects than in another country. This is closely related to the fact that educational and occupational content is not homogenous across countries, which reflects different systems of skill formation and, linked to this, differences in skill transparency and skill acquisition (Nelson 2010).

While in practice any investigation of the low-skilled labour market segment is constrained by the availability of (comparative) standardized measures, the problem of their cross-country content validity can be overcome by richer conceptual underpinning of low-skillness. Several studies already go in the direction of rethinking the concept of low-skilled by taking a broader look at the sources of low-skillness and considering various ‘classes’ of vulnerable people. In particular, Illeris (2006) points to the necessity of going beyond the traditional identification through the lenses of the educational attainment (primary and/or lower secondary schooling) and to consider the various classes of people who are at risk of being excluded from the labour market. He labels these people *vulnerable adults*, including school drop-outs, who have not completed any education leading to formal qualifications, those with obsolete skills and the young adults who do not possess the social competencies for a lasting job. Going farther, the author even ventures the idea that the term “low-skilled” is on the way of becoming obsolete. Spenner (1983) also points out the lack of definition and measurement of skills. He calls attention to the fact that *skills*, regarded as “a portable form of human baggage“, is not a synonym for their usage. This reveals that measuring skills through occupational or educational categories may not be the best approach for understanding the content of “skills”.

Similarly, Solga (2002) positions the understanding of the low-skilled into the wider context of educational expansion and engages with the problem of stigmatization of the less-educated people as a factor for their decreasing chances in the labour market. Fossum et al. (1986) in turn develop a model of skills obsolescence and its external (structural) and internal (individual) determinants and discuss the interaction of structural changes and individual characteristics in affecting the chances and performance in the labour market. Nixon (2009) brings in the concept of job masculinity which prevents the low-skilled men to take-up training and to adapt their skills to the characteristics of the service economy. The gender perspective turns out to be fairly important especially for the older men who detach from the labour market rather than accepting entry level jobs. The above-discussed studies, however, are typically concerned with a particular group (or two) of low-skilled workers and analytically comprehensive studies covering a range of low-skilled ‘types’ are less common. In addition, these studies come short of providing a systematic empirical application of the broader conceptualization they might implicitly or explicitly entail.

In sum, we find that the academic and policy discussion about low-skilled workers is rather over-simplified and characterized by homogenization of the low-skilled, especially in the empirical applications and large-N quantitative studies. In our view, especially the measurement by educational attainment sterilizes the concept of low-skillness and obscures it from the sources of low-skillness that are important for a better understanding of the heterogeneity of the low-skilled workers within countries and across the EU states, in turn enabling a more accurate identification of remedies. In Section 5 we aim to contribute to this literature by a re-conceptualization of the concept of low-skillness, going beyond the rather raw standardized classifications mentioned earlier. Before turning to that, however, we first carry out a detailed analysis of the EU policy documents with a focus on the definition and conceptualization of low-skillness.

III. EU POLICY DOCUMENTS AND LOW-SKILLNESS

This section reviews the concept of low-skillness in the EU-level policy documents focusing on two issues: a) analytically summarizing how skills, and especially low-skillness, are defined and measured; and b) reviewing which policy recommendations are given to individual countries in the EU guidelines related especially to European Employment Strategy and EU 2020 goals, but also in the other policy areas related to skills, such as education and training. This analysis aims to complement and link the conceptual and empirical parts of this report where we analyze the sources of low-skillness and propose a broader and more complex definition and measurement of low-skillness with a more policy-oriented analysis to understand and evaluate the awareness of low-skillness and proposed remedies at the EU- and national-policy level. The four core questions we address in this section are:

- a) How is low-skillness defined in the EU-level documents and country specific recommendations?*
- b) Are recommendations of EU/EC aware of country-specific problems or one-size-fits-all approach seems to prevail?*
- c) Are country specific plans to deal with labour market problems blind to intra-country specificities?*
- d) Is the awareness of structural processes and changes linked to how problems and remedies are defined and dealt with?*

The used conceptualization of low-skilled workers was analyzed with a particular emphasis on how the skills are defined. Often-lacking coherent conceptualization in the documents led us to examine how the low-skills segment is distinguished from other skill levels, what are the key issues raised with regard to low-skillness and how are they constructed. Secondly, we examine the proposed remedies aimed at tackling employment problems associated with low-skilled labour and recommendations designed for helping the low-skilled.

We gather the empirical evidence for this section by a thorough and comprehensive review of various policy documents related especially to the European

Employment Strategy (ESS). The process of policy creation of EES is summarized in Box 1.

Box 1: European Employment Strategy and the process of policy creation

The European Employment Strategy (EES) coordinates attempts of Member States to address the high levels of unemployment through policy measures. Early efforts to coordinate policy initiatives dealing with employment issues at the European Community level date back to the 1970s. These were followed by numerous structural fund initiatives in the 1980s to be confirmed at the European Council Summit in Essen in 1994 in the form of key policy objectives designed to boost employment. Specific objectives included development of resources through vocational training, promotion of productive investment through moderate wage policies, efficacy of labour market institutions, promotion of local job initiatives and policies designed for specific target groups. The Treaty of Amsterdam institutionalized these objectives (Eurofound, 2010). The competences related to the creation of employment policy guidelines, prepared on an annual basis, are now stipulated in the Treaty of the Functioning of the European Union (Article 148) (European Union, 2008).

The process of policy creation is the Commission consulting the annual guidelines with the European Parliament, the Economic and Social Committee of the Regions and social partners. They are put into practice through the open method of coordination, a convergence model, which does not lead to binding EU legislative measures. The Member States then create National Action Plans (NAPs), since 2005 known as National Reform Programmes (NRPs), where they incorporate the guidelines into their national employment policies. The implementation is examined by the Commission and Employment Committee (EMCO). The final part of the cycle consists of publishing the Joint Employment Report (JER), which is endorsed by the European Council.

We find it important to consider both the EU-level broad documents and their country-level ‘applications’. Therefore, two broad types of EU-level documents have been analyzed going back for about a decade, and are listed in Annex A. The first set consist of general EU policy documents with regard to employment and skills, such as Key Messages Paper, EMCO Opinions and Contributions, EMCO Thematic Reports, and Joint Employment Reports, which have been reviewed for the last decade. The EES process includes the stage of national level implementation, where each Member State draws up national plan – National Action Plan (NAP), later renamed to National Reform Programme (NRP). In order to understand the differences in the conceptualization of the low-skilled at a country and the EU level, the NAPs/NRPs of selected Member States are analyzed in terms of how they approach the low-skilled. The countries selected include Spain, Portugal, Slovakia, Czech Republic, Austria, the Netherlands, Ireland and Italy in the analysis of country-specific documents. The choice of these countries was

guided by the ambition to cover countries with poor as well as well performing labour markets on the aggregate level, to have geographical variation (East, West, North and South) and to include different ‘models of capitalism’(Hall & Soskice 2001; Nölke & Vliegenthart 2009). The analysis starts with NAPs of 1999 (where available) and ends with NRPs 2008-2010.

How are low-skilled conceptualized and measured?

Low-skilled workers lack a coherent conceptualization in the EU policy documents studied. The fuzziness of the concept is demonstrated through ambiguous use of language and rather incidental attempts for conceptualization which are not unified. In many ways, the utilization of low-skillness in the EU documents resembles lack of coherence and fuzziness found in the review of the academic literature.

For example, the Draft Joint Employment Report 2001 that does not make a distinction between the low-paid and low-skilled labour: “Progress in reducing the tax burden on labour is relatively slow overall, but more substantial in respect of low-paid/low-skilled labour.” (Draft Joint Employment Report 2001:7). In most other documents, the low-skilled are often referred to in rather descriptive terms, e.g. “people at the margins of the labour market” (Joint Employment Report 2006-2007: 17), “vulnerable groups” (Joint Employment Report 2011: 2), “people most in need” (Joint Employment Report 2004-2005: 10), “groups staying outside the labour market” (Joint Employment Report 2008-2009: 13). The low-skilled fall under these descriptive categories with other groups such as older workers, immigrants, ethnic minorities, incapacity benefit receivers, etc., without being distinctly differentiated. Importantly, the content of these groupings varies over the years and countries (See Table 1).

These designations suggest that the main criteria for the given conceptualization of the low-skilled are labour market participation, vulnerability and distance from the labour market. A group is perceived to be vulnerable when high proportion of their members stays outside the labour market. The low-skilled often fall into a category described as “people at the margins of the labour market”, “furthest from the labour market” (Report to the EMCO Group of Experts on Making Work Pay (2003): 1) or they are advised to “climb the job ladder” (EMCO opinion on Enhancing higher productivity and more and better jobs including people at the margins of the labour market (2006: 3) implying that the perceived distance from the labour market is the prominent

characteristic used for the low-skilled. Relatedly, problems associated with and issues raised with regard to the low-skilled labour are: low educational attainment, early school leaving and lifelong training. However, no comprehensive specification of the “low educational attainment” is given in the documents which we reviewed, highlighting again the fuzziness of the measurement of who the low-skilled are and how they should be empirically identified.

Looking at how skills are defined and used generally, differing definitions were found in the skill-focused EU policy documents. These have become more prominent in the second half of 2000s, marking a shift towards greater focus on skills and labour matching in labour market governance. Among those, the European Qualification Framework (EQF) offers a set of very clear definitions with regard to qualifications. It does not base the educational attainment on the length of schooling (as it is the case of ISCED levels), but focuses rather on learning outcomes, defined in terms of knowledge, skills and competences. Skills are defined as the ability to apply knowledge and use know-how to complete tasks and solve problems. In the context of the European Qualifications Framework for Lifelong Learning, skills are described as either cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments). Yet, EQF remains implicitly ISCED-centric as its various stages are made to correspond to what are considered to be appropriate outcomes of formal education levels.

EC 2008 New Skills for New Jobs distinguishes workers by categories of occupation (elementary occupations, skilled non-manual occupations, skilled manual occupations, high-skilled non-manual occupations) and also by the categories of educational attainment (low level, medium level, high level) (EC 2008 New Skills To New Jobs: 10), making a distinction typically lacking in other EU-level documents. An explicit acknowledgement of the impact of structural processes on low-skillness was largely missing in the analyzed documents. References to the global financial crisis were an exception, and have led to a shift in the types of issues addressed and remedies proposed in connection to low-skilled. These will be discussed in the subsection looking into the proposed remedies.

National Action Plans / National Reform Programmes analysis

The European Employment Strategy (EES) process includes the stage of national level implementation, where National Action Plan (NAP) (later renamed to National Reform Programme (NRP) are drafted. In such document country specific guidelines are taken into account and further elaborated by the Member State. The action plans/reform programmes are later subjected to further monitoring. Some authors doubt the consistency between the EES and national employment policies and attribute the advances of national labour policies to other factors. Previous examination of NAPs showed that countries differ in the extent to which they refer to country-specific recommendations, the changes in policies are difficult to be traced and there is a possibility of simple lip-service is being paid (Begg et al. 2010). Mailand (2008) asserts that pre-existing compliance, national consensus and to some extent Europeanization help explaining the uneven impact of EES across the Member States. NAPs and NRPs seem to increase the overall coherence with regard to labour market policies, but doubts remain whether the propensity to comply with the form rather than the substance is not the price being paid for it. As Mosher & Trubek (2003) put it, NAPs are treated as a bureaucratic reporting task, not an opportunity for policy reflection. We nevertheless find it important to consider whether national-level employment-related documents consider low-skilled explicitly, and whether heterogeneity of their composition within and across EU countries comes across this type of policy documents. The attention was given to the groups usually associated with low skills or similar disadvantage in labour market.

Similarly to the general documents, also in the country-specific documents mostly descriptive definitions were found: “workers most likely to be in insecure employment or excluded from the labour market” (National Action Plan for Employment - Spain – 1998: 19), “people facing particular difficulties on the labour market” (National Action Plan for Employment - Spain – 2003: 29), “population groups with low educational levels and low occupational skills” (National Action Plan for Employment - Portugal – 1998: 20), “people at a disadvantage in the labour market” (National Action Plan for Employment - Slovakia – 2004: 35), “those with a cumulated set of handicaps” (National reform programme - Implementation report 2006 Czech Republic: 38), “those on the margin of labour market” (National reform programme - Implementation report 2006 Czech Republic: 39), “those furthest away from the labour

market” (National reform programme 2008-2010 Czech Republic: 70), people having difficulties in entering the labour market (National Action Plan for Employment Austria, 2002: 26).

Additionally, we have found significant differences among the Member States in how they approach the low-skilled workers. This is usually associated with the overall educational attainment in a country and structural weaknesses within respective labour markets. The issues addressed in NAPs/NRPs with regard to low-skilled workers point out to major differences among the Member States. While Portugal identifies low educational levels to be of structural nature, Austrian NAP states that qualification levels of Austrian workers are above the average of EU. The differences remain also in the way how the NAPs/NRPs are structured and understood by a country. Some documents serve more as a general descriptive tool, others tend to address difficulties more concretely and come with present or future remedies. The Netherlands, Czech Republic and Ireland address more specific issues, e.g. of overcoming ICT skills gaps, mobility of disadvantaged workers, while Italy, Portugal and Spain tend to deal with qualitatively different structural issues such as vocational education reform or major regional disparities. This variation then reflects the overall countries’ labour market differences, namely differing labour market needs and challenges ahead. Hence, while some countries face fundamental issues with low-levels of educational attainment (e.g. Portugal) or massive regional discrepancies (Italy), other countries have already implemented major changes and their adjustments ahead appear less radical and suggested measures ‘finer’ (e.g. providing low skilled workers with lacking IT skills in the Netherlands). The overview of the document analysis for each country considered is summarized in Table 1.

Table 1: Conceptualization of low-skilled in selected countries

Member State	Conceptualisation of low-skilled workers
Spain	<p>Keywords: women, workers over 45 years of age, Education Act, vocational qualification</p> <p>Pressing issues with regard to low-skilled workers are insufficient promotion of acquisition of basic skills, flexible vocational education, life-long learning, certification of skills and addressing early school dropout rates. The employability of low-skilled workers has both social and labour market relevancy, both being interconnected dimensions of one issue.</p> <p>Workers most likely to be in insecure employment or excluded from the labour market are identified as women, people over 45 years of age, temporary workers, people with few skills, the self-employed and agricultural workers. Emphasis on skills-learning and lifelong training is stressed. In 1999, 2002 and 2003 priority in training is given to women,</p>

	<p>unskilled workers and workers over the age of 45. Also, social inclusion measures were called for in 2003 in regard to workers with low skills levels (also workers with disabilities, immigrants, members of ethnic minorities and young school dropouts. In 2004 Spain reacted on recommendation for strengthening incentives for lifelong training to increase participation of the low-skilled workers in the labour market. In 2004, priority was given to developing Quality of Education Act, Vocational Qualifications and Training Act, creating National System of Qualifications and completing National Catalogue of Qualifications. Specific programmes were introduced targeted at increasing the employability of people at risk of social exclusion, women in particular, but also “workers in SMEs, workers aged over 45, disabled and unskilled”.</p> <p>Priority in training initiatives in 2008-2010 should be given to women, youth, the disabled, persons affected by terrorism and gender violence, the long-term unemployed, persons over 45 years of age, persons at risk of social exclusion, SME workers and low-skilled workers. The low-skilled were also identified as one of the groups at a risk of being affected by discrimination.</p>
Portugal	<p>Keywords: long-term unemployed, overall low educational and training levels, older unemployed, young unemployed, vocational training reform</p> <p>Structural disadvantage of Portuguese labour market was identified in 2000 as a low educational and training level of the population with high numbers of long term unemployed with having particular difficulties reintegrating into labour market among young people, older workers, women, ethnic minorities and the disabled. Recruitment focused on low-skilled personnel was identified as a structural feature of the Portuguese labour market in 2001. The Action Plan of 2002 uses “high skill” and “low skill” distinction, where “qualified staff, intellectuals, scientists and technicians and medium qualified personnel” constitutes high-skilled workers and low (-skilled) stands for “the remaining professions”. (National Action Plan for Employment - Portugal – 2002: 28)</p> <p>Of particular interest in 2003 were older workers. Their vulnerability is related to the low level of skills/qualifications and they typically have the lowest levels of qualification and benefit less from vocational training. In 2005-2008 Portugal introduced Intervention Programme for Young Unemployed under 23 years, Intervention Programme for Active Ageing, intervention programme “Inclusive Market” for people at a risk of exclusion, professional training and employment programme for disabled persons and Intervention Programme for unemployed immigrants.</p> <p>The reform of the vocational training system constitutes a fundamental instrument for pursuing the overall qualification strategy. In the framework of this reform, the legal system of the National Qualifications System was established. (National reform programme 2008-2010 Portugal: 8)</p>
Slovakia	<p>Keywords: low employment rates of low-skilled workers, Roma, social exclusion, educational structure, active labour market policies</p> <p>Low employment rates of (among others) low-skilled workers with significant regional differences are to be addressed in country’s labour market. The priority in targeted active labour market measures is given to the long-term unemployed, persons with a low level of education and inappropriate skills, young persons including graduates, disabled persons, persons over 50 years of age and single parents with dependent children. Roma-specific unemployment has deep social impact.</p> <p>Measures focused on education of the unemployed are to be implemented in 2005-2008. The individual role shall be assumed by the educational programmes of second chance for people with low qualifications focusing on completion of primary education and furthered with preparation to achieve secondary education.</p> <p>One of the main causes of long term unemployment was in 2008 - 2010 identified as “unsuitable educational structure”. Low qualifications are tied with unemployment and with a long-term disadvantage in the labour market. - the group of long-term jobseekers consists of jobseekers who frequently have little or no work experience and work habits. The inclusion of long-term unemployed into the labour market will be part of the solution within the National Project which will introduce a new instrument of active labour market policy – an allowance for the support of employment of disadvantaged jobseekers.</p>
Czech	<p>Keywords: mobility, incentives, inactivity, life-long learning</p>

Republic	<p>Czech republic should enhance the effort to integrate the most vulnerable groups in the labour market and invest more effectively in human capital and lifelong learning. For the low skilled, job creation and supporting occupational and geographic mobility seem to be crucial. One of the priorities in fostering higher flexibility is to improve the stimulation effect of direct taxes and benefits with the aim to cut down unemployment and subsequent increase in the motivation of low-income groups to work.</p> <p>Czech labour market suffers under insufficient incentives for non-qualified or low qualified individuals to accept a job and maintain it, insufficient supply of social services focused on the integration of individuals threatened by social exclusion, insufficient participation in the labour market by mothers, elderly citizens, individuals with low qualification and other disadvantaged and inactive individuals and insufficient level of professional and geographic mobility, implementation of a fully functional system of lifelong learning, in particular of further vocational education and training. (National reform programme 2008-2010 Czech Republic: 65)</p>
Austria	<p>Keywords: lifelong learning, upskilling, advisory tools</p> <p>The qualification levels of Austrian workers are above the average of EU. Targeted modular courses focused on marketable knowledge and skills are needed. Policies within the framework of lifelong learning are mostly aimed at women, older workers and early school leavers. Upskilling is aimed at the whole population, with a stronger emphasis on women. High risk groups in regard to poverty and social exclusion are identified in 2003 as women, lone parents, multi-child families, long-term unemployed, low-skilled workers, people with disabilities, over 65-year olds, non-EU nationals and people living in rural areas. School dropouts are added in 2004. The measures are taken to create employment advisory tools.</p>
The Netherlands	<p>Keywords: lifelong learning, mobility, early school leavers, young unemployed, immigrants</p> <p>The unemployment is largely concentrated within the lower skilled and immigrant groups. Targeted reduction in wage costs at the lower end of the labour market and the targeted reduction of poverty and of unemployment trap is needed. In 1999 three types of labour were distinguished: highly skilled, moderately skilled and unskilled. Lifelong learning with special attention to low-skilled workers was acknowledged to be an important tool for adapting skills to changing economic, social and technological conditions. In 2001 physical distance was identified as a factor influencing low-skilled labour supply. Government was trying to invest into and promote the mobility. Projects addressing the digital disadvantage (ICT skills) of disadvantaged groups were started. Dutch tax system already included measures designed to encourage employers to hire more low-paid workers and more long-term unemployed people.</p> <p>National Reform Programme Netherlands 2005-2008 states that young unemployed people are very often early school-leavers without a basic qualification. This leads to fewer chances to enter the labour market and a lower level of participation in social activities. The Netherlands examined the feasibility of making it obligatory for young people to actively participate in society. In 2008-2010 the concept of vulnerable groups was introduced. Policy responses in respect to women, older workers and vulnerable groups (disabled, long-term unemployed, people receiving social assistance benefits, young people and minorities) include: reducing unemployment fund premium for employees to 0%, increase of supplementary combination tax credit, establishment of part-time plus task force, converting supplementary combination tax credit into income-based supplementary combination tax credit, phasing out transferability of general tax credit over 15-year period, converting premium exemption into a targeted temporary premium discount for older unemployed workers, introducing bonus for continuing to work after reaching the age of 62, implementing employment scheme to facilitate the creation of jobs for those receiving benefits, agreements with the 39 regions to address school drop-out, legislation changes, introducing earned income tax credit.</p>
Ireland	<p>Keywords: upskilling, early school leavers, further training</p> <p>The long-term unemployment in Ireland has a persisting structural dimension associated</p>

