

Future Scenarios of the Qualifications and Skills in the European Union

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Executive summary

This paper presents scenarios of the future composition of ISCED qualifications and skills for the European Union for 2025 from the perspective of quantity (skills supply) and equality (of educational opportunities). The proposed scenarios serve a double purpose. First, they are a valuable input for decision-making because they raise awareness of possible future outcomes. Second, they effectively summarize the body of research conducted as a part of the NEUJOBS project in a memorable form of a narrative.

The scenarios were built using the “intuitive logics” approach, which consists of a sequence of steps: specification of focus, identification of drivers of change and establishment of the scenario set. This qualitative approach enables to combine objective information with subjective evaluation of uncertainty. The high complexity of the European qualifications and skills environment and the potentially disruptive uncertainties related to the ongoing financial and economic crisis make narrative scenarios an ideal technique for the scenario building.

The key drivers of departure from the “Business as Usual” scenario (extrapolation of past trends) are based on the type of policy response to the ongoing financial and economic crisis (see Saul, 2010). “Me First” response to the sovereign debt crisis may lead to the growing divergence among European countries and fragmentations of educational systems. In response to growing fiscal pressures, countries opt for cost-effective solutions to the provision of education. Vocational education is preferred to higher education in provision of training in soft and generic skills for service sectors, such as social care (see CEDEFOP, 2011). States also move towards market-oriented schooling models (OECD, 2001a: 82). Alternatively, depressed economies may look for “best practices” present in the fastest growing countries and enter the pathway towards highly stratified educational systems, such as the German one. A combination of early tracking and private privatization of education reduce equality of educational opportunities. Training in vocational schools slows the expansion of the tertiary sector.

A coordinated response to the crisis assumes a policy response explicitly aimed to increase equality of educational opportunities and secure education for students regardless of their socio-economic background or abilities. These efforts are strengthened by the major vehicle of Europeanization of education, the Bologna Process. Although the implementation of Bologna process still varies significantly across countries (Lub et al., 2003; Alesi et al., 2005; Witte, 2006), the European educational systems will gradually converge towards the international model promoted by OECD, characterized by later tracking and elimination of educational dead-end pathways.

We propose three scenarios. “Business as Usual” scenario represents an extrapolation of the current trends. The tertiary sector gradually expands but islands of elite tertiary education survive in the massified tertiary system. There is a general up-skilling of the population but access to the higher education depends on the characteristics of an individual national system. The remaining two scenarios describe radical departures from the current trend. The pathway

towards these extreme cases is triggered by the policy response to the ongoing sovereign debt crisis.

In the "Fragmentation" scenario, countries respond to growing fiscal pressure by a search for cost-effective solutions to education. Publicly funded provision of soft and generic skills is delegated from tertiary institutions to vocational institutions. States give blessing to the ongoing privatization of the public schooling. Alternatively, governments look for the best practices in the fastest growing countries. Early tracking is re-introduced in line with the German model. As a result, the expansion of the tertiary sector is hampered or is socially differentiated. However, policies in support of the vocational education help to counteract the job polarization. At the same time, investment in adult training will be left to private organizations, which tend to underinvest in education of the most vulnerable part of the workforce, the low-skilled, the older and the immigrant workers.

In contrast, the "Inclusive convergence" scenario assumes a society-wide consensus that no child should be left behind. An initiative similar to the Bologna process will harmonize national upper secondary systems, which will converge towards Anglo-Saxon or Swedish comprehensive model of schooling. The generalization of the upper secondary education will enlarge the pool of students eligible for tertiary studies and this way contribute to the fast expansion of the tertiary sector. With a general up-skilling of the workforce, there is a great risk of marginalization and social exclusion of the low-skilled.

The proposed scenarios illustrate that there is no ultimate hierarchy of futures, which ranges from the worst to the best possible outcome. The process of educational expansion is not a linear process, which necessarily leads to better outcomes. Each policy intervention is associated with social consequences and each possible future is associated with a different set of new challenges and problems, which need to be addressed.

We provide the following policy recommendations to European policy-makers:

- Do not be complacent with regard to polarization.
- However and by the same token, do NOT give in to skill polarization.
- Effective policy-making requires sophisticated understanding of nuances of the "education – labour market" link in a rapidly changing environment.
- Do not confuse "greening" of the economy with "inclusive convergence".
- For tertiary education, focus on what people study and the quality rather than overall participation.
- If you want the same results, do not always follow the same policies in every country

1. INTRODUCTION

European economies and labor markets face important challenges posed by the ongoing economic and financial crisis, demographic changes and the climate change. As a result, policy makers operate in an environment of increasing uncertainty at both the macro- and micro-level. It is therefore more important than ever to provide future-oriented labour-market information (CEDEFOP, 2009: 4). This has been acknowledged by the European Commission, which launched the "New Skills for New Jobs" initiative in 2008. Among other goals, the initiative aims to promote better anticipation of future skills needs. Practical

measures include forecasts by the European Centre for the Development of Vocational Training (CEDEFOP).

CEDEFOP (2008, 2009, 2010) provides quantitative projections of European skills demand, skills supply and skills mismatches. The supply of skills is expected to shift towards higher-level qualifications. On the demand side, the demand is expected to shift towards skilled workers but the overall amount of new jobs will depend on the speed of recovery from the crisis. However, CEDEFOP (2008: 18) emphasizes that quantitative projections fail to take into account wider social implications and should be therefore complemented with qualitative projections, which take into account wider social implications.

This paper presents scenarios of the future composition of ISCED qualifications and skills for the European Union for 2025 from the perspective of quantity and equality. By quantity we mean the skills supply. By equality we mean equality of opportunities, which levels the playing field so that all have a chance to achieve the same outcomes (Roemer, 1998). With regard to education, equality of opportunity refers to a decoupling of educational performance of students and factors that are beyond the student's control, such as socio-economic status.

We rely on the “intuitive logics“ approach to scenario planning, which has been increasingly recommended as a tool useful in dealing with uncertainty (Varum and Melo, 2010: 356). Given this uncertainty, no scenario can provide an accurate description of the future. Certain factors and events are always deliberately taken to be relevant or are ignored to reduce the complexity (Kosow and Gassner, 2008: 11). Rather than claiming an ability to predict future, scenario planners attempt to raise awareness of policy makers of several plausible futures and this way improve their decisions about the future (Chermack and Merwe, 2003: 447).

The scenarios in this paper grow from the body of research produced within NEUJOBS, which examined various aspects of education systems and training. Specifically, the research focused on the issue of equality in education, mass higher education, lifelong learning, job polarization and low-skillness. We propose three scenarios for the future composition of qualifications and skills. The “Business as Usual” scenario is based on the extrapolation of the current trends and assumes a modest convergence towards the international educational model promoted by OECD (2004; 2007; 2010; see also various country reports). Policy response to the financial crisis sets Europe on two different pathways. In the “Inclusive Convergence” scenario, countries massively intervene in their educational systems to increase the equality of educational opportunities and secure education for everyone. In the “Fragmentation” scenario, countries give in to fiscal pressures and search for cost-effective solutions to provision of public education. There is a growing divergence between countries in both the quantity and equality of education.

The rest of the paper is organized as follows. Section two reviews existing future scenarios of education. The review is selective in that it focuses on international scenarios produced during the past decade. Section three discusses the research methodology. Section four provides a systemic review of the literature that addresses issues of quantity and equality of education. The survey of the research outputs of the NEUJOBS project is complemented by the review of relevant literature. Section five describes three scenarios of future European qualifications and skills from the perspective of quantity and quality. Section six concludes.

2. OVERVIEW OF EXISTING SCENARIOS OF HIGHER EDUCATION AND SKILLS FORMATION

The definition of “scenario planning” is contested (Godet and Roubelat, 1996; Varum and Melo, 2010). Nevertheless, most of the definitions emphasize the usefulness of scenarios in dealing with uncertainty and unknowables. Given the uncertainty, no scenario can provide an accurate description of the future. Scenarios are “an internally consistent view of what the future might turn out to be – not a forecast, but one possible future outcome (Porter, 1985: 63).” In other words, scenarios should not be viewed as a comprehensive image of the future (Kosow and Gassner, 2008: 11). Rather, they are “hypothetical sequences of events constructed for the purpose of focusing attention on causal processes and decision points (Kahn and Wiener, 1967: 6).” Working with several plausible scenarios enables to deal with unforeseen events and better plan the future (McIntyre, 2003: 1) and overcome the common errors in decision making: overconfidence and tunnel vision (Schoemaker, 1995).

To resolve the confusion over the definitions and methods of scenarios, Bradfield et al. (2005) adopt a historical approach.¹ Based on an analysis of the origins of scenarios and the subsequent evolution of methodologies, they identify three main schools of techniques. The first school grew from experimentation with scenario planning in Stanford Research Institute “Futures Group” (SRI) and the Global Business Network. The “intuitive logics model” was widely utilized by the Royal Dutch/Shell Group (see Wack, 1985) and has become the “gold standard of corporate scenario generation (Millet, 2003).” This approach enables to use every available piece of information about the future to identify underlying patterns. At the same time, the resulting scenarios depend on the network of experts who work on the scenarios (Meitzner and Reger, 2005: 227). In contrast to the “intuitive logics” approach, the “probabilistic modified trend” relies on quantitative methods (Bradfield et al., 2005). It combines trend extrapolations with probabilities and this way allows for a “surprise” change in the trend. The main advantage is that it enables variation on each individual factor. However, it may be used only when there is a long and reliable time series of data available (Meitzner and Reger, 2005: 227). Finally, the “French” school attempted to develop “normative scenarios”, which could guide policy makers and managers (Bradfield et al., 2005: 502). To this end, it relies on highly formalized techniques and computer-based tools (Godet et al., 2003).

The majority of the scenarios for future education rely on intuitive logics models (Inayatullah and Gidley, 2000; OECD, 2001a; 2006; JISC infoNet, 2007; JISC Netskills, 2009; Saul, 2010; Sellin, 2002). Some of them combine intuitive logics approach with background studies that rely on quantitative methods. In contrast, the dominant approach to the forecasting of future skills in Europe is based on econometric approaches and quantitative projections (CEDEFOP, 2008; 2009; 2010). The reviewed studies document the richness of perspectives, from which it is possible to examine the future of education.

2.1 Quantitative projections

The most comprehensive pan-European forecast of skills needs and skill supply has been conducted by CEDEFOP since 2008 (2008; 2009; 2010). The basic methodology is

¹ For an alternative classification of scenarios, see van Notten et al. 2003 or Martelli 2001. It is beyond the scope of this paper to provide a comprehensive review of literature on the scenario planning (see Bradfield et al. 2005, Kosow and Gassner 2008, Varum and Melo 2010). In what follows, we therefore sketch the basic approaches and focus more on the “intuitive logic” technique used in this paper.

econometric modeling using time series data. The main advantage of the adopted modular approach is that it enables to plug in alternative assumptions and parameters (see Box 1). As a result, the model allows exploring alternative scenarios, which, for example, focus on a specific sector or country or represent the impact of a concrete policy measure. These quantitative projections, however, should not be viewed as precise predictions of future reality (CEDEFOP, 2010: 21). Rather, they should be seen as an early warning system that indicates potential future problems (ibid).

Box 1: Review of the Modular to Skills Forecasting Used by CEDEFOP

The demand side involves modules:

- Module 1: a set of multisectoral macroeconomic forecasts of employment, based on the E3ME macroeconomic model (Gardiner et al., 2007);
- Module 2: an occupational model, focused on explaining expansion demand within sectors adopting common classifications and data sources – LFS (EDMOD);
- Module 3: a qualifications module (QMOD), based on similar data sources, focusing initially on the implications for qualification intensities within occupations (demand) and without interaction with the supply side;
- Module 4: a replacement demand module, based on similar data sources, recognising the crucial importance of considering not just changing occupational employment levels but also the need to replace those leaving the workforce because of retirement, migration and occupational mobility (RDMOD).

The supply side involves three main modules:

- (a) **Module 1* – E3ME***: an augmented/extended version of the existing E3ME pan-European macroeconomic model (see Section 2.1), which incorporates a new demographic and labour-supply module. This provides historical analysis and projections of overall labour supply by age and gender;
- (b) **Module 5 – StockMOD**: an analysis of LFS microdata from Eurostat to project the probabilities of the population and the labour force to achieve different levels of qualification;
- (c) in future, these will be complemented by **Module 6 – FlowMOD**: an analysis of aggregate flow data published by Eurostat/OECD (on enrolment and graduation) to produce a complementary analysis of participation and qualification rates by broad age groups (17).

To provide information on possible labour market imbalances and skill mismatches a further module has been added:

Module 7 – BALMOD: a module which confronts skill demand and skill supply projections, focusing on qualifications, and reconciling the two.