	<p>with low levels of education, low skill levels and poor prospects of finding a job which declines with the duration of unemployment. The focus in combating adult long term unemployment will be on providing support for integration and personal or skills development programmes. With regard to measures taken, emphasis will be on combining reductions in income tax rates with improvements in allowances and bands and statutory charges, particularly for lower skilled workers on below average earnings. Continued progress will also be made towards reducing the non-payroll cost of hiring workers and further reductions in corporation tax.</p> <p>Irish labour market will address imbalances or mismatches of demand and supply requiring the upskilling of the workforce and updating the skills of those persons who retain outdated or inappropriate skills.</p> <p>In 2001 Government's aim was to eliminate unqualified early school leaving and significantly increase school completion to upper second level. In 2003 Youthreach and Vocational Training Opportunities Scheme was introduced; programmes designed to offer second chance education and training to young people who have left school without formal qualifications. The programmes aim to integrate the unskilled into the labour force and promote a pattern of lifelong learning.</p> <p>The cost of transport for workers was acknowledged and subjected to further plans encouraging low-skilled workers to enhance their qualification levels.</p> <p>Within the framework of lifelong learning, addressing skill needs and widening access to lifelong learning, tackling disadvantage in terms of literacy and numeracy, early school leaving and providing second chance education and training for those with low skill, addressing access barriers through a strengthening of financial supports, counselling and childcare services and increased flexibility of provision were identified as priorities in National Reform Programme Ireland 2005-2008.</p> <p>Support to older and lower skilled workers focused throughout 2008-2010 on the provision of training of the low skilled and those in vulnerable employment. Continued attention remains on early school leavers and adult literacy.</p> <p>Much of the active labour market programmes is aimed specifically at the low-skilled and those "more marginalised from the labour market". Lifelong Learning National Skills Strategy to 2020 sets long-term objectives for developing country's human capital through upskilling, training and education.</p>
Italy	<p>Keywords: women, training, education, regional disparities, skills gaps</p> <p>In 2000 a discussion was under way on the possibility of introducing tax and/or social security contribution rebates, in order to encourage enterprises to hire unskilled workers, raise the income of employees, boost labour supply and tackle the surfacing of hidden employment.</p> <p>Intensification of the policies aimed at promoting female labour participation, employment of low-skilled workers and extension of the working life of older workers is needed.</p> <p>The Action Plan in 2001 addressed emerging bottlenecks as partly the result of a relative slow turnover of labour, difficulties in planning manpower needs and limited number of workers with suitable vocational skills. This also points to difficulties within the training system.</p> <p>National Reform Programme Italy 2008-2010 alleges that the labour market reforms implemented in recent years have stimulated job creation and contributed to a reduction in the unemployment rate. However, the success has been limited in regard to the whole society and in decreasing regional differences. Also, there is a potentially unfavourable impact of vocational training and life-long learning policies which are less developed than in the rest of Europe.</p> <p>The low rate of participation in the labour market remains among women, young people and workers over 55 years. The need of reducing the weight of taxes and social security contributions especially for lesser skilled workers who are generally associated with lower incomes is acknowledged in 2008-2010.</p> <p>Programmes for Education are contributing to Italy's commitment to reduce both the rate of early school dropouts and the percentages of 15-year old students with poor reading and math skills. Skills gaps of students in southern Italy are to be addressed.</p>

Source: Authors, based on the review of country-specific documents.

Remedies and recommendations with regard to low-skilled workers

Recommendations addressed to the low-skilled workers underwent adjustments after the global financial crisis of 2008. Issues gaining prominence prior to the crisis were associated with wages, reducing non-wage costs and rather general calls for investments into human capital. After the crisis, skills matching, skills upgrading and tackling the issues of poverty have risen in importance.

The earlier reports (1999-2002) call for attention to be given to vulnerable groups but remain rather unspecific. The following documents give more extensive attention to the low-skilled. For example, Joint Employment Report covering 2003-2004 gives increased attention to low-skilled when compared to the previous reports. According to the report, employers should be more involved in achieving the objective of increased participation of disadvantaged people and Member States were asked to reduce non-wage labour costs, particularly for the low-skilled and those on a low wage. Investments in human capital were encouraged, with particular attention for the low-skilled. Similarly, the Report to the Employment Committee Group of Experts on Making Work Pay (2003) is devoted to the unemployment problems among low skilled workers. It proposes that relatively high minimum wages and/or relatively high social security contributions and payroll taxes imposed on low wages contribute to the problems of low-skilled.

The issue of low-skillness is in the following years more extensively linked to the investment in human capital, advocating measures to embrace education and life-long learning. The development of skills becomes prioritized and the suggested policy responses towards these objectives include qualitative reforms in education systems, reforms to stimulate adult learning, particularly for the low-skilled, and improved lifelong learning strategies (Joint Employment Report 2005-2006: 15). EMCO Opinion and Contributions call for appropriate minimum wages or targeted pay-roll tax cuts to foster the creation of jobs accessible for low-skilled people, adjusting tax and benefit systems that make work and work transitions pay, tailoring labour market policy measures and activating social security systems, supporting good initial education, job training and credible lifelong learning systems. This ought to be combined with measures to transform undeclared work into regular employment. (EMCO Opinion on enhancing higher productivity and more and better jobs including for people at the margins of the labour market 2006: 3).

The policies aimed at the low-skilled were in 2007/2008 increasingly associated with combating poverty and efforts to make work more attractive than the unemployment/social benefits. “Appropriate incentives” should be implemented including appropriate minimum wages and targeted payroll tax cuts. Efforts should be strengthened to create opportunities for low-skilled and to support upward occupational transitions (Joint Employment Report 2007-2008: 15).

In Joint Employment Report 2008-2009: 8) represents a shift in the approach to the skills. Matching and skills upgrading are advocated as critical measures for avoiding long-term unemployment in the future European labour market. Of increased importance is continued vocational training and lifelong learning, and these are highlighted with respect to low-skilled workers.

In sum, calls for effective tackling of social issues, proactive inclusion, preventing inactivity, incentivizing employers, improving skills structure became more prominent after 2008, as compared to prior years when the stimulation of labour supply was the main focus of employment policies. (EMCO Ad Hoc Group Report on the 2009 thematic review: Inclusive Labour Markets). Specifically, Joint Employment Report 2008-2009 warns against the consequences economic crisis and names people at the margins of the labour market to be among the most vulnerable. For them, active inclusive policies are needed. Draft Joint Employment Report 2009-2010 identifies groups particularly at risk and also hardest hit by the crisis to be: young people, migrants, and low-skilled workers. Joint Employment Report in 2011 recognizes the crisis to aggravate “the risk especially for the low-skilled, non-EU migrants”(Joint Employment Report 2011: 6), youth and it raises concern of a possible structural mismatch between the skills of jobseekers and skills required for available jobs (Joint Employment Report 2011: 7). EMCO Contribution to the ES Presidency Conference on New Skills for New Jobs - Barcelona 8-9 April 2010 alleged the economic crisis to push the case for skills upgrading and skills matching.

Section summary

Our document analysis revealed that the general EU policy documents, similarly to academic works, do not contain coherent conceptualization of low-skillness. Descriptive explanations are often used instead of a single concept. No comprehensive specification of the “low educational attainment” is given in the documents which we

reviewed, highlighting again the fuzziness of the measurement of who the low-skilled are and how they should be empirically identified. The prominent characteristics of low-skillness include proximity to the labour market, social vulnerability and labour market participation.

Recommendations of EU/EC follow generalizable paths and are designed to fit all of the Member States. This is enabled through calls for “increased attention”, “appropriate minimum wages” and “appropriate incentives”, which can be with some adjustments applied to a wide range of labour markets. Space for country-specific alterations is given in the NAPs/NRPs which should present specific remedies reflecting intra-country specificities. However, rigor of these remedies as well as the precision of policy targeting significantly varies over countries, as Table 2 reveals. While this diversity across countries in low-skilled ‘typology’ is in line with our broader view of low-skillness, set of indicators for measuring low-skillness remain unspecific and vague. Additionally, it appears that this cross-country variation emerges from the fact that the NAPs are prepared by national officials, and that it is not a result of the awareness of the EU of differentiated impact structural processes and changes might be exerting on the individual countries across the EU and different people within them, that might require diverse policy remedies.

Importantly, we have not found strong evidence for explicit linking of the structural processes to low-skillness in the studied documents. Global financial crisis, however, has altered the issues associated with the low-skilled in the studied EU policy documents. These now increasingly lean towards social issues, proactive inclusion, prevention of inactivity, incentivizing employers and improvement of the skills structure and skill matching.

Table 2: Definitions, typology and remedies – summary

Country	Definition of low-skillness	“Typology”	Remedies
Spain	No explicit definition, labour is divided into eleven occupational categories based on skills.	women, people over 45 years of age, temporary workers, people with few skills, the self-employed, agricultural workers, unskilled workers	Proposed remedies tend to be universal, but at the same time designed for many differing types of labour. Both social and educational issues are raised. Priority in training initiatives is given to women, youth, the disabled, persons affected by terrorism and gender violence, the long-term unemployed, persons over 45 years of age, persons at risk of social exclusion, SME workers and low-skilled workers.

Portugal	No explicit definition, labour is divided into categories based on qualification levels.	young people, older workers, women, ethnic minorities, the disabled	Highly specific, Intervention Programme for Young Unemployed under 23 years, Intervention Programme for Active Ageing, intervention programme Inclusive Market for people at a risk of exclusion, professional training and employment programme for disabled persons and Intervention Programme for unemployed immigrants, were introduced.
Slovakia	No explicit definition.	long-term unemployed, persons with a low level of education and inappropriate skills, young people including graduates, the disabled, workers over 50 years of age, single parents, Roma	Active labour market measures are targeted at all of the listed vulnerable groups. Educational measures are aimed at the unemployed and low-qualified.
Czech republic	No explicit definition.	individuals threatened by social exclusion, mothers, older people, the disadvantaged and inactive	Support for occupational and geographic mobility is aimed at the low-skilled. Implementation of a fully functional system of lifelong learning is directed at all vulnerable groups.
Austria	No explicit definition.	women, older workers, early school leavers, lone parents, multi-child families, long-term unemployed, people with disabilities, over 65-years old, non-EU nationals, people living in rural areas	The need for targeted modular courses focused on marketable knowledge and skills is expressed. Lifelong learning programmes are mostly aimed at women, older workers and early school leavers. Upskilling is aimed at the whole population, with a stronger emphasis on women.
The Netherlands	No explicit definition. Three types of labour are distinguished within the service sector: highly skilled, moderately skilled and unskilled.	immigrants, low-paid workers, long-term unemployed, early school leavers, young people, women, older workers, the disabled, long-term unemployed, people receiving social assistance benefits, minorities	The remedies are targeted and highly specific. Promotion of mobility, addressing the ICT skills gap, tax incentives, lifelong learning programmes are designed for low-skilled and low paid workers.
Ireland	No explicit definition.	early school leavers, the unskilled, older workers	Combining reductions in income tax rates, improvements in allowances and bands and statutory charges, are targeted at low-skilled and low-paid workers. Programmes, financial support and counselling are designed specifically for the low-skilled.
Italy	No explicit definition.	women, older workers, early school leavers	The need of tax and social security adjustments is aimed especially at low-skilled workers. Educational programmes are designed for early school dropouts.

Source: Authors.

IV. STRUCTURAL PROCESSES AND CHANGES AFFECTING LOW-SKILLNESS

A crucial approach to the investigation of the sources of low-skillness is through the changing demand for skills. Several different processes have been proposed in the literature and they can be grouped into four, partly interrelated, forces: skill-biased technological change; educational expansion and skill upgrading; growth of the service sector; and trade liberalization related to the shifts of the low-sophisticated production towards the developing economies. These processes have jointly impacted how firms and employers recruit workers and what key abilities and skills are demanded at different skill levels, including the low-skilled.³ In this section we concentrate on discussing how these processes affect skill demand for low-skilled workers by spurring changes in firms' organization of production and other more systemic changes and processes, such as skilled-biased organizational change. All of the above mechanisms are not to be regarded in isolation from each other or as alternative explanations but rather as an ensemble of interrelated processes.

This review of structural macro-processes is essential in highlighting dynamic aspect of low-skillness – ‘becoming low-skilled’. Importantly, the processes of technological change, growing service sector or educational expansion that we are going to discuss are not neutral in terms of how they affect different age categories and, through uneven sectoral impact, tend to be also gender-biased. All this is fundamentally affecting who is likely to occupy a low-skilled job and is *de facto* low-skilled as well as who is pushed out of the labour market into marginalization and inactivity. Importantly, individuals with secondary or even tertiary formal educational attainment may well be performing low-skilled jobs.

In sum, the following review of structural processes enables us to show that the low-skillness is both a status and a process and to highlight the multifaceted and heterogeneous character of low-skillness in the 21st century, which we have not fully acknowledged in academic works and EU policy documents. We see labour market as a dynamic and idiosyncratic mechanism where labour market outcomes are

³ In view of the foreseen fossil-fuel shortage, the urge for the shift towards green (or clean) economy has also joined the discourse on changing demand for skills. Due to the fact that to date this literature remains relatively underdeveloped and its implications on the low-skilled workers are yet unclear, we do not engage with it extensively.

determined by interplay of structural (macro) and individual (micro) level factors. We propose that it is an interplay of several factors which interacts to determine who low-skilled people are on the labour market. Examples of such interactions include interplay of age, skill and structural change (skill obsolescence); nationality/country of origin, type of host country labour market and institutional framework (temporarily low-skilled / migrants); or skill, gender and sector. In this approach, “de facto” skills are a function of absolute level of skill and relative sorting impacted by external conditions and structural processes/changes.

Skill-biased technological change

The skilled-biased technological change (SBTC) amounts to the fact that the average job is getting more demanding in terms of skills. The key factor underlying the skill-biased technological change is the introduction of computers and information technology (ICT) which has affected wages at different skill levels, employment outcomes and labour market in general (Handel 2003). Within the stream of literature that also empirically test this phenomenon, competing hypotheses exist about the effect of technological change on the labour demand at different skill levels. A first set of studies claim that the newer technologies have replaced the tasks from the bottom of the job distribution and that technological progress is skill-complementary meaning that higher technology goes together with higher skills (Autor et al. 1997; Autor & Dorn 2009 for evidence on US data). Other scholars rather argue that the technology is negatively affecting more the middle-skilled jobs than the low-skilled jobs claiming that although the middle-skilled jobs require high cognitive skills, they are repetitive and thus easily made automatic (Autor et al. 2003; Manning 2004). Consequently, skills polarization takes place manifested by an increasing demand at the extremes of the skills distribution. Manning’s theoretical model predicts also polarization by sectors of activity, i.e. an increase in the proportion of the low-skilled/unskilled workers in the non-traded (service) sector while the high skills move to the business and traded sectors. These theories also propose a strong complementarity of low-skilled and high-skilled labour and their geographical concentration.⁴

⁴ Related literature is the dual labour market theory applied extensively in migration studies. For a short but comprehensive review see Maxwell (2006, 26-27).

Importantly, skill-biased technological change implies that the skill complexity has increased at all levels of the skill distribution, leading to higher or ‘broader’ (more types of skills) requirements on low-skilled workers as well. Works that study the details of tasks performed by low-skilled workers and how these tasks have changed in time are particularly informative. For example, (Levy & Murnane 2005) split the human inputs on job tasks in five major categories and find that the demand for the routine type of tasks has declined from 1969 to 1999 in the US, where the computerization expansion started at the end of the 1970’s – beginning of the 1980’s. The routine tasks, both the cognitive and manual ones, have lost the race with the ICT because they can be performed by computers at lower costs. However, the non-routine, expert thinking and complex communications tasks, that have become increasingly important, cannot be replaced by computers. Computers are rather acting as complements for those workers who perform these categories of tasks. Therefore the adoption of the ICT calls for an upgrade in the skills content and not necessarily for a shift away from the low-skilled jobs.

Along these lines (Wolff 2000) finds that the rate of computerization in the US economy/industries had a positive relationship to the change in substantive complexity and interactive skills in the past decades. Maxwell (2006) studies the job tasks of low-skilled occupations in particular and demonstrates that there is a great heterogeneity of required skills generally but also across different low-skilled sectoral segments and occupations. He links the co-existence of labour shortages and low-skilled unemployment to the fact that even low-skilled workers have skills that can be in a relative shortage at a given point in time. A wide range of these skills and their mix include what he calls “new basic skills” such as problem solving, communication and computer usage, which are required in different low-skilled occupations (cf. (Levy & Murnane 2004).

At individual level, the SBTC is, *ceteris paribus*, likely to impact the older workers more negatively than other categories. That is in particular for those older workers with knowledge and qualifications gained prior to the vast expansion of technology, but even more-so those who remain out of the labour market for protracted periods of time and, therefore, are not exposed to workplace learning that typically enables skills upgrading. A concomitant factor is the speed with which a given individual is exposed to technological change – in the EU, this is particularly relevant for workers in the new member states which underwent multiple transitions

and labour had to adapt very fast to new technologies as well as to new organization of work.

Educational expansion

Educational expansion, that in the past covered secondary education and now relates to tertiary education, has been an important factor that contributes to changing demand for skills by fundamentally changing the educational composition of the workforce and the value of education in the societies. Educational expansion is interlinked with the technological change but the direction of the link has been debated. The endogenous technological progress channel dwells on the idea that the educational expansion is responsible for the changing demand for skills. The educational expansion leads to an overall skills upgrading and an increase in the supply of more skilled people. These changes have been recognized by firms as new profit opportunities and in turn fostered technological progress and increased the demand for skills (the solid arrows in Figure 1). The second channel regards the technological progress as an exogenous decision of the entrepreneurs. The need for higher skills in turn induces a response on the supply side through educational expansion (the dashed arrows in Figure 1).

An accompanying phenomenon to the educational expansion is an upward shift in the overall skill-set required by employers both from low-skilled and high-skilled graduates. Given that diplomas and certifications play a signalling role of the skill endowments of a potential employee, the overall skill upgrading helps firms to more easily screen out the low-educated at a lower cost and at a lower risk of losing a good candidate (Solga 2002). Since educational expansion indicates a decreasing cost of the access to education, it becomes apparent that those who cannot certify at least high-school credentials are more likely to lack not only basic hard skills, but also discipline and motivation which would make them employable.