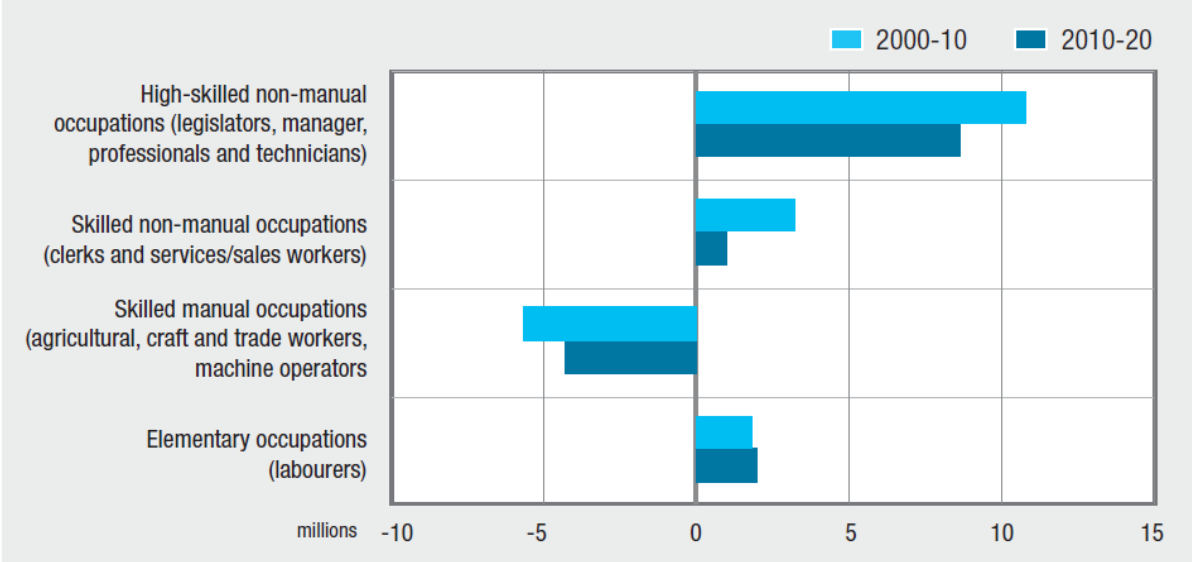
Source: CEDEFOP (2010: 25-30).

The macroeconomic model sets the macroeconomic context for the overall skills projections. The E3ME model provides estimates of employment growth, considering factors such as output growth, as well as underlying changes in the components of aggregate demand, demographic changes, etc. Scenarios are developed for demand for and supply of skills, as well as adjustment mechanism that reconcile imbalances and mismatches.

The macro (baseline) scenario assumes a modest recovery from the financial and economic crisis that struck in 2008. On the demand side, the demand is expected to shift towards skilled workers (see Figure 1). More than 8.5 millions high-skilled non-manual occupations are expected to be created between 2010 and 2020 (CEDEFOP, 2010: 68). These include jobs, such as management, professional and associate professional jobs. The overall share of people

employed in the knowledge- and skills-intensive occupations is expected to increase by 2 percentage points to 42% of total employment in 2020 (ibid: 69). CEDEFOP (2010: 69-70) also points out that job polarization will be accompanied by a general upskilling, i.e. higher demand for high and medium qualifications.

Figure 1: Net employment change by broad occupational groups, 2010-20, EU-27+



Source: CEDEFOP (2010: 68)

On the supply side, there is a strong tendency for an increase in the proportions of those with higher-level qualifications and a reduction in the proportions of those with low-level qualifications. Over the period 2007-20, CEDEFOP (2009: 95) predicts an increase in the numbers in the population aged 15+ with high-level qualifications by 32 millions, or equivalently, by 42%. The numbers with low-level or no qualifications are expected to fall by about 19%, or by 29% if looking solely at the economically active labor force.

Two additional alternative scenarios are explored around the baseline scenario. The key drivers of change that set Europe on the pathway toward one of the three scenarios include access to credit, consumer confidence, global impact, uncertainty over commodity prices, government responses and wealth effect on labor supply (CEDEFOP, 2010: 36). On the demand side, the alternative scenarios explored suggest that the overall employment change might range between a low of an increase of 7.5 million and a high of 17.5 million (CEDEFOP, 2008: 87). On the supply side, the overall improvements in terms of average qualification levels are likely to be a common feature, whichever scenario evolves (CEDEFOP, 2009: 96).

Pan-European forecasts require data comparability. National forecast are mostly not comparable because of different approaches, methods and data qualifications (CEDEFOP, 2008: 4). CEDEFOP (2008; 2009; 2010) therefore relied on a combination of Eurostat Labour Force Survey (LFS) data and other sources, including National Accounts data. LFS is conducted in a consistent fashion across the EU and provides comparable data that can be used for projections of the skills supply. Skills are measured using formal qualifications, distinguishing three broad levels: low, medium and high. For example, ISCED 0-6 is used for classifying the qualification levels attained. Despite methodological improvements (see, for example Stehrer and Ward, 2010; 2013), CEDEFOP (2010: 21) remains concerned about data

quality. The LFS data is not fully sufficient, especially on detailed trends in skill demand within sectors and occupations and some other aspects of skill (ibid). Analyzing skill needs in Europe is therefore constrained by lack of data and appropriate classifications (CEDEFOP, 2013b: 1). CEDEFOP addressed the issue in two ways. First, it tried to utilize the existing statistical sources at national, European and international levels, such as the European social survey and the O*NET – the US primary description of knowledge, skills and abilities in occupations (CEDEFOP, 2013b). This data was complemented by information drawn from German, Italian and Czech skills surveys. The resulting occupational skills profiles (OSPs) enable an analysis of occupational characteristics, such as level and field of education and training required or requirements in terms of knowledge, skills, abilities and attitudes. Second, CEDEFOP launched the multilingual classification of European Skills/Competences, Qualifications and Occupations (see European Commission, 2013). ESCO provides occupational profiles showing which competences and qualifications are relevant for an occupation. The standardized terminology of occupations, skills/competences and qualifications in 22 languages serves as a “common language between education/training and the world of work” (European Commission, 2013).