Figure 1: The two channels for the increase in the demand for skills

Source: Authors.

On the other hand, the expansion of secondary and now tertiary education makes it more difficult for employers to distinguish among the candidates. Partly as a result of this phenomenon, academic literature and employer surveys jointly note the demand for more extensive skill requirements which go beyond cognitive skills acquired during the education process. Weight is increasingly given to the *soft* or *non-cognitive* skills which emphasize social and behavioural abilities. These skills include communication, motivation and initiative, teamwork and leadership, inter-personal skills, flexibility, adaptability and honesty, and are expected not only in highly skilled occupation but also in lower-skilled service interactive occupations that have been on the rise. For example, based on interviews with employers in several US cities, (Moss & Tilly 2001) found that about 40% reported a rise in the skills demand over the five to ten years prior to the study. Although the increase in the basic (hard) skills was mentioned most frequently, the soft skills followed very closely behind. Moreover, the highest increase in the demand for the basic skills was found for blue-collar

occupations, while the highest increase for the social skills appears in the jobs that require direct contact with the customers. The reasons for the increased demand for skills were mostly reported to be the increase in the ICT utilization and organizational change. When the questions were directed to employers of low-skilled, soft skills were mentioned far more many times than the hard skills and in almost half of the cases they were mentioned first.

Growth of the service sector

Another dimension of the changing demand for skills is the shift towards the service sector. More advanced economies are shifting more and more towards the service sector, which comprises a wide range of occupations and industries at especially high and low skill levels (Autor & Dorn 2009). Across these levels, the sector is customer-oriented and requires sound social skills, in addition to cognitive skills. The shift towards the service economy is closely related to the notion of job polarization whereby the demand for the lower and upper-tail of the occupational distribution rose, while the middle-occupations, which require cognitive but repetitive skills, were more easily replaced by automatic machines (Autor et al. 2003).

This results in a re-allocation of the labour supply through a decline in the non-service - low-educated or medium-educated occupations - and an increase in the demand for the service occupations targeting the low-skilled. Overall, the demand at the lower tail of the skills distribution tends to rise simultaneously with the increase of the employment in the managerial and professional occupations, i.e. the highly-educated professions. Testing these processes empirically, Autor and Dorn (2009) using US data from 1980 to 2005 identify the occurrence of the polarization especially in the 1990s. (McIntosh 2002) studied demand for low-skilled (ISCED 0-2) at sectoral level in five EU countries and found that the only sector which continued to hire low-skilled labour was the service sector, and in particular those activities which involve direct contact with the customer, such as hotel and restaurants, travel agencies, transport, retail trade, private household work, real estate, but also in post and telecommunication, sanitation and sewage and minor repairs. The debate is open on whether this shift will produce enough low-skilled jobs to compensate for the decline in other sectors.

The concept of work polarization has been linked to the flattening of the skills distribution accompanied by the crowding-out of the low-skilled workers from the low-skilled occupations and from the labour market altogether by the medium-skilled workforce who is pushed out from the declining occupations (Manning 2004). This argument is consistent with the *displacement mechanism* described by (Mayer & Solga 2008): as the middle occupations disappear and education acts as a signal for worker's future productivity, the low-skilled are pushed down in the labour queue and the vacancies are filled by people with higher educational achievements. Mayer & Solga (2008) also find that the risk of unemployment of the low-skilled workers (ISCED0/1/2) relative to that of the middle-skilled workers (ISCED3/4) is higher in countries with lower demand for labour, meaning that the risk of displacement increases with the slackness of the labour market.

A crucial element of the growth of the sector is the needed skill-set related to the character of the sector. It practically pushes backwards the mechanical or technical skills (related to manual and repetitive tasks) towards inter-personal skills. Service occupations are difficult to automate and require personal proximity related to the possession of social and other soft skills, in addition to the basic cognitive skills. Relatedly, the occurring shift appears to favour low-skilled women against their male counterparts, as women are perceived to have a more adequate development of this type of skills. Along these lines Nixon (2009) studying the UK economy offered the concept of "job masculinity" (pride, self-esteem and power) according to which men tend to drift away and refuse jobs in the service sector as they regard it as female dominated and unable to feed their masculinity or, alternatively consider themselves lacking in communication and other skills or simply unfit for the job (cf. (Lindsay & McQuaid 2004))

The adaptation to the new reality might be facilitated through learning and training. The literature on life-long learning rather consistently notes, however, that the low-skilled participate less in training than the high-skilled and attribute this to factors such as the lack of intrinsic motivation, fear of exams, desire to avoid a failure experience, external locus of control,⁵ or un-openness to new experience (Illeris 2006; Fouarge et al. 2010). An important dimension to consider about workers likely to face

⁵ The locus of control is a psychological concept which refers to individuals' beliefs about the extent to which they are able to control the events that affect them. A person has an external locus of control if he or she believes that it is merely the fate, the luck or the chance that affect their lives and decisions.

labour market reallocation as an outcome of any of the earlier described processes therefore is the motivation and ability to re-train and adapt.

Trade liberalization

The trade liberalization argument for the shift of labour demand is grounded on the Heckscher-Ohlin theory of trade. According to this theory, a country specializes in the production of goods and services that use more intensively the factor of production which is more abundant in that country. Thus, if we regard the low-skilled and high-skilled as two different factors of production, the developed country, which is more abundant in the high-skilled factor, will specialize in the production of the skill-intensive goods. This country will export skill-intensive goods and import labour-intensive goods. This causes the shift of the relative demand for skills (low-skilled/high-skilled) to the left (Wood 1995). Therefore, the unemployment among the low-skilled in the developed country rises. Or, alternatively, firms which use the low-skilled labour move their production to the country which pays the international equilibrium wage for the low-skilled (the developing country). This is possible due to the financial liberalization. Either way, the demand for the low-skilled in the developed country falls. Against this theory, Schlotter & others 2008 argue that the trade with the developing countries abundant in the low-skilled labour is not large enough to explain the shift in the demand for high-skilled in the developing countries. Skill upgrading takes place in the developing countries as well, and also in the non-traded sector, therefore making trade liberalization a weak argument for the shift in the demand for skills.

Employer preferences and organizational change

The changed demand for skills, generated through innovation, technology advances and other structural changes, is reflected in the changes in employers' preferences and in the organization of the firms, i.e. organizational change. The organizational change has involved decentralization of authority and shift towards greater flexibility, thus engaging workers in more responsibility and uncertainty (Caroli & van Reenen 2001; Hujer et al. 2002). Findings on the implications of such changes on the demand for low-skilled have been mixed. (Caroli & van Reenen 2001) using panel data of British and French establishments, find evidence of the decreased

demand for the less skilled workers in the workplaces that introduced organizational changes. The argument is based on the cost-benefit analysis. First, skilled workers can handle and communicate information more efficiently, which facilitates decentralization. Second, skilled workers are more able to perform multiple tasks and react faster to the market changes from their autonomous level. On the contrary, the econometric model of Hujer et al. (2002) on German data leads to the conclusion that the organizational change is not skill-biased, but it is closely related to the technological change, i.e. investment in ICT increases the probability of introducing organizational changes. This suggests, as discussed in the earlier sections, that the content of the low-skilled job has been broadened to include more responsibility and independent work.

Solga's (2002) work demonstrates the impact of educational expansion on firm's preferences towards the less educated. As a consequence of becoming a minority or an exception from the educational norm, the low-educated are perceived not only as less capable, but increasingly incapable. While educational attainment acts as a signal for the applicants' productivity and their ability to learn (Spence 1973), the lack of it acts as a signal for failure. Hence, this type of perception on the side of firms decreases the employment opportunities of the less-educated to the extent that they are screened-out from the labour market, in particular in countries where they constitute a minority. This phenomenon has been termed *stigmatization by negative selection* (Solga 2002). This stigmatization was confirmed empirically by showing that in countries with low share of low-educated (e.g. Norway or Switzerland), the unemployment risk of the low-skilled (defined as ISCED0/1/2) is the highest. Conversely, in countries with high shares of low-skilled (Portugal, Spain) the unemployment risk of this group is low (Mayer & Solga (2008)). In conclusion, the job market opportunities of the low-skilled depend crucially on employers' beliefs and perceptions about the relationship between applicants' education and their future productivity.

The main idea emerging from the review of the macro processes affecting low-skillness is that while there are contradicting views regarding the evolution of the demand for the low-skilled (see skills polarization vs. educational expansion), there is agreement on the fact that the skills content of the low-skilled jobs has increased, leading to the phenomenon of up-skilling. This seems to hold for all occupational levels and categories. Many of the low-skilled occupations are now only nominally

equivalent with what they were thirty years ago. Additionally, the skills requirements have increased even for the jobs which previously required only physical or mechanical skills. Therefore, in terms of the evolution of the concept of the low-skillness in time, we can say that the skills content of the low-skilled occupations has changed and it increasingly includes aptitudes, attitudes and social or soft skills. This has important implications for the prospects of workers in the low-skilled labour market.

Impact of structural processes: Low-skillness at the individual level

Considering structural changes contributes to extending a static focus of low-skillness to a more dynamic approach which considers not only *who is* but also *who is likely to become* low-skilled at the individual (micro) level. The processes of technological change, growing service sector or educational expansion are not neutral in terms of how they affect different types of people, and their impact varies along, for example, age or gender. We therefore now turn to discussing the demonstration of the described processes on the micro-level. We first engage with age, gender, nationality and ethnicity as dimensions of low-skillness. A key cross-cutting concept that we discuss then is skill obsolescence.

As our discussion alluded, low-skilled workers need to be looked at not only in the labour market but also (or especially) outside of the labour market. In addition to workers with obsolete skills who are pushed into unemployment, groups such as vulnerable adults, who spend a long time in unemployment (for example for health-related reasons), or women, who temporarily withdraw their participation from the labour market for family reasons, also belong here. For them it is difficult to re-enter the labour market because of the employers' perception/bias or even discrimination (Hananel 2011). In the empirical chapter we will therefore consider the above dimension in as well as out of the labour market.

Age

Structural processes described earlier are not age neutral. The interaction between the qualification levels and age deserves particular attention. The educational expansions is reflected in the fact that the younger age cohorts have markedly lower shares of low-educated (ISCED 0-2) than the old age cohorts did, and the educational

structure in general is very different compared to 15 years ago (Figure 26). As a result of this shift, the meaning of low-qualifications in the labour market across the age cohorts differs. This is likely to have implications on how the same level of degree is valued across time and cohort. Importantly, across the EU countries, low-qualifications can be valued differently between the youth and older workers. The issue of stigmatization by negative selection has been by Mayer & Solga (2008) who found that in countries with low share of low-educated (e.g. Norway or Switzerland), the unemployment risk of the low-skilled (defined as ISCED0/1/2) is the highest. Conversely, in countries with high shares of low-skilled (Portugal, Spain) the unemployment risk of this group is low.

In the context of the educational expansion and educational inflation where more and more people earn college degrees, the risk of the younger workers being trapped into a low-skilled job might be also increasing. A specific group of workers are therefore young graduates who, due to their lack of working experience, are forced to start at entry level positions. This most likely leads to the underutilization of skills – over-qualification mismatch. The existing literature proposed varying views on the persistency of this situation (Quintini 2011). We will investigate this issue further in the empirical section.

On the end of the age spectrum Schweitzer & Smith (1974) identified *discouraged worker effect*. They found that older men (55+) suffer the most from the discouraged worker effect, and that the young (16-24) and old (55-64) cohorts suffer more from the discouraged worker effect than the middle aged, 25-54 years of age. Moreover, this effect is statistically stronger for males than for females, but higher in magnitude for females as compared with males.

Gender

From the discussion it also follows that gender is an important element signalling differential impact of the undergoing structural processes on males and on females. This is related to a number of processes. First, with educational expansion, the gender gap in access to education has been closed (Lyly-Yrjänäinen, 2008). However, in spite of higher average educational attainment among women, males are overrepresented in employment and underrepresented in inactivity. The second process is the expansion of service sector that is argued to be female-biased and implication ensuing from that on the disappearance of male-dominated middle-level

jobs. A distinct ‘vulnerable category’ is that of the low-skilled men who tend to detach from the labour market as a consequence of the expansion of the service sector. Nixon (2009) documents this for the case of the low-skilled men in Great Britain whose inactivity numbers doubled from 1970 to 2009. At least in Britain, the low-skilled manual workers are over-represented in the total population of unemployed. At the same time, their period of unemployment or inactivity has stretched out to the extent that the older ones have completely withdrawn their participation from the labour market, becoming *discouraged workers*. Several countries have also pushed these workers into early retirement schemes.

A characteristic feature of the category of vulnerable adults and discouraged workers is the fact that they are only marginally attached to the labour force and therefore they usually fall out of the statistics of the labour force. Consequently, they fail to be accounted among the low-skilled population of workers. Thus, endeavours to quantify the population of the low-skilled may often be biased downwards due to this phenomenon. These groups of people need to be targeted by inclusion and integration processes and identified as a distinct group of *de facto* low-skilled.

Nationality or ethnicity

In our discussion of low-skillness we would like to bring into consideration the migrants as a distinct category. In many countries immigrants are disadvantaged relative to the native population when it comes to their integration in the labour market of the host country. In terms of actual qualification levels, they are fairly heterogeneous. While the low-skilled immigrants often face weak job opportunities,⁶ high educational attainment also does not guarantee employment and work in occupations of similar level, quite the contrary. The fact that immigrants with formal qualifications in effect take on low-skilled positions or work in the under-ground economy has been well documented for the Canadian and the US labour markets (Mattoo et al. 2008; Galarneau & Morissette 2008)) and to some extent also for the European market (Nielsen 2007; Fernandez & Ortega 2006) where migrants can be

⁶ One documented exception seems to be the famous Mariel boatlift event of 1980 in Miami, which, despite the large inflow of low-skilled immigrants, did not seem to disturb the local labour market. The immigrants were successfully absorbed. This smooth absorption seems to have been caused by the special nature of the Miami labour market, which was prepared to make use of a large intake of low-skilled thanks to its industrial structure suitable for this type of labour (Card 1990).

found in constructions, food processing, household work and catering and hospitality (OECD 2008). Interestingly, wide-spread down-skilling in the EU has been the case not only with respect to the third-country immigrants but also for the post-accession migration from the CEE countries to the EU where the recognition of qualifications, at least in theory, should be less of an issue (Kurekova 2011).

In this way, the position of immigrants is similar to that of workers with obsolete skills, but the mechanisms or causes which lead to such an outcome are vastly different. They mostly relate to the lack of recognition of qualifications or language deficiencies. Although qualification mismatch, and in particular the over-qualification mismatch, is not an issue specific to immigrants, there is evidence that they are more likely than the native workers to experience over-qualification (see Quintini (2011) for cited evidence on this).

In light of this discussion, we propose to label this group of workers *temporarily low-skilled* since from the perspective of the host labour market they are regarded as low-skilled. This is one instance of discrepancy between job and qualifications that goes in similar direction as the obsolescence case: highly-qualified workers engaged in low-skilled occupations, but the remedies of which would require very different approach and measures (Nelson n.d.). The position of immigrants in the EU labour markets raises the issue of whether low-skilled should be defined through the skills they own or through the jobs they perform.

The low-educated migrants have formed a considerable part of the workforce in the EU countries too. In some countries, this refers even to the second generation immigrants who in spite of being nationals face barriers in integrating into the labour markets. Importantly, especially in the CEE countries, the discouraged workers which we discussed above are often identified with the Roma population, which, on average, is also significantly less educated than the majority. Low-skilled migrants or low-skilled ethnic minorities can therefore also be identified in some countries as belonging to a discriminated or segregated ethnic or immigrant group, where the ‘temporary’ aspect suggested above does not hold anymore.

Skills obsolescence

The economic processes discussed above have altered firms’ skill needs and generated a sustained period of high skill obsolescence defined as worker’s deficiency of skills necessary to fulfil the tasks associated with one’s employment position or

comparable employment positions (Nelson n.d.). We find this concept crucial to the interest of this study because skill obsolescence at the lower end of the skill hierarchy in effect often means *de facto* labour market exclusion or decline in the occupational ladder, although these workers are not formally un-qualified. From the perspective of the current economic reality, people whose skills have become obsolete can therefore be regarded as low-skilled or unskilled people. Skill obsolescence, defined as the incongruence between the stock of knowledge, skills and abilities of the worker hired on the job and the actual knowledge and skills required by the tasks associated with that job (Fossum et al. 1986), can be an outcome of two (sometimes) interrelated processes: external changes of the economic structure and internal changes related to skill atrophy (due to illness or non-use). Relatedly, a distinction between the human capital depreciation as a consequence of worker's aging (internal depreciation) and the depreciation due to the obsolescence of worker's education and skills as a result of the changes occurred in the economic environment (external depreciation) has been proposed (Nueman & Weiss 1995).

An example of external depreciation is the natural experiment which took place in the Eastern European countries after the fall of the communism. Abandoning the controlled economy and adopting the rules of the market economy, many workers have lost the value of their human capital both due to the extent of structural economic change and its speed. The new market reality seems to have affected the low-educated the most. Commander & Kollo (2004) found that during the transition period in Hungary and Romania, both the destructed and the newly created jobs were biased against the low-educated. At the same time, with the adoption of the market economy rules, the skill content of the blue-collars has been under pressure for continuous upgrading. It is for these reasons that workers with vocational secondary education (and not only those with ISCED 0-2) in these countries are at high risk of unemployment or face inactivity.

Importantly, many studies conjecture a positive relationship between age and skills obsolescence. First, the elderly had a longer time during which their skills could erode or they were initially endowed with skills of lower quality. Second, the potential for learning new things decreases with age. Finally, there is a motivational aspect in that older people perceive the investment in acquiring new skills as being unrewarded for the duration of their remaining life span. However, apart from the acceleration of skills obsolescence in relation with age, there are also studies which

reported a U-shaped relationship between age and skills obsolescence (see Fossum et.al. 1986).⁷ In effect, focusing on the interaction between age and type of education might be crucial for an accurate identification of workers with obsolete skills or in danger of facing skill obsolescence in the fast changing economies.

A related important aspect to consider in relation to skill obsolescence is worker's skills specificity which implies harder and/or longer periods of adjustments due to, typically, inverse relationship between skill specificity and skill transferability. Nueman and Weiss (1995) show that the effect of skill obsolescence is more pronounced for workers in the high-tech industries than for those in the low-tech industries. The intuition behind this finding is that the knowledge and the education of the workers in the high-tech industries are more contingent on technology than they are in other industries. Therefore, fast advances in technology outdate their knowledge more rapidly because their education has a higher degree of specificity relative to the workers in the low-tech industries, who also tend to be less educated than their high-tech counterparts.

To sum up, skill obsolescence in effect means skill mismatch and leads to the situation when otherwise trained and educated individuals (with formally acquired skills through education and/or experience) are pushed down on the occupational ladder, ending up performing jobs which require a low level of cognitive skills or being pushed out from the labour market altogether.⁸ We propose that people with obsolete skills, although formally not low-qualified,⁹ are *de facto* low-skilled and should be considered as an important category in the investigation of who the low-skilled is and who is likely to become low-skilled in light of the ensuing macro-processes and their nature.

⁷ Skill obsolescence is not exclusive to the lower-skilled workers but has been argued to exist also in the case of tertiary educated persons where it is most widely generated by providing tertiary education (type and/or quality) in dissonance with the labour market demand, i.e. following educational path that is inadequate for the purpose of occupation (Allen & van der Velden 2001). We acknowledge this fact, but do not elaborate it further as it is beyond the scope of this report.

⁸ Early-retirement policies were a common solution aimed at dealing with older workers with difficulties to find employment. These were used extensively in Central and Eastern Europe in the 1990s but also across OECD countries.

⁹ A distinction one can make here, that captures this, is between over-qualified and over-skilled. While such workers are formally over-qualified, they are not necessarily over-skilled.