The quantitative projections based on past trends and behavior patterns focus solely on economic considerations without reference to wider social implications (CEDEFOP, 2008: 18). CEDEFOP therefore tries to promote a multifaceted approach, which combines both quantitative and qualitative approaches. The existing quantitative scenarios are therefore enriched with additional, albeit limited, qualitative input. Procedures have been developed to adjust the initial results in response to the suggestions of country experts from CEDEFOP’s Skillsnet network (CEDEFOP, 2010: 24). The debate on the possible multi-method approach was informed also by a recent overview of innovative approaches that combine qualitative and quantitative methods for skills anticipation in Europe was examined by Dzhengozova and Humpl (2013). The study examines how national approaches to skills monitoring and forecasting could support further development of the CEDEFOP model. For this purpose, six different methodological approaches used in five countries and one region were compared. The comparative analysis covers the following information tools:

- Austria: AMS-Skills Barometer
- Finland: Occupational Barometer (OB)
- Germany: Labour Market Monitor (LMM)
- Ireland: FÁS labour market anticipation system
- Slovak Republic: National Occupations Framework (NSP)
- Øresund Labour Market Balance (LMB)

All of the approaches rely on the viewpoints of experts in the estimation of skills shortages and employment prospects. “More balanced estimations” integrate multiple perspectives (those of employers, employees, educational providers, social partners, etc.), whereas “more focused estimations” give priority to one of a few perspectives only (ibid: 8). Collected data includes occupations according to sectors and regions and is usually updated the data twice to thrice a year. However, Dzhengozova and Humpl (2013: 21) stress that the development of a transnational and Europe-wide skills forecasting tool that combines qualitative and quantitative methods faces a major challenge of data comparability.

To overcome the problem of data comparability, CEDEFOP is developing a European employer survey on skill needs, which aims to complement, in the medium to longer term, the quantitative forecasts with other information (CEDEFOP, 2013a). The collected data aims to improve our understanding of changing skill requirements and developments in occupations at

the workplace by measuring skill needs from the employers' point of view. So far, a pilot survey was conducted, which focused on testing questions on the importance of generic skill requirements and specific working tasks, as well as relevant changes in defined occupations (CEDEFOP, 2013a). Furthermore, it collected also information on drivers of change, such as innovations and environmental awareness, and their impact on skill requirements at the workplace. This type of information might serve as an input for scenario building.

The deepening interest of CEDEFOP in multifaceted approach to anticipation stems from the belief that the combination of the quantitative and qualitative approaches can provide a comprehensive picture of future possibilities that is useful to a range of different users (CEDEFOP, 2008: 20-21). Qualitative approaches, such as qualitative inquiry or qualitative scenarios building - such as the one presented in this paper - offer insight into those aspects of the social reality which lie beyond numerical and statistical modelling. Qualitative approaches should therefore be viewed as complementary to quantitative approaches that dominate CEDEFOP's forecasts of future skills needs.

OECD developed a set of quantitative projections, which address specific features of the future higher education. OECD's (2008; 2009) volumes on Higher Education to 2030 analyze trends in tertiary education systems that relate to demographic changes and globalization and draw up several possible future scenarios for their evolution. OECD (2008) examines links between the changes in the population of students, demographic changes and higher education policy. They predict further expansion of higher education systems. Contractions will affect only a small number of countries. Half or almost half of all people in the youngest age cohorts will be graduates. The mix of students will be more varied, with a greater number of international students, older students and those studying part-time. The social base will continue to broaden. They point out that migration might worsen the inequality. Challenges will arise linked to the possible social exclusion of groups not involved in higher education.

Vincent-Lancrin (2008) evaluates the impact of demographic changes on the student population, student-teacher ratios and expenditure in higher education and on the level to which the populations are educated. The expansion of the higher education emphasized by CEDEFOP (2009) is thus mediated by demographic changes. Two projections of student enrolments in higher education are proposed.

The "status quo" scenario assumes that entry and survival rates remain as they were in 2004. In this scenario, the changes are essentially demographic and depend solely on the size of the younger age cohorts and on changes in entry rates between 1998 and 2004. According to this scenario, countries would on average have 3% more students in 2015, with their numbers then falling back, but just gradually, to the same level in 2020 as in 2005, and then to 2% beneath the 2005 level in 2025. However, individual OECD countries will experience diverse changes in tertiary enrolment rates. The Czech Republic, Hungary, Japan, Korea, Poland, the Slovak Republic and Spain would experience a contraction of over 15% in 2025 compared to 2005, if there were no growth in their student access rates. In contrast, Denmark, Iceland, Norway, Sweden and Switzerland would for their part experience an increase of over 15% by 2015, but only Denmark would still be in this position in 2025.

The trend scenario assumes that the rise in entry rates may offset decreases in student enrolments or accelerate their growth because the "massification" of higher education in many countries did not always occur at a time of demographic growth in the past. In comparison with the first scenario, student enrolment levels in countries would increase by 13% in 2015

and 2020 as opposed to 2005, and by 14% in 2025 – with the growth in enrolments slightly higher in 2025 when expressed in terms of weighted averages. This would lead to a stark difference between two scenarios for some of the countries. For example, whereas the Czech Republic would experience a 15% decrease in enrolments in 2025 in the status quo scenario, its tertiary education sector would continue to expand and grow by 20% in the years up to 2025.

Salmi (2009) explores the funding pressures resulting from the continuous expansion of the tertiary education. Based on the study of recent trends in the world of tertiary education, he proposes three alternative scenarios to consider the likely evolution of higher education financing in future years (see Table 1). His scenarios explicitly touch upon the issue of equality, which is at the main issue addressed by this paper. Supply-side scenario reflects the traditional financing model with the objective to support the public good functions of higher education, especially with regard to fundamental research, and to provide equal opportunities for access to tertiary education.

Table 1: Main characteristics of the financing scenario

	Scenarios		
Characteristics	Supply-side scenario	Transformation scenario	Demand-side scenario
Rationale	Provide equal opportunities for access to tertiary education Support the public good functions of higher education, especially with regard to fundamental research	Improve or correct the impact of earlier reforms in order to adjust to changing circumstances	Allow sufficient and efficiently used resources for improved quality and relevance of higher education
Features	Main part of higher education funding going directly from public sources to institutions Non-performance based resource allocation	Forward-looking vision to implement second-generation reforms to address quality and equity concerns Unintended consequences of earlier reforms	Growing share of public resources allocated indirectly through demand-side mechanisms
Advantages	Strong and diversified tertiary education participation in high-income countries with sufficient fiscal resources	Flexibility and adaptability	More choice for users Increased responsiveness of institutions Higher efficiency in resource use Greater motivation among students
Drawbacks	Negative outcome in terms of coverage, quality and equity, especially in less-developed countries Little incentive to improve system and institutional performance	Risk of inequity of access	Lack of attention to public goods programs (research and training)
Risk Factors	Growing gap between funding needs and funding capacity Inertia and resistance to change	Political opposition to change among groups whose interests are threatened Little incentive to improve cost-efficiency	Insufficient institutional differentiation to allow for competition
Corrective action	Increase in public investment to higher education Resource mobilisation through cost-sharing and other forms of income diversification	Likely to work better if additional public resources are available	Careful government oversight and sufficient public funding for public goods programs

Source: Salmi (2009: 315).

The transformation scenario describes tertiary education institutions that have gone through first generation reforms towards cost-sharing. Salmi (2009) points out to some negative

unanticipated consequences, such as a rising default on loan reimbursement because of high graduate unemployment or a failure to remove barriers for the private universities and colleges to operate effectively. Poorly designed institutions may negatively affect equality of educational opportunities. Salmi (2009) cites the example of former socialist countries or eastern African countries, which introduced tuition fees on a selective basis, in which students with highest scores in entrance exams are eligible for a tuition waiver. However, this favors students from wealthier families either because they studies in good private secondary schools, were able to spend money on private tutoring or come from families with a higher cultural capital.

Finally, the demand-side scenario envisages a funding system predominantly based on market mechanisms, which allow the public resources to follow students directly rather than being transferred to universities. Furthermore, the public funding would not be available solely to first-time students but would apply also to retraining or skill updating of adult learners. Salmi (2009) points out to a variety instruments that would enable such a radical reshaping of the public financing of tertiary education, such as scholarships and grants, student loans, human capital contracts, vouchers or education savings accounts. He cites Chile as a country whose financing model comes closer to the demand-side financing scenario.

2.2 Qualitative or Combined Approaches

OECD's Centre for Educational Research and Innovation has been developing futures thinking in education system as a whole as a part of its "Schooling for Tomorrow" project. "Schooling for Tomorrow" scenarios (OECD, 2001a) combine different trends between clusters of variables. Five critical dimensions determining the shape of school systems were identified as a) attitudes, expectations, political support; b) goals and functions for schooling; c) organization and structures; d) the geo-political dimension; e) the teaching force. Six scenarios were proposed (see Table 2). Two of them are an extension of existing models (the "status quo extrapolated"), two assume substantial strengthening of schools with new dynamism, recognition and purpose ("re-schooling") and two describe a significant decline in the position of schools ("de-schooling").

Table 2: Scenarios for the future education

<i>The "status quo extrapolated"</i>	<i>The "re-schooling" scenarios</i>	<i>The "de-schooling" scenarios</i>
Scenario 1: " <i>Robust bureaucratic school systems</i> "	Scenario 3: " <i>Schools as core social centres</i> "	Scenario 5: " <i>Learner networks and the network society</i> "
Scenario 2: " <i>Extending the market model</i> "	Scenario 4: " <i>Schools as focused learning organisations</i> "	Scenario 6: " <i>Teacher exodus – the 'meltdown' scenario</i> "

Source: OECD (2001a: 79)

Scenario 1: "Robust bureaucratic school systems"

- Strong bureaucracies and robust institutions
- Vested interests resist fundamental change
- Continuing problems of school image and resourcing

This scenario assumes the continuation of dominant school systems, characterized by strong bureaucratic elements and pressures towards uniformity. Strong vested interests do not allow for a radical change. The educational change is therefore incremental, characterized by a continual adding of new tasks and responsibilities to the remit of schools. As a result, schools' financial and human resources are continually stretched. Formal certificates are viewed as a main passport to economic/social life. This reinforces the norm of staying on in education longer a longer and enables reproduction of social inequalities.

Scenario 2: “Extending the market model”

- Widespread dissatisfaction leads to re-shaping public funding and school systems
- Rapid growth of demand-driven “market currencies”, indicators and accreditation
- Greater diversity of providers and professionals, greater Inequality

Private education sector expands in response to the growing dissatisfaction with the performance of relatively uniform structures of public school systems and with existing funding arrangements to provide cost-effective solutions. Opportunities for innovative solutions are coupled with transition problems until new markets become embedded. The continuing privatization and the emergence of mixed public/private partnerships enhance risks of inequality and exclusion.

Scenario 3: “Schools as core social centres”

- High levels of public trust and funding
- Schools as centres of community and social capital formation
- Greater organisational/professional diversity, greater social Equity

Schools are considered the most effective bulwark against social fragmentation and a crisis of values. The funding of schools increases. Schools in poor areas enjoy high levels of financial, teaching and other community-based resources. As a result of increased spending on education, schools enjoy a great degree of autonomy. However, strong pressures for corrective action come into play in face of evidence that any particular school is under-performing. Schools are supposed to lay the foundations of knowledge and skills, which serve as a basis for the lifelong learning. Norms of lengthening duration in initial schooling may well be reversed. According to OECD (2001a), it is not very probably that this scenario will materialize, as it would require endorsement by the main stakeholders throughout the society. Furthermore, it may exacerbate existing inequalities by linking schools closely with their communities.

Scenario 4: “Schools as focused learning organisations”

- High levels of public trust and funding
- Schools and teachers network widely in learning organisations
- Strong quality and equity features

Schools are revitalized around a strong “knowledge” agenda. Highly demanding curricula are the norm for all students. Schools become “learning organizations”, i.e. they provide “lifelong learning for all.” This agenda is driven by a strong equity ethos. Funding is generous but close attention is paid to the way resources are spent. This scenario would require a radical break with established practice.

Scenario 5: “Learner networks and the network society”

- Widespread dissatisfaction with/rejection of organised school systems

- Non-formal learning using ICT potential reflect the “network society”
- Communities of interest, potentially serious equity problems

This scenario is characterized by a widespread dissatisfaction with the bureaucratic nature of schools and perceived inability to deliver learning suitable for complex, diverse societies. The school system is dismantled, as educated classes and various interest and religious groups flee schools and opt for alternative learning on an individualized basis or through networks of learners, parents and professionals. This may lead to growing inequalities between those participating in the network society and those who do not. OECD suggests that it is difficult to predict how far various alternative measures of competence become accepted as a signal of competence in the labor market.

Scenario 6: “Teacher exodus – The ‘meltdown scenario’”

- Severe teacher shortages do not respond to policy action
- Retrenchment, conflict, and falling standards leading to areas of “meltdown”, or
- Crisis provides spur to widespread innovation but future still uncertain

OECD (2001a: 94) dubs this “an elaboration of ‘worst case’” scenario. It is characterized by a real staffing crisis as a combination of outflow of teachers into retirement, skill shortages and low financial rewards. Any policy response would require long delays before a noticeable change in the number of teachers occurs. Teacher exodus might lead to very different outcomes. At one extreme, it would trigger a vicious circle of retrenchment and conflict, leading to higher inequalities. At the other extreme, it would trigger radical innovation and eventually a reconstruction.