V. NEW APPROACH TO LOW-SKILLNESS AND CATEGORIZATION OF LOW-SKILLED

Before formulating conceptualization of the low-skilled, we find it important to clarify how we use the word *skills* throughout this study, in order to avoid any undue confusion. In a paper from several decades ago (Lee, 1982) urges the analysts to give the precise sense of the word by drawing the attention to the fact that skills refer either to the requirements of the job or to the capabilities of the worker. However, since we are trying to conceptualize a specific segment of the skills, that is the low-skilled segment, we address the concept both starting from the low-skilled jobs and the low-skilled people and very often we combine the two perspectives deriving the concept of low-skillness from the *de facto* relationship between jobs and people. We find that this approach extends the simplified conceptualization of the term usually found in the literature and it creates a more comprehensive definition worth considering in the empirical assessments of this labour force segment, but, most importantly for a more precise identification of the places where policy has to intervene.

Thus, as a first step, it is important to acknowledge the difference between being intrinsically low-skilled and becoming low-skilled, which is largely a consequence of the relation between the person and his/her abilities and the content of the job requirements. Regarding low-skillness from the job rather than from the person's perspective often requires a conscious dissection of the job content¹⁰ which, in many cases, has to take into account the evolution in time of the nature of the job. Therefore, we regard low-skillness as a dynamic phenomenon with economic, social and to some extent also psychological roots (if we refer, for example, to long-term unemployment and discouraged workers). Skills obsolescence and deskilling¹¹ happening parallel to the increase in the skills requirements for the same nominal jobs motivate us to look at low-skillness as a dynamic phenomenon of the relationship between jobs and people.

¹⁰ Unfortunately, understanding the job content and the match between the person and the job is mostly a survey-based task, which obeys the subjectivity of the self-reporting worker.

¹¹ This is defined as a continuous trend for jobs to become void of intrinsic content, routinized and mechanical. Deskilling is typically the effect of the SBTC on the middle skilled occupations. The same SBTC had the effect of up-skilling on the lower and upper tails of the skills distribution for which technology is skill complementary.

In our conceptualization of low-skillness we emphasize the link between people and jobs because of the dynamic aspect of skills stock residing in people and skills requirements residing in jobs, which captures what we call the process of “becoming low-skilled”. In time worker’s skills are subject to acquisition, evolution and depreciation, while the nature of the job and its requirements suffer alterations due to organizational, technological and structural changes which ultimately reshape the production process affecting the worker. When these changes are asymmetric in time and/or intensity, mismatches arise, as it is the case with the above-mentioned skills obsolescence and deskilling,¹² but also with various classes of vulnerable people.

Apart from the dynamic aspect, looking at the interaction between jobs and people helps us to also point to certain categories of people, whose vulnerability in the labour market has a high relevance for policy making. Under this scope are the young graduates, who due to the educational inflation and the disproportionate evolution of the labour demand are forced to occupy low-skilled positions (Vedder, Denhart, & Denhart, 2010). Taken alone, with disregard to the work in which these people are employed, their educational attainment would indicate that they are high-skilled. However, their *de facto* status is that of a low-skilled with a high likelihood of eroding the skills obtained during their formal education if they are captured for a long time in the low-skilled positions.

In our view, considering the person in conjunction with the job content, attempts, among other things, to capture the concern raised in the literature regarding the match between the supply of formal qualification and the types of skills required in the modern workplace. A widely made working assumption is that the job duties are an unbiased measure of person’s skills, though it is also acknowledged that under- and over-utilization of skills in the work place may render job duties as a biased measure for the actual skills level (Green, Ashton, & Felstead, 2001). Hence, this defines people through occupations. The other side of the coin is defining occupations through people: the low-skilled jobs being defined through the education and experience required for occupying a given position (Maxwell, 2006). Therefore, the combination of the two and their analysis in conjunction with each other helps us

¹² The process in which the job becomes void of content and the worker becomes over-qualified for the tasks required by the respective job.

understand *low-skillness as a phenomenon* instead of just people or occupations alone.

We believe that looking at the content of the job enables us to uncover certain types of skills, like the “soft skills”, which are more likely to be acquired outside the formal education and, therefore, missed out from the analysis if only the personal approach to skills is given. Hence, taken together, person and job, contributes to building a more accurate picture of what the concept of low-skilled captures. In addition, the recent reality has shown us that a generalized phenomenon of upskilling and increasing demand for new skills is taking place. Thus, skills like teamwork or communication (in particular for service occupations), which are increasingly demanded, cannot be evaluated as stand-alone attributes of the worker unless they are observed through the tasks of the job. Moreover, the continuous organizational change requires contextual knowledge as a new skill which enables the worker to perform the tasks with minimum supervision. These types of skills are more likely to be revealed when the worker and the job are considered together since worker’s skills stock is reflected in the tasks of the job. Disregarding this conjunction and considering only the worker, the researcher may run into the danger of a downward-biased estimation of the actual skills of the low-skilled worker if relying, for example, only on the educational attainment.

From reasons which we outlined above, it becomes apparent that the concept of low-skillness comprises heterogeneous classes of people, jobs and even situations. Heterogeneity of low-skillness is encountered both within and across countries and it is very often a function of the social and economic context. In more concrete terms, the educational attainment is valued differently in different countries to such extent as to creating social stigmas. Moreover, measuring skills via educational qualifications makes the young and the old cohorts’ skills less comparable since the old cohort is more likely to possess skills for which they do not hold an actual certificate. This is perhaps one reason why education is merely used as a signal for abilities rather than being considered a source of skills in itself.

Wages alone do not qualify for reliable cross-country comparisons of low-skillness because of the different labour market institutions and the heterogeneity of the trade unions power. In addition, the use of earnings as a proxy for skills requires very strong assumption with respect to the type of competition in the labour market, which is obviously not the case for all countries at any moment in time, and with

respect to the perfect mobility of the labour force. In addition, labour earnings may often reflect the shortage or, on the contrary, the inflation of certain skills in certain economies, on a longer, but most often short run, making them a poor indicator of the true skills. Finally, the occupational-based measure for skills suffers from cultural differences issues reflected in the occupational structures derived from the type of work incorporated in the job (Elias & McKnight, 2001).

While we attempt to conceptualize low-skillness combining both jobs and persons, we do acknowledge the fact that approaching skills measure from job's or from person's perspective depends very much on the purpose of the specific analysis, being it economic, sociologic, political, occupational psychological etc. For example, in this direction (Statz, 2001) contrasts the economic and socio-cultural perspective to approaching skills and their measuring, advocating the socio-cultural perspective as an alternative to the economic one, on the grounds that it can provide a richer guidance for policy regarding the ways in which the academic curricula should be adapted to the requirements of the labour market.

In sum, our approach to low-skillness, in which jobs and people are not regarded in isolation of each other, has the potential to capture a more comprehensive definition of low-skillness offering perspectives for identifying new dimensions of heterogeneity of the low-skilled phenomenon as a whole. As a consequence, we believe that the more complete the understanding of this phenomenon is the more precisely tailored cures for it can be designed. With this in mind, in the following sections we proceed with developing our conceptualization of low-skillness taking into account the micro and the macro processes affecting both the demand and the supply side, focusing on their interaction and the effects they have on each other.

Categorization of low-skillness

Guided by an approach which addressed jobs and workers inter-relatedly, reviewed sources of low-skillness, identified it dynamically as both a status and a process, and highlighted the multifaceted and heterogeneous character of low-skillness in the 21st century, we now propose a broader conceptualization of who the low-skilled are and suggest a categorization of low-skillness in Table 3. Combined, these categories of low-skillness aim at providing a conceptually richer understanding of the low-skilled workers which considers the interaction of macro-structural

changes with individuals' characteristics. We therefore include also those workers who might be formally educated, experienced or trained but *de facto* work in low-skilled jobs or are outside the labour market.

Table 3: A categorization and conceptualization of low-skillness

Category	Characteristics
Low educated	People with basic level of education (no more than ISCED 2 - lower secondary education). In line with the educational expansion, when the majority of people complete at least a high-school degree (ISCED 3-4), this category of low-skilled typically comprises school drop-outs. They often belong to disadvantaged social groups – socially deprived or segregated communities.
People with obsolete skills	Obsolete education due to structural and market changes (external depreciation or economic obsolescence). It amounts to the fact that their skills become unmarketable. This is in particular the case with older people, who often have higher education than ISCED 0-2.
	Due to the non-use or atrophy of skills (technical obsolescence) – mostly for individuals with long-spells out of the labour market, like women with career interruptions or long-term sick.
	Aging, decrease of mental abilities (internal depreciation).
Temporarily low-skilled	Migrants who take up low-skilled jobs which do not need certification of qualifications.
	Temporary migrants who take up short-term low-skilled jobs but do not intend to settle in the host country.
Mismatched, over-qualified workers	Immigrants “settling for less” (de facto high-skilled established immigrants who never make it to their true qualification status).
	Youngsters at entry level positions due to their lack of experience.
Discouraged and detached	Unemployed and inactive, unmotivated to join training programs which would prepare them for coping with the skills requirements of the new (knowledge) economy.
	People who encountered long spells out of the labour market and who are not searching for a job. Potentially, they may be searching for a job, but they encounter discrimination from the employer' side based on their long absence from the labour market.
	Discriminated minorities.
Displaced workers	People affected by the “jobs polarization” phenomenon, i.e. those displaced from the low-skilled occupations by those formerly occupying the middle-skilled occupations. Typically they would be found in unemployment.
Stigmatized	Low educated people, and especially, youth, who are part of a majoritarily highly-educated society. They are negatively selected from the pool of employable people and thus fail to gain the chance of developing additional skills through experience, learning-by-doing, and/or on-the-job training

Source: Authors.

Having settled the theoretical ‘classes’ of whom we consider low-skilled, our next claim is that the empirical investigations as well as the policy guidelines should

reflect this broader conceptualization. Although any cross-country comparative work will need to continue to rely on the available classifications and measures, such as ISCO and ISCED, what we advocate is their usage in a conceptually broader and richer manner. In line with our approach to low-skillness, this involves three aspects:

- a) a greater focus on ISCO measure, i.e. the actual job placement;
- b) an inclusion of higher ISCO and ISCED categories than typically used in other empirical analyses;
- c) measuring low-skillness both in and out of the labour market, i.e. looking at employment, unemployment as well as inactivity;

Due to the fact that our conceptualization identifies categories by *de facto* use of skills, we propose to engage with occupational low-skillness measured through ISCO (rather than just ISCED) intensively. ISCO classification is in our view superior to ISCED also due the fact that the ISCED classification cannot account for the skills which are not acquired through formal training. The non-cognitive, soft skills are more and more demanded in the modern workplaces, but weakly correlated with the cognitive skills (Brunello & Schlotter 2011) and less likely to be acquired through formal education (Hoffmann 1999). Moreover, together with the job content (the tasks required for performing a given job), the conceptualization of ISCO is also based on the concept of skill level, which is a function of the complexity and range of the tasks and duties involved, where complexity has priority over the range (Hoffmann 1999).¹³

Further, reflecting the impact of structural macro-processes on formally educated workers as well as those employed in medium-skilled occupations, we suggest identifying the low-skilled as those occupying jobs above the ISCO 9th category, including also the medium-skilled categories 4 to 8. In addition to elementary occupations, low skilled potentially encompass clerks, service workers and shop and market sales workers, skilled agricultural and fishery workers, craft and

¹³ A drawback of the ISCO88 classification is that it defines the skills levels based only on the educational attainment actually creating a correspondence with the ISCED classification. Thus, skill level 1 implies ISCED 1 category, i.e. primary education. Skill level 2 corresponds to ISCED categories 2 and 3, i.e. up to and including secondary education.¹³ Due to this drawback of skill level content defined by ISCO88, the newest occupational classification, ISCO08 would serve better for our purpose, since it takes a wider approach to the skill level. Specifically, the skill levels of ISCO08 are designed to account for the nature of the work performed and the amount of informal on-the-job training and/or previous experience, apart from the formal educational attainment. However, most representative survey data are still relying on the older ISCO88 classification and that is the reason why we continue working with it in the empirical sections.

related workers, plant and machine operators and assemblers. These occupations are classified as level 2 with respect to skills. To reflect this, any analysis of low-skillness should consider also those who have acquired secondary education (ISCED 3-4) in addition to primary education (ISCED 0-2) as a relevant dimension, and to engage with the interaction of different demographic factors (such as age, gender, nationality and ethnicity) with educational attainment. We aim to demonstrate the relevance of broader approach to measurement and conceptualization of the low-skilled in the empirical section which follows.

VI. EMPIRICAL ANALYSIS

In this section we complement our conceptualization of low-skillness with an empirical exercise designed to capture, to the extent that data allows, the dimensions and the processes of low-skillness which we identified in the conceptual review. Thus, we aim at demonstrating the sources and the processes of being and becoming low-skilled as they were invoked in our theoretical conceptualization of the term.

Our aim in this section is to look not only at the low-skilled segment of workers, but also to other classes of workers in conjunction with the *de-facto* utilization of their skills. Following this approach we are able to capture a larger category of people who are at the risk of becoming low-skilled through the various conditions under which low-skillness is not only a state but also a process. Although the empirical work provided in this section is based mostly on simple descriptive analysis, we are confident that the manner in which this is conducted constitutes a good foundation for rigorous quantitative analyses in which one can zoom into the different aspects, processes and dimensions of low-skillness introduced here. At the same time we believe that the differences among countries regarding low-skillness can serve as a realistic motivation for employing country specific analysis that should serve as a base for country-specific policy recommendations.

Despite our rich and broad conceptualization of low-skillness, in our empirical endeavour we still have to rely on the available measures associated with the concept. However, our contribution consists of the way we utilize these measures and the way we relate them with the processes identified in the literature review of low-skillness. In addition, although we use the standardized measures for skills, we go beyond the usual method of equating low-skilled with the lowest level of educational attainment, ISCED 0-2. As one of our arguments is that low-skillness is not only a state but also a process, we extend the ISCED 0-2 measure with the ISCED 3-4 category and we demonstrate the risks and the process through which people with this educational attainment fall into low-skillness, through various channels and contexts, i.e. geographical, sectoral, occupational, etc. A second direction in which we extend the concept of low-skilled is by employing the ISCO occupational categories. This is derived from our approach to low-skillness where we consider low-skillness both from people and jobs perspectives, as well as their interrelation. Therefore, in our

analysis we consider both the elementary occupations ISCO 9 and the middle-skilled occupations ISCO 4-8. Thus, with the aid of the two measures we are able to combine the demand and the supply side in order to illustrate empirically the various dimensions of low-skillness.

Since we are focused on the EU labour market we use data from two different European sources. First and most extensively we use the European Union Labour Force Survey (EU LFS), which is a quarterly survey conducted by the EU in the EU27 countries, EFTA (except Lichtenstein) and Candidate Countries, with the collaboration of the national institutes of statistics. This survey is well suitable to our study because it provides unified and standardized measures, classification and definitions which allow us to make cross-country comparisons. All the LFS data used in this analysis refer to the year 2010, unless otherwise specified. The second source of data, which we use in a lesser proportion, is the European Working Conditions Survey. This survey is conducted by the European Working Conditions Observatory and it aims at providing the everyday working conditions of both employees and self-employed through face-to-face interviews. For the purpose of this study we use the data from the fifth wave conducted in 2010.

Key findings

Our empirical work brings a rich set of findings which highlight heterogeneity across and within countries, but also ground our proposals for methodological and conceptual extensions. We advocate empirically the need for a joint use of the available standard measures for skills, the educational classification by ISCED and the occupational groups, by ISCO. Since we engage extensively with the ISCO categories, and moreover, with an extended definition of the low-skilled by occupations which also includes the ISCO 4-8 occupational levels, we are able to identify in the data what we call *de-facto* low-skillness. Considering the ISCED and ISCO measures in juxtaposition we are able to find, for example, that the formal qualification levels are valued differently in different labour markets, at least in the EU countries for which we employ this study. This conclusion arises from the fact that while the low (ISCED 0-2) and medium (ISCED 3-4) qualifications are substitutes in employment across the EU countries, the low (ISCO 9) and middle-skilled occupations (ISCO 4-8) do not preserve this property across the EU countries. Therefore, this implies that people with the same educational level are employed in

occupations of different skills requirements across the EU labour markets. For instance, Bulgaria and Portugal have similar shares in employment across ISCO occupational categories, while the educational structures of their employed population are largely different (see Figures 4 and 5 below). Specifically, the ISCED 0-2 educated in Portugal can occupy ISCO 4-8 jobs more easily than they do it in Bulgaria, where their share is much lower in the employed population.

In addition, educational-occupational mismatches turn out to be well correlated with the share of immigrants in a country, which reveals that not only is mismatching a source of low-skillness, but this is more prevalent among immigrants. Therefore, considering only one of these measures or considering them in isolation would hide an important segment of low-skillness, i.e. the *temporarily low-skilled* segment. As we described them in the theoretical conceptualization, these are not low-skilled by education, but their immigrant status often prevents them from taking up jobs corresponding to their level of qualification. While the uneasy labour market condition of the immigrants is not a novelty in the literature, our contribution is that of emphasising the context in which the immigrant status together with the over-educational mismatch is a process of becoming low-skilled. Moreover, this aspect has a particularly important policy implication when it comes to the labour market integration practices and deserves consideration in view of EU's migration policy and EU2020 goals of productivity growth. . Clearly, workers who are well educated but *de facto* low-skilled (working in low-skilled positions) will require different policy intervention than low-educated.

Looking outside of the labour market, we are able to illustrate empirically the macro processes which affect the demand for skills as well as their impact at micro level. Therefore, our extended definition, including unemployment and inactivity, allows us to demonstrate empirically phenomena like skill obsolescence, stigmatization, displacement and detachment from the labour market. Hence, this view which relies on the labour market outcomes leads to the construction of the dynamic aspect of low-skillness. For example we find that obsolescence is more reflected in the inactivity than in the unemployment figures and that this is directly linked with the age.

Before we start our empirical argument on who are the low-skilled, we outline below some of the specific findings which resulted from our empirical enquiry on low-skillness.

- When we regard skills in a uni-dimensional fashion according to the level of educational attainment, in line with other studies (Lyly-Yrjänäinen 2008) we find that the CEE countries have the lowest shares of low-qualified active population, while the Mediterranean countries, particularly Malta and Portugal display the largest shares of low-educated active population, even though their unemployment levels are similar. This shows a complex relationship between the educational attainment in a country and the aggregate labour market outcomes.
- Moreover, according to the educational measure, low-skillness appears to be male biased in all countries. However, along the occupational dimension, low-skillness appears to be biased towards women, except for Denmark, UK, Ireland and Malta where there are relatively more males than females employed in the elementary occupations, ISCO 9. This shows a complex and interrelated nature of education, gender and labour market outcomes, as already demonstrated in other works.
- Competition for jobs takes place within the age cohorts across different levels of formal education, and not between age cohorts. The educational level at which the competition takes place in the youth cohort and the older workers cohort differs. Among the young workers, competition for jobs takes place between medium educated and low-educated while among the older workers medium skilled compete with the highly educated workers in the same age groups. In addition, contrary to the literature and general policy discourse we found that it is more the young workers who tend to suffer in the labour market. Specifically, the young are always at more risk of unemployment than the old, regardless of the qualification level.
- We find confirmation of the theoretical expectations presented in the existing literature that the service sector is favouring women over men. With the continued expansion of the service sector this implies that women might in the future be drawn into employment more extensively.
- In most countries, the elementary occupations (ISCO 9) appear to shrink more than the middle skilled occupations (ISCO 4-8), but this is linked to the overall shrinkage in the labour demand of the country. This is in contrast to the literature which argues for the presence of skill polarisation and decline in

middle-level occupations. We interpret our finding to suggest that a displacement into unemployment of the employed in the elementary occupations by workers from the upper-skilled occupations is taking place.