As a part of the “Schooling for Tomorrow” project, OECD’s Centre for Educational Research and Innovation generated also four basic futures of the higher education OECD (2006). The “Open Networking” Scenario is driven by voluntary co-operation among countries and institutions facilitated by low costs of communication and transportation and development of communication technology. In Europe, Bologna process plays a role. As a result, the higher education is internationalized and involves intensive networking among institutions, scholars and students. Collaboration rather than competition is the key driving force. Harmonization of systems allows students to choose their courses from the global post-secondary education network. The delivery of standardized courses online is enabled by developed technologies and the dominance of English as the main working language. Although the strong hierarchy among higher education institutions persists, the remote access to the top research is available also to the staff and students of institutions not focused on research.

The “Serving Local Communities” scenario could be driven by a backlash against globalization as result off terror attacks, concerns about the growth in immigration or frustration about outsourcing. Higher education institutions are therefore refocused on national and local missions and aim to address local economic and community needs. Only a small number of “elite” higher education institutions are linked to international networks. Reduced international and research ambitions relax the budget pressures. The education is supported by local authorities and business. There is a convergence between universities and polytechnics. Research in “strategic” areas is relocated to the government sector.

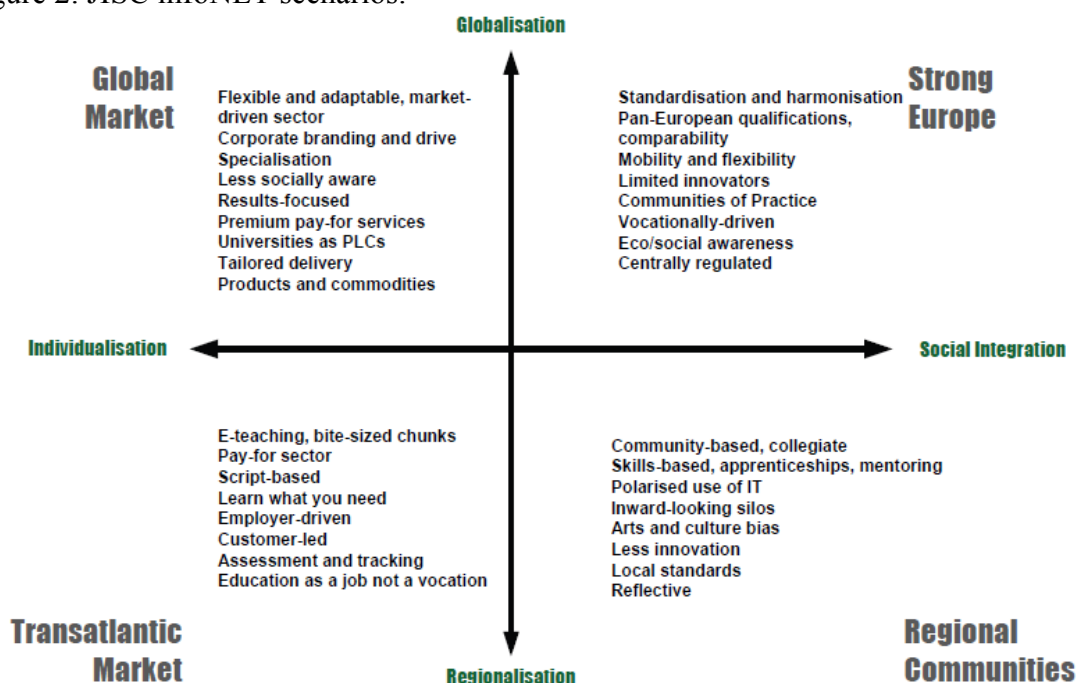
In the “New Public Responsibility” scenario, higher education is still primarily publicly funded but higher education institutions have taken advantage of foreign education markets, the deregulation of tuition fees, the patenting of their research and the links with industry to

diversify their funding sources. Students finance a significant share of their studies, most likely with the use of income contingent loans. The reliance of universities on these diverse funding sources, as well as student funding of the studies, increases pressures for greater accountability. There is a marked division of labor between and within institutions, which specialize either in research or in teaching. Research funds are allocated on the basis of competitive peer-review process.

Finally, the “Higher Education Inc.” scenario is driven by some form of trade liberalization in education. As a result, higher education institutions compete globally to provide education and research on a commercial basis. Teaching and research are increasingly disconnected. Research universities hardly teach at all, whereas most vocational and general institutions concentrate almost exclusively on teaching. Although governments still subsidize research and teaching in areas where there is little commercial interest, these subsidies should not distort trade in commercial research and education. Fierce competition for students leads to franchising of educational programs or emergence of branch campuses abroad. Whereas English has become the language of research, vocationalized teaching institutions still use local languages.

The UK-based JISC produced several scenarios for higher education, which varied according to the angle of view taken. In 2007, JISC infoNET (2007) created four scenarios of the wider learning landscape (as opposed to just considering higher education), paying a specific attention to the role of IT (see Figure 2). The methodology relied on the narrative techniques of scenario planning based on workshops. The scenarios were organized along two dimensions of internationalization (globalization vs. regionalization) and the development process (individualization and integration). Four scenarios were proposed.

Figure 2: JISC infoNET scenarios.



Source: JISC infoNET (2007)

The Global Market scenario (globalization and individualization) paints a future, in which the education is shaped by strong competition and advancement of information technologies. As a result, universities are financed mostly by private or corporate funds. Two-tier system emerges – those who go, those who cannot. Higher education is heavily branded. Learning is applied rather than theoretical. There is an academic divide: academicians either do research or teach. Multinational universities emerge and higher education is franchised. The quality is driven by market forces or is industry-regulated.

The Transatlantic Market scenario suggests that the education will student-driven, as opposed to student-centered. This will imply increased modularization and on-demand teaching. English will be the working language, e-learning will dominate the higher education. The “customer-oriented” teaching will create incentives for academic staff to search for activities outside academia. Whereas this scenario assumes the large expansion of the higher education, this expansion will be possible only at the expense of the quality.

Opportunities for Higher Education scenario presupposes increased integration and harmonization of the European education. Standardization in terms of curricula will enable sharing of e-content. Expectation of “good” jobs with reasonable pay will help to stretch the learning across the entire lifecycle. As a result, we will witness vocationalization of courses. Decline in science maths will lead to polarization of delivery. Greater emphasis will be placed on languages, politics and citizenship. Research agenda will be centrally influenced and research choices in the preferred area will be therefore limited. Overall, it is reasonable to assume the decline in research.