- We find evidence of educational expansion at the EU15 level on the 15-year horizon from 1995 to 2010, which is well documented in the literature relating to the technological progress and skills upgrading.
- With respect to skill obsolescence we analyze unemployment and inactivity rates of the cohort of 35-39 years of age in 1995 (50-54 years old in 2010) to provide a dynamic view. We find that the given age cohort not only becomes less employable as it advances in age, but a large share of its members drops out of the labour market into inactivity by the end of their working life. This is the case for all EU countries especially after 2010. However, as expected, the sharpest changes are found in the CEE countries (Romania, Poland, Slovenia, Bulgaria, Slovakia), which experienced a rampant structural change and reformed their economic systems from socialist to market economies.
- On the subjective level, however, skill obsolescence (measured as the need for further training in order to be able to perform job tasks) is reported more by the young people than by older workers, while equal shares in all generations perceive to have skills enabling them to perform *more* demanding tasks. This should not be seen as contradiction to an earlier finding as older workers might be out of the labour market (and therefore not captured in the survey) while with respect to the youth it might signal lack of experience or practical skills rather than skill obsolescence as such.
- The detachment from the labour market (defined as over 4 years-long unemployment spell) resembles the structure of the overall working population in a given country. The labour market segment we find to be the most affected by detachment is not independent from the general education structure: detachment prevails among low-educated in those countries where population is less educated and among medium-educated where people with secondary education dominate. This again justifies our proposition to go beyond ISCED 0-2 measure of low-skillness in the empirical investigations.
- We find evidence of stigmatization both when we look at the detached and the unemployed; there are more detached workers and higher unemployment rates

among the low-educated in countries with low shares of low-educated in the labour supply.

- Immigrants face worse market conditions than the native population: they are found more in inactivity and unemployment. While the immigrants are not less educated than the native population, in relative terms immigrants occupy low-skilled jobs more often than the natives.
- A sectoral analysis by ISCO and ISCED provides different pictures with respect to the skill levels: according to the occupational measure of low-skillness, there appear to be fewer low-skilled sectors as compared to the educational measure. The service sector appears to use more skilled workers than the other sectors and this finding is more clear-cut when the educational attainment is used as a measure for skills. We do not find, however, that service sector would favour younger workers over older ones.

1. People and jobs: qualifications versus occupations

In this section we seek to demonstrate the relationship between the supply and the demand side and how they concur in the emergence of the process of low-skillness. At the same time we aim at contrasting the two measures of low-skillness for advocating the need for their joint contribution in a comprehensive definition of the low-skilled labour force segment. We start with detailed pictures along the two measures of low-skillness and we characterize low-skillness by country. This will help us in making comparisons of the two measures utilized regarding the cross-country variations of low-skillness. Furthermore, this comparison will contribute to emphasize that the two measures are necessarily to be employed together for a correct and complete understanding of the low-skillness across Europe.

Figure 2 supplies an overview of the variation of low-skillness across the EU using the most commonly utilized measure for this, the qualification level. We consider the employed population and we calculate the shares of ISCED 0-2 and ISCED 3-4 educated people within this population. Thus, this figure gives us the representation of ISCED 0-2 and ISCED 3-4 respectively in the total employed population obtaining the ranking of the EU 27 countries according to the educational

measure.¹⁴ The CEE countries have the lowest shares of low-educated ISCED 0-2, while the Mediterranean countries, particularly Malta and Portugal display the largest shares of low-educated, well above the EU 27 average. Overall, the Mediterranean countries have the highest shares of low-educated and the CEE countries have the lowest shares, with the Northern and West-Northern countries in between. When we look at the medium educational level (ISCED 3-4) we see that the CEE countries appear to have the highest shares of the employed population with this level of educational attainment. Precisely, more than 70% of the employed population achieved at least secondary education. By contrast, the Mediterranean countries have the lowest shares of this educational group in their employment, as the majority of it is taken by the lowest educational group, principally Portugal and Malta. The high cross-country variation regarding the ISCED 0-2 representation in employment carries over to the medium educational levels.

Figure 2: Employed population by ISCED

Now we assume that the low-skilled segment is identified through the demand side, by the elementary occupations (ISCO 9) and the middle-skilled occupations (ISCO 4-8) and we show the shares in employment of the two occupational groups in Figure 3. Contrary to the educational measure, there is not much cross-country variation regarding the share of the elementary occupations in the employment and no clear geographical clustering of countries around this measure appears. However, most of the Mediterranean countries employ more than 10% of their workers in ISCO

¹⁴ This ranking is virtually unchanged if we consider the active population rather than the employed, which indicated that the active population is replicated almost perfectly in the employment across the EU countries.

9 occupations and the only exception is Greece. Apparently, the economy with the smallest share of employment in the elementary occupations is Czech Republic.

Figure 3: Employment by ISCO ¹⁵

Interestingly, comparing Figure 2 with Figure 3 we can quickly see that there are striking differences across countries regarding the utilization of the formal qualification on their respective labour markets. In order to emphasize this point, in Figures 4 and 5 we show how the two measures supply different pictures of the low-skilled segment in the labour market. Specifically, in Figure 4 we represent the shares of employed workers with ISCED 0-2 education, in the total employment in each country, against the shares of employed with ISCED 3-4 education. It clearly shows that the low (ISCED 0-2) and medium (ISCED 3-4) qualifications are substitutes in employment across the EU countries and the two series of shares have a strongly negative correlation. However, the same relationship does not maintain between the shares of ISCO 4-8 employment and the shares of ISCO 9 employment (Figure 5). If anything, the relation between the two series is positive, although the correlation is very weak. This is an indication of the fact that there is no perfect sorting of qualifications on occupations across the EU countries. In other words, the qualification levels are valued differently on the different labour markets, at least in the EU countries. These comparisons indicate the heterogeneity of the labour markets across Europe as well as the differences regarding the *de facto* utilization of skills.

¹⁵ EE, MT, IE and LU had missing data for employed in ISCO 6 or ISCO 7 or both, therefore the ISCO 4-8 aggregation was omitted for these counties.

Figure 4: Low versus medium qualifications

Figure 5: Low versus medium occupations

Further, in Figure 6 we zoom in to provide the country-level educational structure of the low-skilled occupational groups ISCO 9 and ISOC 4-8. It reveals a great variation in the educational structure of workforce by education employed in low-skilled occupation, signalling mismatches (highly educated workers (ISCED 5-6) working in elementary/middle-skilled occupations) in a number of countries (Ireland, Estonia, Spain, Cyprus, UK) (Panel A). High shares of ISCED 3-4 employed in elementary occupations are found in the Baltic and Visegrad countries. The lowest over-educational mismatches are in Romania, Czech Republic and Malta, even when we consider ISCO 4-8 occupations. In Panel B of this figure we show the educational composition of the ISCO 4-8 occupations, which require Level 2 skills. The same countries, Estonia, Ireland, Spain and Cyprus are leaders according to our measure of

over-educational mismatches. In the ISCO 4-8 occupations, as in ISCO 9, we again find high shares of ISCED 3-4 educational category in the Visegrad and Baltic countries. The earlier data showed that these are also the countries with the most educated working population in the EU27, at least at the level of formal qualification. Therefore, the high shares of highly educated in low-skilled jobs could be a signal of educational inflation in these countries, a different value given to the educational achievement in these countries or differences in the educational systems. It also implies differences in the economic structures and degree of the sophistication of the economies across the EU.

Figure 6: Educational structure of the low-skilled occupations

In sum, we provided here a general overview of the variation of low-skillness across Europe using formal qualification and occupations as measures for skills. The resulting differences demonstrate the complementary nature of the two measures in depicting a comprehensive picture of low-skillness. Therefore, in the rest of this section we engage extensively with both measures in an attempt to build a broader profile of the low-skilled work force in Europe. Apart from looking at these two

measures uni-dimensionally, we also put them into contexts where the two measures interact with other dimensions towards supplying evidence for the structural processes conducive to low-skillness, thus deriving empirical support for our theoretical definitions of low-skillness.

2. Low-skillness at the individual level

The macro structural factors identified in the theoretical framework of this study impact several key dimensions at micro level, leading to specific concepts of low-skillness. For example, it has been extensively argued that skills obsolescence, as a process of “becoming” low-skilled is strongly related to the old age. Similarly, the educational expansion leads to the phenomenon of stigmatization by negative selection which is manifested among the young population where experience is missing and the only skills signalling device is the educational attainment. Further, the growth of the service sector has been argued to play against the males whose skills and personality are less adaptable to the requirements of this sector. Therefore, in this section we give an overview of these micro dimensions, focusing on the age and gender interactions with low-skillness. In addition we evaluate the labour market opportunities of the migrants.

Age

In Figure 7 we constructed the age structure of the employed population within the two aggregated levels of educational attainment which designate the low-skilled. Hence in Panel A we take the total employed population with ISCED 0-2 level of education and we split it in three age groups: young age (15-24), prime age (25-49) and old age group (50-59). We do the same exercise with the ISCED 3-4 employed population.

On the one hand, it appears that the countries with the best educated workers, Slovakia and Czech Republic, are also among the countries with the highest representation (more than 40%) of the old age group in the low educated (ISCED 0-2) employed population (Panel A in Figure 5). On the other hand, the Scandinavian countries together with the other Nordic countries Denmark, Germany, Austria and the Netherlands, have the largest proportion of young people in the lowest educated segment of the employment (above 20%).

When we move to the next level of educational attainment (Panel B), the countries with the lowest representation of the old in the ISCED 0-2 employed population, i.e. the Baltic countries and Germany have instead the highest shares of the old age groups in the middle educated (ISCED 3-4) segment of this population. Moreover, it should be noted that there is a larger cross-country variability regarding the representation of the three age groups within ISCED 0-2 than within ISCED 3-4. This leads to the conclusion that, at least with respect to age, the EU27 countries are more different in the lowest skills segment than in the middle skills segment. This can be a consequence of the different pace of the educational expansion across the EU countries but also a reflection of the different educational systems.

Figure 7: Age structure of the employed population in 2010

Note: The data for EE and LT for the case of ISCED 0-2 was not reliable; therefore they were omitted.

When occupational categories are used as a measure for skills, the Visegrad countries, are still above the EU 27 average concerning the low-skillness of the old age group. Figure 8 shows the shares of the three age groups we introduced above, within each occupational category. Similarly to the case of formal qualification, the

occupational measure suggests that the old age group is more concentrated in the lowest skills than in the middle skills (compare the shares of the old age group in the ISCO 9 with those in the ISCO 4-8 occupations). The Netherlands and Denmark are the only two countries where the shares of the young age group are the highest both within the ISCO 9 and within the ISCO 4-8 occupations. In addition, in the “flexicurity” labor markets and in the Baltic countries, there is large share of young people employed in low-skilled occupations (ISCO 9). This could be a factor of part-time arrangements and can suggest that flexible labor markets are more conducive to employment of youth.

Figure 8: Age structure of employed population within occupations

It is interesting to point out that those countries with the smallest shares of low-educated population (Slovakia and Czech Republic) are also among those with the highest shares of old people (50-59 years of age) who are employed in the low-

skilled jobs (ISCO 9 and ISCO 4-8). At the same time, they are among the countries with the smallest shares of young people employed in ISCO 9 and ISCO 4-8 for the obvious reason that this cohort is still engaged in the educational system.

Consistently with the skill measure by ISCED, Slovakia and Czech Republic have a high representation of the old age in the elementary occupations and among the highest in the middle skilled occupations, ISCO 4-8. Generally, the two measures of skills, place these two countries on similar positions among the EU countries regarding the representation of the old age group in the low-skilled employment. However, the rest of the countries do not exhibit a consistent ranking with respect to the representation of the old in the skills group, when moving from the educational to the occupational measure of skills. Instead, the Nordic countries, Denmark, the Netherlands, Finland and Sweden, do preserve their leading positions when it comes to the representation of the young age group in the low-skilled employment, both when we regard low-skillness through the qualification level and the jobs performed.

Taken together, all these findings imply that across the EU countries we are facing largely different labour market institutions where the old and the young are treated differently with respect to their labour market opportunities. In addition, these also suggest that the occupational-educational matches may be age dependent and therefore experience plays different roles in different institutional settings across the EU.

Since the old and the young cohorts are two special groups of workers, the former because of the risk of skill obsolescence and the latter due to the lack of experience, it is informative to learn how they compete for jobs with each other, but also across skills levels. For this, in Figure 9 we show the relative risk of unemployment computed as the ratio of the unemployment rate of one educational/age group to the next. In particular, we compute the relative unemployment risk of one educational group to the next, within the age cohorts: young in Panel A and old in Panel B. In Panel C we calculate the unemployment risk of the young relative to the old within the qualification levels. Thus, each bar of Panels A and B shows how much the young and the old respectively compete for jobs within their own cohort and between the educational levels, while in Panel C each bar shows the relative struggle for jobs between the cohorts and within the educational level designating low-skillness in our study.

Looking at Panel A, it becomes apparent that among the young workers, competition for jobs takes place between medium educated and low-educated rather than between medium and high-educated. This is visible when comparing the levels of the relative risk of unemployment (always greater than unity for the lower educational levels) and also the difference between the first and the second bar which is quite pronounced in most of the countries. For instance, although Spain, Italy or Greece are leading countries with respect to the rates of unemployment among the youth, our measure in Panel A shows that the youth is struggling for jobs alike, regardless of their educational attainment level. Thus, high unemployment rates among the young cohort translate in low relative unemployment risks from one educational attainment to the next.

However, competition among the older workers takes place in most countries between medium skilled and high-skilled (see the level of relative risk of unemployment and the difference between the two columns in Panel B). This is very severe in Greece, Hungary, Poland and Czech Republic, where an ISCED 3-4 educated worker aged 50-59 is over three times more likely to be unemployed as an ISCED 5-6 educated worker within the same age group.

When it comes to the competition between the young and the old cohorts, it can be seen that in almost all countries the ratio of unemployment rates is greater than unity indicating that the youngsters are more at risk of unemployment than the old cohort in both educational categories (Panel C). When comparing the across-cohort risk of unemployment it appears that there is no effect of the educational level. In other words, across educational levels youth have a greater risk of unemployment than old, but across cohorts, whether the person achieves ISCED 0-2 or ISCED 3-4 does not make a difference (except for Italy, Cyprus and Sweden) in old versus young workers context.

Figure 9: Relative unemployment

Hence, on the basis of Figure 9 we can conclude that competition for jobs within age cohorts indeed takes place between the stages of formal qualification achieved and the level at which this competition occurs differs across the age cohorts. However, when it comes to the competition across the age cohorts, the educational

achievement seems not to matter: the youth are more at risk of unemployment than the old, regardless of the level of education achieved. In other words, it is not true that the younger workers would be taking over low-skilled/unskilled occupations (ISCO 9) from the older workers but rather more educated workers within a given age cohort push out lower educated within that cohort.

Gender

While we found that the two measures, i.e. formal qualification and occupations provide a somewhat consistent picture along the age dimension, the same does not maintain along the gender dimension. Specifically, although the educational attainment measure would render males as being low-skilled, i.e. in relative terms men are less educated than women, the occupational approach to low-skillness appears to advocate that low-skillness is biased towards women. This finding is in line with the well-established literature in labour economics concerning the labour market discrimination of women and the genders pay gap.

Low-skilled biasness towards males is visible when we calculate the male to female ratios of the employed population within each of the two measures of educational attainment. This is represented in Figure 10. Thus, for example in Malta, in the total employed population with ISCED 0-2 education, we have 2.5 males to one woman. Moreover, in most of the countries, ISCED 0-2 is more strongly biased towards men than is ISCED 3-4. The largest differences are in the cases of the Mediterranean countries, Malta, Greece, Italy, Spain, i.e. the countries with the most low-skilled employed population, but also for Ireland, Latvia, Estonia and Belgium. Only in the CEE countries, Slovakia, Romania, Hungary, Austria and Czech Republic the male biasness is more pronounced for the ISCED 3-4 qualification levels than for ISCED 0-2. Moreover, in the case of Austria and Czech Republic, ISCED 0-2 is clearly female biased.

Nevertheless, generally speaking, Figure 10 indicates that by the educational level the male employed population in the EU 27 is more low-skilled than the female employed population. In other words, we can say that women are more educated than men, at least when it comes to the employed population. However, the conclusion that employed women are more educated than their male counterparts is also due to women's lower representation and self-selection in the participation to the labour market, i.e. it is more likely for a low-educated woman to become inactive once she

enters family obligations and child rearing than it is for a highly educated woman. Indeed, when we look at the total population within the working age limits, the low-skillness bias towards men vanishes (graphs not shown). Therefore, one conclusion of this exercise is that the low-educated woman who are found in inactivity represent a vulnerable category of low-skilled which may deserve attention in the policy agenda.

Figure 10: Male to female ratio of employed population by qualification

The male low-skilled biasness we found in connection to the educational level is in clear contrast with the result provided by the occupational measure. Apparently, the employment in the low-skilled occupations is biased towards women since their representation in the total female employment is, in most of the countries, above the corresponding male representation. This conclusion is supported when we look at the gender structure within the occupational categories in Figure 11. In this figure we show the male to female ratios within each of the occupational categories. In the lowest skilled occupations (ISCO 9) females are over-represented as compared to the males employed in this category. The big exceptions are Malta, Ireland, UK but also Romania, Slovakia, Bulgaria and the Netherlands. Moreover, Malta has an outstanding representation of males as compared to females in the low-skilled occupations ISCO 9 (about 3.5 males to one female), but also in the middle-skilled ISCO 4-8 (2 males to one female). Moreover, the ISCO 4-8 occupations are slightly dominated by males in most of the countries, with the exception of UK. Thus, the

middle-skilled occupations in UK are female dominate, while the elementary occupations are male dominated.¹⁶

Figure 11: Male to female ratio of employed, by occupation

The contrasting results regarding gender low-skillness when using educational attainment as opposed to occupations as measures for skills, represent an additional argument for the need to employ both measures when one seeks to understand the various dimensions of low-skillness. Furthermore, this gender comparison between educational outcomes and labour market outcomes reveals that despite women not being less educated than men, they face different labour market opportunities than men. Although a precise analysis of this cursory judgment is beyond the scope of this report, it does support our approach to low-skillness which takes into account the *de facto* utilization of skills for correctly identifying the low-skilled segments of the work force.

Migrants and temporarily low-skilled

A third dimension along which we want to study the low-skillness is that of the immigrants. For the purpose of the argument in this section it sufficed to illustrate that the immigrants face worse labour market conditions than the national population. For this purpose, we consider two aggregate classes of immigrants according to their origin relative to each of the EU 27 countries. First, we have the immigrants coming

¹⁶ This seems to be in line with the literature which advocates based on UK survey data that males are reluctant to take up service jobs (Nixon 2009).

from another EU 27 country, labelled “EU27”. Second, we merge the immigrants coming from another European country which is not an EU member with those immigrants coming from a third country outside of Europe and we label them “non-EU27”.

Following the International Labour Organization definition of the labour status, in Figure 12 we show the distribution among employment, unemployment and inactivity labour market status of the immigrant and native population.¹⁷ As expected, in most of the EU countries, the representation of the unemployed and inactive is higher among the immigrant categories than among the native population, which directly suggests that the immigrants face worse market conditions than the native population. In particular, the share of the unemployed non-EU27 immigrants is generally higher than that of the immigrants coming from another EU 27 country.

Figure 12: Employment status by nationality

¹⁷ Since the military service status is applicable only to the native population, it was excluded from the construction of these distributions.

Further, Figure 13 shows that these conditions are not due to the immigrants being less qualified than the natives. Here we show the educational attainment composition of the immigrant population for each of the two aggregate categories of immigrants next to that of the native population. This allows us to compare the shares of ISCED 0-2 and ISCED 3-4 within each nationality. Generally do not find that the native population is more educated than the immigrant population, that is, the shares of ISCED 0-2 within the native population are not lower than those of the other nationalities living in a given country. However, Austria, Belgium, Germany, Denmark, Finland, France, Netherlands, Sweden and Slovenia have more educated native population than the immigrant population. We also find that immigrants from within the EU27 are more educated than the non-EU27 immigrants and most often they are also more educated than the nationals.

Figure 13: Educational structure by nationality

Further, having established that generally in the EU countries the immigrants face worse labour market conditions than the native population, we analyze the employment conditions of those who are engaged in a job. Particularly, we are interested to see how well their qualifications are matched with the job they perform. For this purpose, Figure 14 shows a cross-sectional analysis of the shares of employed immigrants coming from outside the EU27 and the educational mismatches measured as the share of ISCED 5-6 educated workers working in ISCO9 occupations in the total employment of the country (Panel A). In Panel B we show the same information for the immigrants coming from the non-EU15 countries.

This simple analysis shows that there is indeed a positive correlation between over-educational mismatches and the shares of immigrants across the EU27 countries, indicating that a phenomenon of (temporarily) low-skillness is very likely to take place among the population of immigrants.

Figure 14: The share of immigrants vs. the share of over-educational mismatches

To strengthen the ideas about the labour market conditions of immigrants in the EU27 countries, in Figure 15 we depict the over-educational mismatches of the immigrants by comparison with the national population. The mismatched is measures as the share of highly educated workers (ISCED 5-6) employed in low-skilled occupations (ISCO 9). We calculated these shares for the total immigrant population, (other EU 27 countries plus the non-EU 27 immigrants) as well as for the national population. The bars represent the shares of the ISCED 5-6 educated immigrants working in ISCO 9 occupations, while the circles show the same indicator for the case of the native population.

As it can be seen, in most of the countries the share of ISCED 5-6 immigrants working in the elementary occupations ISCO 9 is higher than that of the corresponding share for the national population. This suggests that the immigrants have a relatively higher difficulty to integrate in the host labour market. The country which exhibits the highest discrepancy between the over-educational mismatch

among the immigrants and that of the national population is Lithuania, followed by Ireland and Sweden. Estonia and Poland also show discriminative labour market conditions for the immigrants, at least according to the raw measure for educational mismatches that we used here.

Figure 15: The shares of ISCED 5-6 working in ISCO 9 – all immigrants

In conclusion, we demonstrated that while low-educated immigrants face higher risk of unemployment than the native population, highly educated immigrants do not necessarily encounter job opportunities suitable to their level of qualification. This may be due to various reasons which we developed in the theoretical framework: the recognition of their qualification credentials in the host country, language barriers, the lack of contacts in the labour market etc. We find it justified to treat the highly educated migrants as a distinct category of people who are in the process of becoming low-skilled. While we acknowledge that the over-educational mismatch is not a problem specific to migrants and that also the native population is largely affected by it, we identify it distinctively among the migrants since the policy remedies might be largely different and sometimes more intricate than those suitable for the native population.

3. Sectoral analysis

The aim of this section is to identify the low-skilled sectors, both from the qualification levels (ISCED) and occupational (ISCO) perspective. This allows us to understand the sectoral profile of low-skillness and how this differs across countries. For this we use the NACE Rev.2 classification of the economic activities, which groups them into 21 sectors. We start with presenting a general overview of the 21

sectors in relation to the skills usage at the EU 27 aggregate level. We use both the educational and occupational measures and we provide comparisons of the outcome delivered by each regarding the classification of the sectors according to the level of skills. In Figure 16 we use the educational attainment measure in order to differentiate the low-skilled sectors. Here we show the distribution of the three educational categories within each sector of economic activity, that is, the share of workers with a certain level of education employed in the particular sector at the EU 27 aggregated level. From this representation of the data it becomes apparent that *household activities* and *agriculture* are low-skilled sectors with more than 50% of the employed having only ISCED 0-2 educational attainment. They are followed by *construction*, *water supply* and *administrative activities*. *Manufacturing* has only 25% ISCED 0-2 educated, while the majority (60%) of the employment in this sector have at least a secondary level of education (ISCED 3-4).

Figure 16: Educational attainment within sectors in EU 27

Occupational categories are further used in Figure 17 in order to construct the skills structure of the sectors of activity. Precisely, this figure shows the occupational structure within the sectors as the shares of people employed in each of the three occupation groups considered, in each sector. Consistent with the finding using the educational attainment as a measure for skills, *household activities* by-far hosts the highest share of low-skilled people (78% of the employment is represented by ISCO 9 jobs). Therefore, we can safely say that this sector is low-skilled. The *agriculture* sector is ranked only the 5th according to the ISCO 9 occupations as measure of low-

skillness. Instead, this sector has the highest share of ISCO 4-8 jobs and in this respect it is followed by *transportation, construction* and *mining*.

Interestingly, according to the occupational measure of low-skillness, there appear to be fewer low-skilled sectors as compared to the results delivered by the educational measure. For example, *art, entertainment and recreation* would be classified as a low-skilled sector if we use the educational measure, since more than 60% of the employment in this sector has only up to secondary level of education. However, the occupational measure puts this sector in the high-skilled since about 56% of the employment is formed by occupations which require third or fourth level of skills (ISCO 1-3).

Figure 17: Occupational structure within sectors in EU 27

Service sector

Due to the particular importance of the service sector in re-shaping the demand for skills, we want to see how the low-skilled employment differs across countries in this sector and by this, in which countries the expansion of the service sector was more effective in raising the demand for skills. We define the service sector as the economic activities covered by Sections G to U of NACE Rev. 2, which includes a range of different activities, ranging from ICT to hospitality. ¹⁸

¹⁸ This definition can be found in “Challenges for EU support to innovation in services – Fostering new markets and jobs through innovation” - Commission Staff Working Document SEC (2009) 1195 of 09.09.2009. The service sector contains the following 15 subsectors: Wholesale and retail trade, Transporting and storage, Accommodation and food service, Information and communication, Financial and insurance, Real estate, Professional, scientific and technical, Administrative and support service, Public administration and defence, Education, Human health and social work, Arts,

In Figure 18 we show how the service sector is divided according to the occupational categories by comparison with the rest of the sectors. If we look at the share of the ISCO 9 occupations within the service sector, this does not appear to be significantly different from other sectors. If, however, we consider also the ISCO 4-8 and ISCO 1-3 occupations, it becomes clear that the service sector is more skilled than the other sectors of the economy in all the EU 27 countries. In literally all the EU 27 countries, the share of the ISCO 1-3 in the service sector is considerably higher than in the other sectors of the economy.

Figure 18: Occupational structure of the service sector

Figure 19 instead shows the educational structure of the service sector in comparison with other sectors of the economy. Unlike in the occupational approach, the educational measure of skills provides sizable differences between the service sector and the other sectors of the economy. Particularly in the Mediterranean countries there are significant gaps between the services sector and the other sectors with respect to the usage of the ICED 0-2 educated workers, in that the service sector appears to use more educated people than the other sector of the economy.

Figure 19: Educational structure of the service sector

In conclusion, the two measures of skills provide a consistent picture regarding the service sector, in that it more skilled than the rest of the sectors in the economy and this is true for virtually all the EU 27 countries. However, the educational measure gives a sharper picture than the occupational measure regarding the skills level as well as a larger variability across countries, which again points to the different educational systems and/or different value give to the educational achievements across the labour markets in the EU 27.

Regarding the gender composition, Figure 20 confirms our theoretical expectations that the service sectors draws more women than men. The figure shows that the service sector is indeed biased towards women, with a share between 51% and 64% women working in this sector. The only exceptions are Malta and Greece, where the service sector is male dominated. However, in the Baltic countries and Estonia the service sector is clearly female dominated with a share of over 60%.

Figure 20: Gender composition in the service sector

Evidence of the fact that the expansion of the service sector is favouring women is given in Figure 21 where we show the ratio of males to females working in the sector at the aggregate EU level. If until the beginning of the 1990s the sector was male dominated, the proportions have been constantly changing after this date, reaching above 1.2 women to one man employed in the sector. Thus, not only that this sector is hiring more women, but this trend has been kept slowly but consistently over the period of more than 20 years.

Figure 21: Ratio of females to males working in the service sector¹⁹, EU level

Displaced workers

Apart from favouring women in employment, the service sector was argued to affect the usage of skills towards the low and high skills in the detriment of the

¹⁹ NACE Rev. 1.1 classification of sectors until 2008 and Rev.2 after 2008.

medium skills, under the phenomenon of *skills polarization*. Some evidence of skills polarization can be found in Figure 22 where we show the evolution of the share of the employment by occupational groups over time. It is thus visible that the middle occupations (ISCO 4-8) are losing their share in the total employment, being accompanied by an increase in the share of employment in the high-skilled occupations (ISCO 1-3), although at a very slow pace. At the same time, while not shrinking, the low-skilled occupations (ISCO 9) do not appear to record a visible increase in their employment shares over time, at least not at the EU aggregate level. A more in-depth country level analysis may reveal more pronounced skills polarization in some countries than in others. However, at the EU level one can see a converging trend between the high educated (ISCO 1-3) and medium-educated (ISCO 4-8) in the labour force.

Figure 22: Share of employment by occupations, over time, EU level

Thus, one mechanism which was described in connection with the skills polarization is that of the displacement of the workers from the low-skilled occupations by the more qualified workers who lose their jobs from the medium skilled positions. In this direction, Figure 23 shows the rate of sending in unemployment by the previous occupation of the unemployed, calculated as the unemployed relative to the total employed within the particular occupational category. For example, on average in the EU27, for one person who was sent in unemployment in 2010, the ISCO 9 occupations employed approximately 10 persons, while the medium skilled occupations (ISCO 4-8) employed approximately 15 persons. Apart from the rate of sending into unemployment within the occupational groups, for the

sake of comparison we also show the rates of sending into unemployment at country level, that is, for all occupations taken together (the triangle series).

In relative terms, ISCO 9 sends more in unemployment than do ISCO 4-8 occupations.²⁰ Lithuania is somewhat outstanding regarding the lowest skilled occupations ISCO 9 in that it sends in unemployment almost half of what it retains in employment in this occupational category. Overall, it appears that ISCO 9 shrinks more than ISCO 4-8. In labour markets which experience high pressure, like the Baltic countries and Spain, with a country-level rate of sending in unemployment of above 20%, the rates of sending in unemployment from both low-skilled occupational groups are the highest. Thus, in these countries, the tightening of the low-skilled occupations is driven by the overall shrinking of the labour market demand. This affects the low-skilled workers who are crowded out of the labour market as their jobs become occupied by those workers employed in the upper skill occupations, who potentially lose their jobs. This is particularly true for Latvia and Spain where the overall rate of sending in unemployment is in the same range as the rate of sending in unemployment from ISCO 9. Therefore, at least in these countries we cannot argue that the low-skilled occupations are shrinking, but rather that a phenomenon of *displacement* may be at play. This phenomenon seems to take place also in other countries, at a smaller scale: at the EU27 level, Portugal, Belgium, Finland, Bulgaria, Slovenia, Romania, Cyprus.

Figure 23: Rate of sending in unemployment

²⁰ This might suggest a trend that comes against the polarization hypothesis, but a more detailed disaggregation of occupations is needed for a clear-cut conclusion.

However, the Visegrad countries, Sweden, Denmark and especially Lithuania have large discrepancies between the overall labour market decay and the one experienced by the elementary occupations ISCO 9. Therefore, for these countries we may argue that the low-skilled segment, as designated by the elementary occupations, suffers a decline in the labour market demand. Interestingly, in UK and the Netherlands, the overall labour market shrinkage seems to be driven more by the high-skilled occupations than by the low-skilled. These are also the countries that suffer the least from the reduction of the relative employment in the low-skilled occupations.

4. Skills obsolescence

In this section we combine the two measures for skills, i.e. formal qualification and occupations recorded by the LFS, as well as the subjective reporting from the European Working Conditions Survey (EWCS) in order to construct the pragmatic picture of the obsolescence phenomenon as one dimension of low-skillness.

Macro static view

From our conceptual review it followed that skill obsolescence is largely a characteristic of the older groups of workers, typically the more educated (male) workers. We expect to find this phenomenon more prominent in the CEE region due to the fast structural changes suffered during the transition to the market economy, but also across the other EU countries where the expansion of the service sector brought on a new demand for skills. Thus, unemployment and inactivity are very likely labour market outcomes among those workers whose skills become obsolete under the light of the changing demand for skills, regardless of the root of this change.

Following our theoretical conceptualization we assume that skill obsolescence is to be found among the older groups of workers. Therefore, in this section we use the unemployment and inactivity figures to construct the macro picture of skill obsolescence across the EU countries, focusing on the old age groups (Y50-59) and contrasting them with the prime age groups (Y24-49). Figure 24 demonstrates that it is indeed the old who suffers from the obsolescence of their skills and that, moreover, it leads to inactivity rather than unemployment. Contrary to our initial expectations, Panel A of this figure shows that the unemployment is rather more prevalent among the younger worker; the unemployment rates are the higher among the prime age

population, although in most of the countries they do not differ significantly from those of the old group. However, if we look at the inactivity rates, calculated as a percentage of the total population, by age (Panel B), we find that these are by far larger for the old population and that the relation between age and inactivity rate is monotonously increasing. The reason is that once they fall into unemployment due to the obsolescence of their skills, the old workers will fall completely out of the labour market, in inactivity, since they might find it difficult and un-motivating to attend training and requalification programs, or these might not be easily available. Consequently, they drop out of the unemployment records. Hence, based on the evidence provided in Figure 24 we conclude that people with obsolete skills are to be found among the inactive. We shall then further draw on the inactivity figures as proxy for skills obsolescence in order to investigate its relation with other dimensions, particularly gender and qualification levels.

Figure 24: Labour market status: old vs. prime age

Although we expected to find that the population of the CEE countries would suffer from skills obsolescence more than other countries, for most of them the inactivity rates are below the EU 27 average regarding the old age group 50-59. Only Romania, Poland, Slovenia and Hungary are dragging behind by keeping their inactivity rates high among the old. This is also true for some Mediterranean countries like Malta, Italy and Greece. Surprisingly, the Czech Republic has one of the lowest inactivity rates in the old age group, not far from the Baltic countries and Germany. Nevertheless, the CEE countries lead the ranks of older workers' unemployment (the Baltic countries, Slovakia) or the ranks of older workers' inactivity rates (Romania, Poland, Slovenia, Hungary).

For the interaction of obsolescence with gender and education, in Figure 25 we take the inactive population aged 15-59 and we calculate the shares of the inactive people by their educational attainment for each gender. The bars represent the shares of the educational attainment in the total inactive population for each of the genders separately, while the triangles are the shares of the same educational attainment for both genders taken together. Regarded in conjunction, Panel A and B of this figure show that the majority of the inactive population is low-skilled (the highest educational levels ISCED 5-6 were omitted), if the formal qualification is the measure for skills. Moreover, the highest shares are found for those with below secondary education.

Figure 25: Inactivity by educational attainment, population aged 15-59

It should be noted also that at the lowest levels of education (ISCED 0-2) the inactivity is more pronounced for males than for females, while at the middle level of education there are no sensible differences between the two genders regarding their own representation in the educational category (ISCED 3-4). In conclusion, low educated men have a higher risk of falling into inactivity than the low-educated women, but this does not hold true when we move up on the educational ladder. However, given the high shares of middle-educated people found in inactivity, from the labour market vulnerability point of view they are low-skilled.

Macro dynamic view

In this section we employ the inactivity figures, by age cohorts, in order to demonstrate the labour market situation of a given cohort followed over a period of 15 years from 1995 to 2010. We are thus able to show that over time these workers not only lose their jobs, but they are pushed out of the labour market, in inactivity.²¹

²¹ As previously argued, we found that the inactivity figures capture skill obsolescence better than the unemployment rates do. Moreover, unlike in the case of the inactivity measure, we cannot detect a

Before providing this evidence we lay the grounds for our argumentation. First, in Figure 26, we show some support for the educational expansion as a structural process affecting low-skillness. Next, in Figure Y we show that the inactivity rates of the cohort which was 35-39 years old in 1995 increase as they become older. Therefore, corroborated with the educational expansion, we conjecture that the deterioration of the labour market conditions of a given cohort, particularly after a certain age, is due to the obsolescence of their skills. As the new, more educated cohorts, with skills corresponding better to the market demand, are entering the labour market, they are crowding out the older, less educated, whose skills are obsolete from the point of view of the new demand for skills. Thus, we do not only show the deterioration of the labour market conditions over time, but we also point to the reasons which are likely to stand behind it.

Hence, Figure 26 shows the representation of each of the classes of educational attainment within the given age group. Each bar represents the share of the employed population with a given educational attainment in the total employed population of the same age for the years 1995 and 2010. Thus, comparing these shares over 15 years for the same age group provides a picture of the educational achievement of the newer cohorts relative to the older cohorts. For example, consider the age group 25-29 years of age. Within this age group, 28% had ISCED 0-2 educational attainment in 1995 compared to only 16% in 2010. Further, while for the middle-educational group the shares are not very different between the two years, for the highest level of education the proportions are reversed: 36% of this age cohort has ISCED 5-6 level of education in 2010 as compared to only 22% in 1995.

clear-cut upward trend in the unemployment rates of this cohort over time. The reason may be the discouraged worker effect, which means that instead of being counted among the unemployed, these workers completely fall out of the labour market, in inactivity.

Figure 26: Educational structure of the age groups in EU15: 15 years overview

It follows that over the 15 years period any given aged cohort has shifted towards larger shares in the higher educational levels and smaller shares in the low educational levels. This means that in each of the age groups there are less people low qualified workers in 2010 than 15 years before and more highly qualified in 2010 than 15 years before. Therefore, we can conclude that at least for the 15-year horizon considered here we have found evidence for the educational expansion. Apart from the educational expansion, in Figure 26 it is worth noting the pronounced U-shape formed by the bars in the ISCED 0-2 block and the inverted-U-shape in the ISCED 5-6 block, for 1995 and 2010 takes separately. The ISCED 3-4 block has only a mild inverted-U shape. This means that for any moment of time the prime age groups, 30-49 years of age are more educated, at least formally, than the old age group, 50-64 years of age as well as than the youngsters. However, the youngsters are still at the age of acquiring education.

Having established that the young cohorts today are more skilled, at least in the formal sense, than their counterpart cohorts 15 years ago and that the prime age is also more qualified than the old, we propose a simple dynamic approach to the phenomenon of skills obsolescence. Under the assumption that the young cohorts are more educated and that their skills correspond to the current demand of the labour market, they have the potential of driving the older cohorts into unemployment or out of the labour market, in inactivity. If experience is not enough for maintaining the job, then skill obsolescence can most likely be made accountable for their inactivity status.

For this, in Figure 27 we take the cohort aged 35-39 years of age in 1995 and we follow their inactivity rates, on 5-year intervals until 2010. This means that in 2010 this cohort is 50-54 years old. As we expect, the evidence of skill obsolescence is shown in the form of higher inactivity rates as this age cohort becomes older, especially after 2000, for all the EU countries.²²

Figure 27: Inactive population in total population: cohort aged 35-39 in 1995 (%)

The sharpest change in the inactivity figures for this age cohort is found in the case of Romania, where it goes from 12% to 30% during the time span of 10 years from 2000 to 2010. Similarly, in Poland the inactivity rate of this age cohort grows rapidly from 13% to 35% during the same time period. Next, is Slovenia with an increase of 9 percentage points of inactivity rate between the same period, followed by Bulgaria and Slovakia with 8 percentage points each.