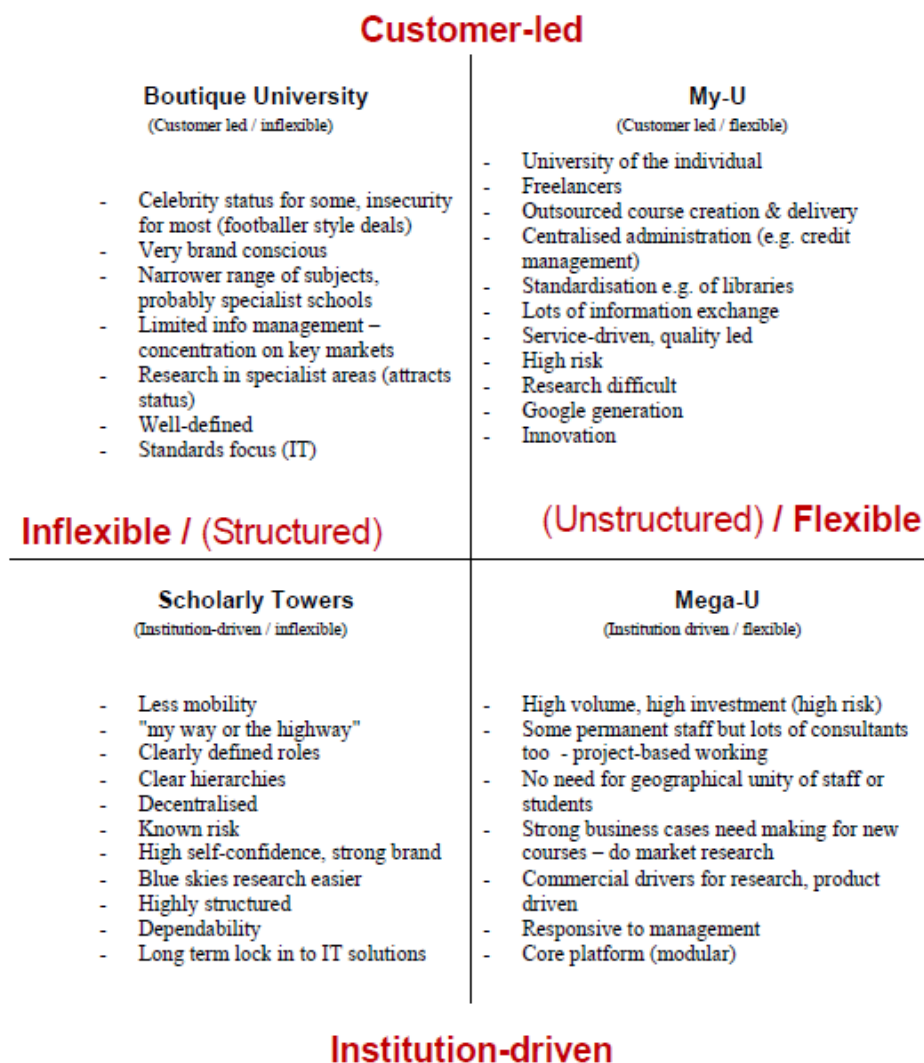
Regional Communities (regionalization and social integration) scenario suggests emergence of community-based education. On the one hand, this type of education will be able to flexibly respond to the needs of the local community and the local business. Students will be mostly local. The number of overseas students will be low. On the other hand, the local focus will lead to reactive rather than innovative content. The absence of international competition will have detrimental effects of research, which will reflect local priorities. We will observe vocationalization of the higher education. Teaching will be more important than research. Further education will grow at the expense of the higher education. There will be a risk that the education will be politically-driven. Finally, the local education will be associated with high tax burden.

In 2008, JISC Netskills focused on the changing staff roles, relationships and skills (JISC Netskills, 2009). The emphasis was placed on the type of roles and organizational structures needed to support future working practices resulting from technological change and technology supported practices. The resulting scenarios are listed Figure 3.

Boutique University (Customer-led/Inflexible, Structured) was built around the notion of student focused learning in a secure environment. Boutique university is specialized and reputation and brand-conscious. Student is viewed as a customer and the university adjusts its practices and roles to his needs. The learning is therefore specialized. To keep the high profile, the Chief Executive tries to hire “star” professors. My-U (Customer-led/Flexible, Unstructured) describes a flexible university with a personalized customer focus. “A different university for a different you – every day!” is its motto. As a result, the teaching relies on e-content. The faculty staff is employed full-time but not for a single institutions. Effectively, they work as freelancers. This makes the research difficult. Mega-U scenario assumes existence of large institutions with global reach. Mega-U relies heavily on the use technology,

which enables it cope with huge numbers of students. The staff is hired on short-term rolling contracts. Research is commercially driven. Finally, Scholarly Towers scenario is the closest to the classical, Oxbridge type of academic institution. It is research-intensive and confident in its own identity.

Figure 3: JISC Netskills Scenarios



Source: JISC infoNET (2007)

Less attention has been paid to the secondary schooling. Van Wieringen (1999) developed scenarios for vocational and adult education. He considered five dimensions: (a) dependence of the economy on the knowledge interaction structure, (b) employability life (work-training-care) cycle/alternation, (c) decreasing company responsibility for educational investment, (d) difficult to place/migrants and (e) education outside the school/the school under threat/ICT competitors. The first two were used to construct the initial scenarios. The two main factors used as dimensions in the scenario model were “economic dependence on the knowledge interaction structure” and “flexible periods of work, care and training.” Based on this mode, four social scenarios were constructed.

The Aloof Society

The government supports and funds initial vocational training because it believes that this form of training should provide the best opportunities for underprivileged groups to enter the labor market with the highest possible initial qualifications. At-work training is considered the responsibility of workers and their companies. As companies invest mostly in those workers whose training leads to the highest increase in dividends, i.e. managers and skilled workers, little training is offered to the low-skilled, older workers or immigrants.

The Dual Society

The government recognizes responsibility for initial training and for further job-specific training. The government collaborates with industry on the development of the curriculum and dual training systems, which combine in-company training with part-time schooling. Industry invests in the education of special groups, such as first/second generation immigrants, the low skilled or older workers only when there is a shortage of workers with high level qualifications and specialist skills.

The Secure Society

This system aims at equipping people for employment rather than at providing incomes for the unemployed. This is enabled by the tripartite social consensus and cooperation on getting the low-skilled into paid employment. The education system is expected to provide solid basic training. Further training is provided at work on the basis of collective labor agreements.

The Pick-‘n’-Mix Society

There is no standard solution here. Diversity is more important than security and expectations regarding education are varied. Education system is supposed to contribute to the development of skills along lines formulated by companies, either alone or in collaboration with training institutions. Workers are responsible for keeping their knowledge and skills up to standard. This is particularly true of those who take career breaks or switch to part-time employment. The mobile and flexible labor force is supported also by an individualized pension system.