Micro static view

In this section we look at various aspects of the low-skilled labour force which help us understand the phenomenon of skill obsolescence in the EU countries across the skill levels, genders and age groups. For this we use the data from the European Working Conditions Survey (EWCS) conducted in 2010, in which skill obsolescence is subjectively measured through self-reporting. We first look at the EU 27 aggregate

²² Malta was excluded because of an outlier position.

level to identify the declared skill-obsolescence according to occupation, age and sector of activity at the EU 27 level as well as at individual country level. For this we use the answers to Question 60 from the survey and we show the distribution of these answers according to the above-mentioned dimensions:

“Q60: Which of the following alternatives would best describe your skills in your own work?”

- 1 – I need further training to cope well with my duties*
- 2 – My present skills correspond well with my duties*
- 3 – I have the skills to cope with more demanding duties”*

In Figure 28 we display the perceived skills obsolescence by occupations, using the ISCO classifications. While the majority of the respondents perceive that their skills are well suitable for the job they perform, the low-skills occupation workers, ISCO 9 are those who perceive the least the need for farther training to cope with their duties. Despite the fact that there is no clear monotonous relationship between the level of skills and the need for farther training, we do observe that in the higher skill occupations, ISCO 2 and ISCO 3, the need for farther training is greater than among the workers from the lowest skills occupations, ISCO 8 and ISCO 9. This is in line with the general argument that skill obsolescence is more likely to manifest at higher levels of skills where there are specificity of skills is also higher.

Figure 28: Perceived obsolescence by occupation in EU27

Next, Figure 29 displays the perceived skill obsolescence by age. The outcome is surprising: the elderly perceive less obsolescence than youngsters, but all generations equally perceive having more skills than needed in order to cope with their job duties. It should be noted that the pattern captured by Figure 29 is not different from the one provided by the 2005 wave of this survey. However, the lack of sufficient skills for the young age segment might also be a signal for their lack of

experience or practical skills, especially for the new graduates. Overall, this figure shows a combination of over-qualification and lack of sufficient skills, in particular for the young cohort.

Figure 29: Perceived obsolescence by age in EU27

Figure 30 shows the perceived skills needs by sector of activity, where sectors are dichotomously captured by Services and Industry. As expected, the service sector employees perceive more lack of skills than those working in the industry sector. While there are more service sector employees than industry sector ones stating that they need more training to cope with their job duties, there is a smaller percent of them compared with that of the industry sector workers perceiving that their skills correspond well with their duties. This result is in line with the argument of the expansion of the service sector which demands new types of skills.

Figure 30: Perceived skill obsolescence by sector of activity in EU27

We turn now to the country profiles in order to investigate how the interaction between the various dimensions and the perceived lack of skills varies across countries. First, in Figure 31 we show the overall perception regarding the skill needs by country. Comparing Panel A and B we see that the earlier result where we found that young face the lack of corresponding skills in a greater extent than old workers, is also translated at individual country level.

Figure 31: Perceived obsolescence by country

Apparently, countries with a low-share of low-qualified people (Austria, Germany, Estonia, Lithuania, Slovakia, Czech Republic) perceive the lack of skills in the largest degree among the EU countries, while those with high share of low qualified (the Mediterranean countries, Ireland) report the problem of skills needs to a lesser extent. Interestingly, the workers from Romania and Bulgaria, countries which suffered massive economic restructuring after the fall of the communism, are among those who perceive the least the lack of skills for the jobs they perform. It should be

also noted that regarding the other direction of skills mismatch, that is when the skills are above the job needs, there is a relatively high variability among the EU countries. Romania, Greece and Cyprus report this type of mismatch the most.

In Figure 32 it can be seen which countries experience more skills obsolescence or lack of skills among their working population, by age: young below 30 years of age in Panel A and old, above 50 years of age in Panel B. The highest is among the young workers in Austria, followed by those in Lithuania, Germany, Estonia, Czech Republic and Poland, with over 20% of the respondents. If in the case of youngsters the lack of skills may be more attributed to the lack of experience, in the case of the old workers it is more likely to be due to the obsolescence of their skills. Hence, in Panel B of this figure we see again that the countries which have the lowest shares of low-educated people report the obsolescence of skills in the largest degree while those countries where we found the largest shares of low-educated, particularly the Mediterranean countries, perceive the least the obsolescence of skills among the old population. This is likely to reflect the types of economic production, whereby Austria, Germany and Visegrad countries are to a greater extent than most of the other countries industrial economies with demand for specific skills. As discussed in the earlier parts of this report, a related important aspect to consider in relation to skill obsolescence is worker's skills specificity which implies harder and/or longer periods of adjustments due to, typically, inverse relationship between skill specificity and skill transferability. By extension of this logic, countries with educational regimes that are more 'skill-specific' are likely to have more workers that are under the risk of facing skill mismatches, which appears to be confirmed by our simple analysis here.

Figure 32: Perceived lack of skills by age and country

To sum up, in this section we found that lack of skills is more pronounced for younger cohort than for the older one. With respect to the older workers, we believe it identifies skill obsolescence brought about by structural changes and new skill demands on the shop floor. . Because skill obsolescence is rather a phenomenon experienced by the older workforce, with respect to the youth ‘lack of skills’ rather identifies a lack of experience, poor quality of education systems as well as cross-country differences in labour demand affected by the economic production which might be more or less ‘skill-specific’.

5. Other categories

Our conceptual review has also pointed to several other categories of low-skillness which are into a vulnerable position in relation to the labour market, like the detached or stigmatized workers. Hence, we dedicate this section to looking more closely at these two categories.

Detached workers

Defining the detached workers as those between the limits of the working age, 15 to 64 years and age, and who were unemployed for more than four years, we find that across the EU 27 countries, the detached workers population is basically split between the ISCED 0-2 and ISCED 3-4 educational levels, except for the Mediterranean countries where ISCED 0-2 is clearly dominant. This can be seen in Figure 33 where we calculate the shares of each educational attainment groups within the population of detached workers. This pattern, however, follows the pattern of the general level of formal qualification in a given country. That means that the share of detached workers with ISCED 0-2 / ISCED 3-4 is higher in countries in which the share of ISCED 0-2/ ISCED 3-4 educated is higher in the general population (not displayed). The picture looks somewhat different if we consider the shares of detached workers in the total population with the same educational attainment (Figure 34). In most countries, the representation of the detached workers is the highest in the lowest educational level. However, in the Baltic countries, Poland, Greece and Romania, the detached workers are more represented in the middle educational group, ISCED 3-4. Interestingly, while in Slovakia the majority of the detached workers have a middle level of education (Figure 33), from Figure 34 it becomes apparent that the detachment from the labour market is more frequent among the lowest educated, ISCED 0-2. This analysis again justifies our proposition to go beyond ISCED 0-2 measure in empirical works about low-skilled.

Figure 33: Educational structure of the detached workers aged 15-64

Figure 34: Proportion of detached workers within total of a given educational category

Stigmatized

The above discussion brings us to the concept of *stigmatization* which appears to be a characteristic of those countries where the low-educated are in minority, i.e. the case of the CEE countries. To illustrate that this is the case, in Figure 35 we show the unemployment rates by educational attainment and the average unemployment rates in each of the EU 27 countries in 2010. Slovakia, Czech Republic and the Baltic countries, where the low educated constitute a minority, are significantly affected by unemployment especially for this segment of the labour force. Moreover, the rate of unemployment among the lowest educated is significantly above that at the country level. By contrast, the Mediterranean countries and Romania, where the low-educated are not in minority, the unemployment rates for the two educational levels, ISCED 0-2 and ISCED 3-4, are relatively balanced and their levels are significantly below those in the CEE and Baltic countries. This result is thus consistent with the stigmatization hypothesis. Evidence for stigmatization, proxied by the relative risk of unemployment, was also found in Figure 9, particularly for the young adults in countries with high levels of secondary educational attainment and/or in countries with strong vocational education systems (Slovakia, Czech Republic, Sweden, and UK). However, this does not carry over to the older cohort where the competition for jobs takes place at higher educational levels and it is not limited to countries with high levels of education.

Figure 35: Unemployment rate by educational attainment of population aged 15-59 (%)

In order to strengthen idea that stigmatization is a problem characteristic to the youngsters in Table 4 we show that the correlation between the shares of low-educated ISCED 0-2 in the total active population and the unemployment rates of the same qualification group is stronger for the young then for the older cohorts. Moreover, while being strongly negative, as expected, this correlation becomes positive, however weak, as we move to the oldest cohort 60-64. Thus, this shows that stigmatization is indeed a phenomenon specific to the young cohorts.

Table 4: Stigmatization (EU 27)

Correlation between the shares of active ISCED0-2 and the unemployment rates of ISCED 0-2	Cohort		
	Young	Old	
	Y15-24	Y50-59	Y60-64
	-0.55	-0.34	0.04

Section summary

In this chapter we used labour market survey data from the EU 27 Member States, in order to provide empirical support for the processes affecting the demand for skills as well as for the definitions of low-skillness which we identified and described in Table 3 belonging to our theoretical chapter. Along with the translation of the data to our categories of low-skillness, we were also able to identify country clustering along various dimensions and measures of low-skillness in Table 5. This table is thus an imperfect image of Table 3, which motivated our empirical

investigation to testing the concepts. Table 5 aims to inform ourselves with regard to countries' characteristics relative to the analyzed concepts. The existence of these clusters holds up to our earlier argument about the unsuitability of a homogenized view of the low-skilled segment across the European countries, particularly when it comes to formulating EU policy recommendations.

Table 5: Countries clustering around various dimensions of low-skillness

Dimension	Value/ Measure/ Argument	Countries Cluster
Education	High share of low educated	Mediterranean countries: Portugal and Malta
	High share of medium educated	Visegrad
Age	The largest shares of old low-skilled	Estonia, Czech Republic, Finland, Denmark
	The largest shares of young low skilled	Denmark, the Netherlands, Finland, UK
Gender	ISCO 9 male biased	Denmark, UK, Ireland and Malta
	ISCO 9 female biased	All countries except Denmark, UK, Ireland and Malta
Detached workers	ISCED 0-2 majority	Mediterranean countries: Malta, Portugal, Spain, Italy, France
	ISCED 3-4 majority	Baltic countries, Visegrad, Slovenia, , Finland, Romania and Cyprus
Stigmatized	Highest differences between the unemployment rate of ISCED 0-2 and that at the national level	Slovakia, Czech Republic, the Baltic countries , Sweden and UK
Over-educational mismatches among migrants (temporarily low-skilled)	ISCED 5-6 educated working in ISCO 9 occupations	Baltic countries, Sweden, Finland
Displacement	The rate of sending in unemployment of all occupations pulled together coincides with the rate of sending in unemployment from ISCO 9 occupations. Thus, the shrinkage of the elementary occupations is linked to the overall shrinkage in the labour demand of the country. Therefore, this suggests the displacement of the employment in the elementary occupations by the workers from the medium-skilled occupations which are driven into unemployment.	Portugal, Spain, Belgium, Finland, Cyprus, Bulgaria, Slovenia, Romania, Latvia
People with obsolete skills	Inactivity young vs. old (higher inactivity rates among the old)	Romania, Poland, Slovenia and Hungary Malta, Italy and Greece
	Increasing inactivity of prime-age cohort as it ages (over time from 1995 to 2010)	Romania, Poland, Slovenia, Bulgaria, Slovakia
	Subjective self-reporting of insufficient skills needs by the old age group	Austria, Germany, Estonia, Lithuania, Slovakia, Czech Republic

In our view, the most important demonstration we made in this chapter is that of the need for a combined utilization of the existing standardized measures for skills. Thus, apart from the states of low-skillness provided through the straight-forward utilization of these measures, their combination allowed us to relate the various demographic dimensions of low-skillness to the structural processes conducive to low-skillness. In particular we identify classes of vulnerable workers, like detached/discouraged workers, disadvantaged categories (females, immigrants), and old workers. While these categories of low-skillness are certainly not new to the literature, our contribution consists of the emphasis we put on the different profile of low-skillness across the EU countries which are produced when contrasting the two measures of skills, i.e. ISCED and ISCO, as well as using them inter-relatedly with other dimensions like age, gender or nationality. This approach allows us to highlight, among other things, the differences among the educational systems among the EU countries as well as the different values attributed to the educational attainment across the EU labour markets.

In addition to the combined utilization of the occupational and educational classes as measures for skills, our extension of these measures compared to the previous literature in which we capture also the middle occupations and secondary education (ISCO 4-8 and ISCED 3-4, respectively) contributed to explain channels of becoming low-skilled: the stigmatization, displacement or the obsolescence of skills, which are all rooted in the dynamics of the economies and the educational systems. For example, we found that in most countries, the elementary occupations (ISCO 9) appear to shrink more than the middle skilled occupations (ISCO 4-8), suggesting the displacement phenomenon by which of the workers in the elementary occupations are driven out of the labour market by those previously occupying the upper-skilled jobs.

Finally, although we acknowledge that most of the dimensions to which we draw attention deserve a more comprehensive discussion and a more complex methodological approach, we do believe that we made an important contribution at least in signalling directions of empirical research which can provide grounds for a better understanding of the low-skilled segment. Therefore, we consider that our descriptive, mostly static, analysis constitutes a valid starting point and motivation for a more rigorous quantitative inquiry not only in each of the dimensions and processes of low-skillness we identified here, but also in constructing country profiles to serve for customized policy recommendations.

VII. CONCLUSIONS AND FINDINGS

Motivated by the lack of a thorough conceptualization and definition of the low-skilled, both in the academic literature and in the EU policy documents, this report evaluated the theoretical, conceptual and empirical literature studying the low-skilled and the sources of low-skillness with the purpose of developing an approach combining the characteristic and the dynamics of low-skilled workers and low-skilled jobs. This enabled us to conceptualize low-skillness as a process rather than just regarding it as a status characterizing the workers alone. We reviewed structural macro-level processes in order to point out the changing demand for skills, examining the implications of these processes on the low-skilled labour market segment in particular. We argued and showed that the processes of technological change, growing service sector or educational expansion are not neutral in terms of how they affect different age categories and, through uneven sectoral impact, tend to be also gender-biased. All this is fundamentally affecting who is likely to occupy a low-skilled job and who is *de facto* low-skilled as well as who is pushed out of the labour market into marginalization and inactivity. Importantly, individuals with secondary or even tertiary formal educational attainment may well be performing low-skilled jobs due to their immigrant status or other instances of over-educational mismatch. Our added-value lies in pointing out deficiencies in research and potentially also policy-making on low-skillness, suggesting broader conceptualization and measurement and empirically prompting our approach to demonstrate cross-country and within country variation in who the low-skilled are. We find our approach fairly innovative in that we connect who the low-skilled are, i.e. being low-skilled, with the sources of low-skillness, i.e. becoming low-skilled, and thus point out the heterogeneity of the low-skilled workers.

A key contribution of this report is a proposition of a broader and more encompassing conceptualization of 'low-skillness', which can better reveal the variety of causes of low-skillness across Europe and within the EU countries, and in turn allow designing better suited policies for the integration of the low-skilled into the labour market and society. Based on the analysis of EU-level employment-related policy documents and national implementation frameworks we indeed discovered that the EU policy making, similarly to academic works, is based on a fuzzy concept and

measurement of low-skillness. Importantly, we did not find strong evidence for explicit linking of the structural processes to low-skillness. In our view, this resulted into the fact that recommendations of EU/EC followed generalizable paths and were often designed to fit all of the Member States.

By addressing jobs and workers inter-relatedly and approaching low-skillness both as status and a process, we suggested a typology of low-skillness. In addition to the typically included ‘low-educated’, our typology includes categories of workers who might be formally well-educated, experienced and trained but have been drawn into low-skillness as an outcome of structural forces or institutional barriers. Examples include people with obsolete skills, displaced workers or ‘temporarily low-skilled’ migrant workers. Relatedly, we identify dimensions along which one can study the low-skilled empirically. We have argued that educational attainment alone is not anymore a sufficient conceptualization and measure of the low-skilled and it is too sterile to capture heterogeneity of the root causes underpinning the ‘being’ (*de facto*) and of ‘becoming’ low-skilled. While we continued to rely on the available classifications and measures, such as ISCO and ISCED, we applied them in a conceptually broader and richer manner. This in practice involved three aspects: first, a greater focus on ISCO measure, i.e. the actual job placement; second, an inclusion of higher ISCO and ISCED categories than typically used in other empirical analyses; and, third, the consideration of those who are temporarily or more lastingly outside of the labour market.

We dedicate an extensive section to an empirical analysis using these measures with the aim to highlight quantitative differences across the EU countries, to understand how the low-skilled differ within them and to elaborate on our proposition that labour market is a dynamic field where structural processes and individual characteristics interact in various ways. Perhaps our most interesting empirical findings based on broader conceptualization and measurement are the following:

- Considering the ISCED and ISCO measures in juxtaposition we find that the formal qualification levels are valued differently in different labour markets. This conclusion arises from the fact that while the low (ISCED 0-2) and medium (ISCED 3-4) qualifications are substitutes in employment across the EU countries, the low (ISCO 9) and middle-skilled occupations (ISCO 4-8) do not preserve this property across the EU countries. Therefore, this implies that

people with the same educational level are employed in occupations of different skills requirements across the EU labour markets.

- While according to the educational measure, low-skillness appears to be male biased in all countries, along the occupational dimension, low-skillness appears to be biased towards women. This shows a complex and interrelated nature of education, gender and labour market outcomes.
- Competition for jobs takes place within the age cohorts across different levels of formal education, and not between age cohorts. The educational level at which the competition takes place in the youth cohort and the older workers cohort differs. Among the young workers, competition for jobs takes place between medium educated and low-educated while among the older workers medium skilled compete with the highly educated workers in the same age groups. Contrary to the literature and general policy discourse we found that it is more the young workers who tend to suffer in the labour market. Specifically, the young are always at more risk of unemployment than the old, regardless of the qualification level.
- We find confirmation of the theoretical expectation presented in the existing literature that the service sector is favouring women over men. With the continued expansion of the service sector this implies that women might be drawn into employment more extensively.
- In most countries, the elementary occupations (ISCO 9) appear to shrink more than the middle skilled occupations (ISCO 4-8), but this is linked to the overall shrinkage in the labour demand of the country. This is in contrast to the literature which argues for the presence of skill polarisation and decline in middle-level occupations. We interpret our finding to suggest that a displacement of the employed in the elementary occupations into unemployment by workers from the upper-skilled occupations is taking place.
- With respect to skill obsolescence we analyze unemployment and inactivity rates of the cohort of 35-39 years of age in 1995 (50-54 years old in 2010) to provide a dynamic view. We find that the given age cohort not only becomes less employable as it advances in age, but a large share of its members drops out of the labour market into inactivity by the end of their working life. This is the case for all EU countries especially after 2010. However, as expected, the sharpest

changes are found in the CEE countries (Romania, Poland, Slovenia, Bulgaria, Slovakia) which experienced a rampant structural change and reformed their economic systems from socialist to market economies.

- On the subjective level, however, skill obsolescence (measured as the need for further training in order to be able to perform job tasks) is reported more by the young people than by the older workers. Equal shares in all the generation perceive to have skills enabling them to perform more demanding tasks. This should not be seen as contradiction to an earlier finding as older workers might be out of the labour market (and therefore not captured in the survey) while with respect to the youth it signals lack of experience or practical skills rather than skill obsolescence as such.

- The detachment from the labour market (defined as over 4 years-long unemployment spell) resembles the structure of the overall working population in a given country. This implies that the labour market segment we find to be the most affected by detachment is not independent from the general education structure which justifies our proposition to go beyond ISCED 0-2 measure in empirical investigations of low-skillness.

All in all, our empirical work brings a rich set of findings which highlight heterogeneity across and within countries, but also ground our proposals for methodological and conceptual extensions. The most important demonstration we made is that of the need for a combined utilization of the existing standardized measures for skills. Their combined usage, moreover, allowed us to relate the various demographic dimensions of low-skillness to the structural processes conducive to low-skillness. In particular we identify classes of vulnerable workers, like detached/discouraged workers, disadvantaged categories (females, immigrants), and old workers. While these categories of low-skillness are certainly not new to the literature, our contribution consists of the emphasis we put on the different profile of low-skillness across the EU countries which are produced when contrasting the two measures of skills, i.e. ISCED and ISCO, as well as using them inter-relatedly with other dimensions like age, gender or nationality. This approach allows us to highlight, among other things, the differences among the educational systems among the EU countries as well as the different values attributed to the educational attainment across the EU labour markets.

In sum, we see labour market as a dynamic and idiosyncratic mechanism where labour market outcomes are determined by interplay of structural (macro) and individual (micro) level factors. Position of a worker on the labour market or *de facto* skills are a function of absolute level of skill and relative sorting impacted by external conditions and structural processes and changes that are different due to a different position and contribution of the EU countries in the world production systems.

While we have drawn on the existing theoretical and empirical literature, we believe that our contribution lies in putting together different approaches and perspectives in a comprehensive and, foremost, analytically a more useful way. Moreover, our conceptualization has key implications for policy that go far beyond the formal educational system most commonly encountered in the EU policy documents. It brings about both the transient and the very durable nature of low-skillness that varies across different categories (temporarily low-skilled vs. discouraged or stigmatized workers) and highlights the differentiated nature of the remedies that are needed for economic, social and political integration of these groups. Our empirical analysis has also demonstrated very different structures of low-skillness that need to be reflected in the design of the EU-wide policies. Future research could aim at building profiles of the low-skilled labour market segments across the EU countries as well as within categories of low-skillness in view of different conceptualizations and definitions proposed in this study and with the purpose of guiding individually tailored remedies, both across countries and categories of low-skillness.

ANNEX 1: List of reviewed document for EU document analysis of low-skillness

Joint Employment Reports

Draft Joint Employment Report in 1999,

<http://register.consilium.europa.eu/pdf/en/99/st13/st13607.en99.pdf>

Draft Joint Employment Report in 2001

<http://register.consilium.europa.eu/pdf/en/01/st13/st13421.en01.pdf>

Joint Employment Report 2002,

<http://register.consilium.europa.eu/pdf/en/03/st07/st07228.en03.pdf>

Joint Employment Report covering 2003-2004,

<http://register.consilium.europa.eu/pdf/en/04/st07/st07069.en04.pdf>

Joint Employment Report 2004-2005,

<http://register.consilium.europa.eu/pdf/en/05/st07/st07010.en05.pdf>

Joint Employment Report 2005-2006,

<http://register.consilium.europa.eu/pdf/en/06/st07/st07347.en06.pdf>

Joint Employment Report 2006-2007,

<http://register.consilium.europa.eu/pdf/en/07/st06/st06706.en07.pdf>

Joint Employment Report 2007-2008,

<http://register.consilium.europa.eu/pdf/en/08/st07/st07169.en08.pdf>

Joint Employment Report 2008-2009,

<http://register.consilium.europa.eu/pdf/en/09/st07/st07435.en09.pdf>

Draft Joint Employment Report 2009-2010,

<http://register.consilium.europa.eu/pdf/en/10/st06/st06575.en10.pdf>

Joint Employment Report in 2011,

<http://register.consilium.europa.eu/pdf/en/11/st07/st07396.en11.pdf>

Key Messages Paper

Key Messages Paper from the EPSCO Council to the Spring European Council,

<http://ec.europa.eu/social/keyDocuments.jsp?type=0&policyArea=81&subCategory=115&country=0&year=0&advSearchKey=emcoopinioncontributionskmp&mode=advancedSubmit&langId=en>

EMCO Opinions and Contributions

Opinion of the Employment Committee on the Commission recommendations 2002,

<http://ec.europa.eu/social/BlobServlet?docId=2327&langId=en>

Opinion of the Employment Committee on High level task force on skills and mobility Report and the Communication on lifelong learning (2002),

<http://ec.europa.eu/social/BlobServlet?docId=2526&langId=en>

Joint Opinion of the Employment Committee and the Social Protection Committee on the Integrated Guidelines for Growth and Jobs,
(<http://ec.europa.eu/social/BlobServlet?docId=2591&langId=en>)

EMCO opinion on Enhancing higher productivity and more and better jobs including for people at the margins of the labour market (2006),
<http://ec.europa.eu/social/BlobServlet?docId=2704&langId=en>

EMCO Opinion on the European Employment Strategy within the post - 2010 Lisbon Agenda (2009), <http://ec.europa.eu/social/BlobServlet?docId=4499&langId=en>

EMCO contribution to the informal Employment Summit (2009),
<http://ec.europa.eu/social/BlobServlet?docId=2991&langId=en>

Policy Conclusions of the “Light” Country Examination - EMCO Opinion (2010),
<http://ec.europa.eu/social/BlobServlet?docId=6537&langId=en>

EMCO’s Making transitions pay Opinion (2010),
<http://ec.europa.eu/social/BlobServlet?docId=6540&langId=en>

EMCO’s Contribution to the EPSCO Council of 7-8 June 2010 on the "EU 2020" Strategy (2010), <http://ec.europa.eu/social/BlobServlet?docId=5676&langId=en>

EMCO Contribution to the ES Presidency Conference on New Skills for New Jobs - Barcelona 8-9 April 2010,
<http://ec.europa.eu/social/BlobServlet?docId=4616&langId=en>

Joint EMCO-COM Paper - The employment crisis: policy responses, their effectiveness and the way ahead,
<http://ec.europa.eu/social/BlobServlet?docId=5697&langId=en>

EMCO Thematic Reports

Progress report from the Employment Committee Indicators Group on the Indicators for monitoring the Employment Guidelines 2002,
<http://ec.europa.eu/social/BlobServlet?docId=2527&langId=en>

Report to the Employment Committee

Group of Experts on Making Work Pay (2003),
<http://ec.europa.eu/social/BlobServlet?docId=2530&langId=en>

Enhancing higher productivity and more and better jobs including for people at the margins of the labour market,
<http://ec.europa.eu/social/BlobServlet?docId=2705&langId=en>

EMCO Ad Hoc Group Report on the 2009 thematic review: Inclusive Labour Markets, <http://ec.europa.eu/social/BlobServlet?docId=4184&langId=en>

EMCO Ad Hoc Group Report on the 2009 thematic review: Skills upgrading and Skills matching, <http://ec.europa.eu/social/BlobServlet?docId=3736&langId=en>

The Employment Dimension of tackling Climate Change - EMCO report (2009),
<http://ec.europa.eu/social/BlobServlet?docId=4195&langId=en>

Policies to support youth - Thematic Review (2010),
<http://ec.europa.eu/social/BlobServlet?docId=6468&langId=en>

Quality in Work – Thematic Review 2010,
<http://ec.europa.eu/social/BlobServlet?docId=6441&langId=en>

Foundations and structures for a Joint Assessment Framework (JAF), including an Employment Performance Monitor (EPM), to monitor the Employment Guidelines under Europe 2020, <http://ec.europa.eu/social/BlobServlet?docId=6440&langId=en>

Annual Work Programmes

EMCO Indicators Group Work Programme 2010,
ec.europa.eu/social/BlobServlet?docId=4619&langId=en

Skill-focused documents

Action Plan on Adult learning EC 2007
http://ec.europa.eu/education/policies/adult/com558_en.pdf

Peer Learning Activity on Adult Literacy EC 2008
http://www.kslll.net/Documents/PLA_Adult%20literacy_Jan.%202008_%20Final%20report.pdf

Transversal Analysis on the Evolution of Skills Needs in 19 Economic Sectors
<http://ec.europa.eu/social/main.jsp?langId=en&catId=89&newsId=731&furtherNews=yes>

New Skills to New Jobs EC 2008
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0868:FIN:EN:PDF>

New Skill for New Jobs Staff Working Paper EC 2008
http://ec.europa.eu/education/lifelong-learning-policy/doc/sec3058_en.pdf

Taking Stock of Five Years of the EES: Mid-term Review EC 2002
http://europa.eu/legislation_summaries/employment_and_social_policy/community_employment_policies/c11315_en.htm

Strietska-Ilina, O. “Skills Shortages – Contribution to the Agora Conference Building a European VET Area,” CEDEFOP 2007
http://www.cedefop.europa.eu/etv/Upload/Projects_Networks/Skillsnet/Publications/Striestka-skills_shortages.pdf

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1. Spain

National Action Plan for Employment - Spain - 1998,
<http://ec.europa.eu/social/BlobServlet?docId=5786&langId=en>

National Action Plan for Employment - Spain - 1999,
<http://ec.europa.eu/social/BlobServlet?docId=5809&langId=en>

National Action Plan for Employment - Spain – 2000,
<http://ec.europa.eu/social/BlobServlet?docId=5822&langId=en>

National action plan for Employment - Spain - 2001,
<http://ec.europa.eu/social/BlobServlet?docId=5836&langId=en>

National Action Plan for Employment - Spain - 2002,
<http://ec.europa.eu/social/BlobServlet?docId=6015&langId=en>

National strategy reports (2002): adequate and sustainable pension systems,
<http://ec.europa.eu/social/BlobServlet?docId=5464&langId=en>

National Action Plan for Employment - Spain - 2003,
<http://ec.europa.eu/social/BlobServlet?docId=6035&langId=en>

National Action Plan for Employment - Spain - 2004,
<http://ec.europa.eu/social/BlobServlet?docId=3259&langId=en>

National Reform Programme Spain 2005-2008,
<http://ec.europa.eu/social/BlobServlet?docId=6280&langId=en>

Feeding In And Feeding Out And National Policies On Immigrants And Ethnic Minorities - Second Semester Report 2006 - National Reports Spain (2006),
<http://ec.europa.eu/social/BlobServlet?docId=5195&langId=en>

National Reform Programme Spain 2008-2010,
<http://ec.europa.eu/social/BlobServlet?docId=6283&langId=en>

National Strategy Report on Social Protection and Social Inclusion 2008-2010 - Spain, <http://ec.europa.eu/social/BlobServlet?docId=2566&langId=en>

2. Portugal

National Action Plan for Employment - Portugal – 1998,
<http://ec.europa.eu/social/BlobServlet?docId=5794&langId=en>

National Action Plan for Employment - Portugal - 2000,
<http://ec.europa.eu/social/BlobServlet?docId=5829&langId=en>

National Action Plan for Employment - Portugal – 2001,
<http://ec.europa.eu/social/BlobServlet?docId=5843&langId=en>

National Action Plan for Employment - Portugal – 2002,
<http://ec.europa.eu/social/BlobServlet?docId=6025&langId=en>

National Action Plan for Employment - Portugal - 2003,
<http://ec.europa.eu/social/BlobServlet?docId=6042&langId=en>

National Action Plan for Employment - Portugal - 2004,
<http://ec.europa.eu/social/BlobServlet?docId=6066&langId=en>

National reform programme 2005-2008 Portugal,
<http://ec.europa.eu/social/BlobServlet?docId=6176&langId=en>

National reform programme 2008-2010 Portugal,
<http://ec.europa.eu/social/BlobServlet?docId=6179&langId=en>

National Strategy Report on Social Protection and Social Inclusion 2008-2010 - Portugal (2008), <http://ec.europa.eu/social/BlobServlet?docId=2562&langId=en>

3. Slovakia

National Action Plan for Employment - Slovakia – 2004,
(<http://ec.europa.eu/social/BlobServlet?docId=6067&langId=en>)

National Reform Programme Slovakia 2005-2008,
(<http://ec.europa.eu/social/BlobServlet?docId=6266&langId=en>)

Trends, Recent Developments, Active Inclusion and Minimum Resources - Semester Report 2006 - National Reports Slovakia,
<http://ec.europa.eu/social/BlobServlet?docId=5219&langId=en>

National Reform Programme - implementation report Slovakia 2006,
<http://ec.europa.eu/social/BlobServlet?docId=6267&langId=en>

National Reform Programme Slovakia 2008-2010,
<http://ec.europa.eu/social/BlobServlet?docId=6269&langId=en>

4. Czech republic

Monitoring and evaluation of the National Action Plans on Social Inclusion (2004) - Czech Republic, <http://ec.europa.eu/social/BlobServlet?docId=5245&langId=en>

National Action Plan for Employment - Czech Republic - 2004-2006,
<http://ec.europa.eu/social/BlobServlet?docId=3239&langId=en>

National reform programme 2005-2008 Czech Republic,
<http://ec.europa.eu/social/BlobServlet?docId=6089&langId=en>

Trends, Recent Developments, Active Inclusion And Minimum Resources - Semester Report 2006 - National Reports Czech Republic (2006),
<http://ec.europa.eu/social/BlobServlet?docId=5202&langId=en>

National reform programme - Implementation report 2006 Czech Republic,
<http://ec.europa.eu/social/BlobServlet?docId=6090&langId=en>

Feeding In And Feeding Out: The Extent Of Synergies Between Growth And Jobs Policies And Social Inclusion Policies Across The EU - Second Semester Report 2007 - National Reports Czech Republic,
<http://ec.europa.eu/social/BlobServlet?docId=5122&langId=en>

National reform programme 2008-2010 Czech Republic,
<http://ec.europa.eu/social/BlobServlet?docId=6095&langId=en>

5. Austria

National Action Plan for Employment - Austria - 1998,
<http://ec.europa.eu/social/BlobServlet?docId=5771&langId=en>

National Action Plan for Employment - Austria - 1999,
<http://ec.europa.eu/social/BlobServlet?docId=5797&langId=en>

National Action Plan for Employment - Austria – 2000,
<http://ec.europa.eu/social/BlobServlet?docId=5816&langId=en>

National Action Plan for Employment - Austria – 2001 ,
<http://ec.europa.eu/social/BlobServlet?docId=5831&langId=en>

National Action Plan for Employment - Austria – 2002,
<http://ec.europa.eu/social/BlobServlet?docId=6013&langId=en>

National Action Plan for Employment - Austria - 2003,
<http://ec.europa.eu/social/BlobServlet?docId=6030&langId=en>

National Action Plan for Employment - Austria - 2004,
<http://ec.europa.eu/social/BlobServlet?docId=6055&langId=en>

Austrian reform programme for Growth and Employment 2005,
<http://ec.europa.eu/social/BlobServlet?docId=6072&langId=en>

Trends, Recent Developments, Active Inclusion and Minimum Resources - Semester Report 2006 - National Reports Austria (2006),
<http://ec.europa.eu/social/BlobServlet?docId=5199&langId=en>

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<http://ec.europa.eu/social/BlobServlet?docId=5118&langId=en>

NRP and action plan 2008-2010 – Austria,
<http://ec.europa.eu/social/BlobServlet?docId=6075&langId=en>

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<http://ec.europa.eu/social/BlobServlet?docId=5793&langId=en>

National Action Plan for Employment - Netherlands – 1999,
<http://ec.europa.eu/social/BlobServlet?docId=5812&langId=en>

National Action Plan for Employment - Netherlands - 2000,
<http://ec.europa.eu/social/BlobServlet?docId=5828&langId=en>

National Action Plan for Employment - Netherlands - 2001,
<http://ec.europa.eu/social/BlobServlet?docId=5842&langId=en>

National Action Plan for Employment - Netherlands – 2002,
<http://ec.europa.eu/social/BlobServlet?docId=6024&langId=en>

National Action Plan for Employment - Netherlands - 2003,
<http://ec.europa.eu/social/BlobServlet?docId=6041&langId=en>

National Action Plan for Employment - Netherlands - 2004,
<http://ec.europa.eu/social/BlobServlet?docId=6064&langId=en>

National Reform Programme Netherlands 2005-2008,
<http://ec.europa.eu/social/BlobServlet?docId=6252&langId=en>

National Reform Programme Netherlands 2008-2010,
<http://ec.europa.eu/social/BlobServlet?docId=6255&langId=en>

7. Ireland

National Action Plan for Employment - Ireland - 1998,
<http://ec.europa.eu/social/BlobServlet?docId=5790&langId=en>

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<http://ec.europa.eu/social/BlobServlet?docId=5808&langId=en>

National Action Plan for Employment - Ireland - 2000,
<http://ec.europa.eu/social/BlobServlet?docId=5825&langId=en>

National Action Plan for Employment - Ireland - 2001,
<http://ec.europa.eu/social/BlobServlet?docId=5839&langId=en>

National Action Plan for Employment - Ireland – 2002,
<http://ec.europa.eu/social/BlobServlet?docId=6022&langId=en>

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<http://ec.europa.eu/social/BlobServlet?docId=6038&langId=en>

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<http://ec.europa.eu/social/BlobServlet?docId=6058&langId=en>

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<http://ec.europa.eu/social/BlobServlet?docId=6203&langId=en>

National Reform Programme Ireland 2008-2010,
<http://ec.europa.eu/social/BlobServlet?docId=6206&langId=en>

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<http://ec.europa.eu/social/BlobServlet?docId=5791&langId=en>

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<http://ec.europa.eu/social/BlobServlet?docId=5826&langId=en>

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<http://ec.europa.eu/social/BlobServlet?docId=5840&langId=en>

National Action Plan for Employment - Italy - 2004,
<http://ec.europa.eu/social/BlobServlet?docId=6059&langId=en>

National Reform Programme Italy 2008-2010,
<http://ec.europa.eu/social/BlobServlet?docId=6210&langId=en>

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1. Spain – Commission Proposal Approved by the Council, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2011:212:0001:0004:EN:PDF>
2. Portugal – Commission Proposal Approved by the Council, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2011:216:0001:0002:EN:PDF>
3. Slovakia – Commission Proposal Approved by the Council, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2011:272:0001:0004:EN:PDF>
4. Czech republic – Commission Proposal Approved by the Council, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2011:212:0005:0008:EN:PDF>

5. Austria - Commission Proposal Approved by the Council, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2011:210:0008:0011:EN:PDF>
6. Netherlands - Commission Proposal Approved by the Council, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2011:212:0013:0015:EN:PDF>
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ABOUT NEUJOBS

“Creating and adapting jobs in Europe in the context of a socio-ecological transition”

NEUJOBS is a research project financed by the European Commission under the 7th Framework Programme. Its objective is to analyse likely future developments in the European labour market(s), in view of four major transitions that will impact employment - particularly certain sectors of the labour force and the economy - and European societies in general. What are these transitions? The first is the **socio-ecological transition**: a comprehensive change in the patterns of social organisation and culture, production and consumption that will drive humanity beyond the current industrial model towards a more sustainable future. The second is the **societal transition**, produced by a combination of population ageing, low fertility rates, changing family structures, urbanisation and growing female employment. The third transition concerns **new territorial dynamics** and the balance between agglomeration and dispersion forces. The fourth is a **skills (upgrading) transition** and its likely consequences for employment and (in)equality.

Research Areas

NEUJOBS consists of 23 work packages organised in six groups:

- **Group 1** provides a conceptualisation of the **socio-ecological transition** that constitutes the basis for the other work-packages.
- **Group 2** considers in detail the main drivers for change and the resulting relevant policies. Regarding the drivers we analyse the discourse on **job quality**, **educational** needs, changes in the organisation of production and in the employment structure. Regarding relevant policies, research in this group assesses the impact of changes in **family composition**, the effect of **labour relations** and the issue of financing transition in an era of budget constraints. The regional dimension is taken into account, also in relation to **migration** flows.
- **Group 3** models economic and employment development on the basis of the inputs provided in the previous work packages.
- **Group 4** examines possible employment trends in key sectors of the economy in the light of the transition processes: energy, health care and goods/services for the **ageing** population, **care services**, housing and transport.
- **Group 5** focuses on impact groups, namely those vital for employment growth in the EU: **women**, the **elderly**, immigrants and **Roma**.
- **Group 6** is composed of transversal work packages: implications NEUJOBS findings for EU policy-making, dissemination, management and coordination.

For more information, visit: www.neujobs.eu

Project coordinator: Miroslav Beblavý (Miroslav.Beblavy@ext.ceps.eu)