European Centre for the Development of Vocational Training has exerted a continuous effort to study the future of vocational education and adult learning. In co-operation with European Training Foundation, it produced three scenarios for vocational training and lifelong learning that would be plausible for 2010 (Sellin, 2002). Training was set into economic, social and labor market contexts. Individual country scenarios were clustered and extrapolated to European-level scenarios (see Table 3).

Table 3: Scenarios for the vocational education and adult learning.

<i>Europe on the edge</i> - a Europe, where everything is uncertain and major current problems are not resolved, e.g. unemployment, lack of flexibility of training provision and work, economic recession, high labour mobility, low (global) competitiveness and growth, traditional practice in companies, inequality neither increasing nor decreasing.
<i>Protective and incremental Europe</i> - tailor-made training programmes, individual training accounts, state not responsible for lifelong learning, unemployment remains a problem, continuing privatisation, small businesses and remote regions have problems, not enough funding possibilities, increasing inequality.
<i>Sustainable and competitive Europe</i> - lifelong learning is important, networks between companies or learning organisations and training providers are common, increased needs for foreign workers, reduced and low unemployment, individuals are mainly responsible

for their own training, companies have well-developed training programmes which are part of their business plan, new kind of work contracts integrating training (leave), social inequalities remain.

Source: Sellin (2002: 56).

The above discussed qualitative scenarios demonstrate both advantages and disadvantages of scenario planning. Scenarios can provide concise descriptions of future higher education at various levels of analysis, such as schooling in the broad terms (OECD, 2006), higher education (OECD 2001a, JISC 2007 or vocational education (van Wieringen, 1999; Sellin, 2002). However, scenarios are not a prognosis of the future but merely a possible future, which depends on the variation in a limited number of key drivers. The main advantage of the qualitative or narrative approaches to scenario planning is that it enables to take into account drivers, which are characterized by high uncertainty or quantitative data insufficiency, such as attitudes, expectations, political support or the geo-political dimension (OECD, 2001a) or the role of IT (JISC infoNET, 2007).

3. METHODOLOGY

We rely on the Shell/GBN method, which is often referred to as “intuitive logics” model (Bradfield et al., 2005; Kosow and Gassner, 2008; Wack 1985; Wilson, 1998). The approach is called intuitive because it allows for estimates and subjective uncertainty evaluations in addition to analysis of objective data (Kosow and Messner, 2008: 63). We opted for creative narrative technique because it enables us to deal with specific uncertainties related to the quantity and equality of the education system. First, qualitative or narrative scenarios are appropriate in the analysis of complex situations with high levels of uncertainty and when relevant information cannot be entirely quantified (van Notten et al., 2003: 431). Second, forecasts based on current trends or historical data can be a problem in environments, which are changing fast (Ringland, 1998: 49). The high complexity of the European qualifications and skills environment and the potentially disruptive uncertainties related to the ongoing financial and economic crisis make narrative scenarios an ideal technique for the building of our scenarios. Finally, scenarios are able to effectively communicate a vast amount of information in a highly memorable form of a narrative (Schwartz, 1991; Swap et al., 2001; Chermack, 2004). Stories thus help in coping with complexity, give meaning to events and provoke openness to multiple perspectives (Georgantzas and Acar, 1995).

The intuitive approach is based on a sequence of steps (see Wilson, 1998 or Bradfield et al., 2005). In the first step, the focus of the scenario is specified. The question asked is: For what purpose are the scenarios developed? The second step is to identify the key factors, or the drivers of change. This can be done on the basis of deep empirical and theoretical analysis, brainstorming, analysis of STEEP factors or discussion with experts. These drivers are then organized, often in the form of a matrix, to establish the scenario set. SRI matrix was the first explicit scenario technique developed to prioritize the long list of key factors and driving trends in order to find the most critical uncertainties and remove incompatible relationships. The key drivers of change are then listed in rows and scenarios are listed in columns. Each scenario is typically supported by a qualitative narrative, which clearly specifies implications of the variation in the key variables. In the final step, internal consistency and coherence of individual scenarios is evaluated.

The presented scenarios focus on quantity and equality of education. As the success of the scenario planning in “intuitive logics” approach depends on the implicit knowledge of experts and their commitment to the project, the presented scenarios grow from the body of research conducted as a part of the NEUJOBS project. Our team of experts examined various aspects of education systems and training. Specifically, we explored the issue of mass higher education, diffusion of new skills throughout the economy, lifelong learning and low-skillness. The research outputs served as the basis for “Business as Usual” scenario, which should be viewed as an extrapolation of the existing trends. The review of the findings and the relevant literature is available in the next section.

The key drivers of change or points of departure from the “Business as Usual” scenario were inspired by three global scenarios for 2025 developed in 2005 by Shell International and adapted by Saul (2005). These drivers were chosen because there is a broad overlap with the drivers of CEDEFOP’s alternative scenarios. But whereas the macroeconomic projections of CEDEFOP consider factors, such as access to credit, consumer confidence, global impact, uncertainty over commodity prices, government responses and wealth effect on labor supply, we focus on specific government responses aimed at equality and quantity of education.

The key driving forces used by Shell to create global future scenarios are (1) market incentives, (2) aspirations to equity and social cohesion, and (3) coercion and regulation by the state. Each of these forces is directed towards objectives that are valued to different degrees by all societies: (1) Efficiency, (2) Fairness or social justice, and (3) security. The three scenarios are defined by considering future world where two of the above drivers are dominant and the third merely adapts to the context created by the two dominant forces:

1. Low Trust Globalization – a world of global markets and coercive states.
2. Open Doors – a world of global markets and cohesive civil societies.
3. Flags – a world of dogmatic, zero-sum assertion of social values and coercive attempts by states to rally divided societies around the flag.

According to Saul (2010), there are two drivers that set countries on the pathway toward one of the three scenarios in light of the ongoing economic and financial crisis. On the one hand, the crisis may bring nations together: “The global nature of the threats associated with the financial crisis leads to the formation or strengthening of institutions of global governance. Thus success fosters greater understanding and trust among nations (Saul, 2010: 132).” On the other hand, we may witness “Me First” response to the crisis: “Despite early cooperative rhetoric by nations around dealing with the global financial crisis, the failure of global initiatives subsequently leads many countries to act in their own self-interest.

We adapt these drivers to meet our research goals in the following way (see Table 4). “Me First” response to the sovereign debt crisis may lead to the growing divergence among European countries and fragmentations of educational systems. In response to growing fiscal pressures, countries opt for cost-effective solutions to the provision of education. Vocational education is preferred to higher education in provision of training in soft and generic skills for service sectors, such as social care (see CEDEFOP, 2011). States also move towards market-oriented schooling models (OECD, 2001a: 82). Alternatively, depressed economies may look for “best practices” present in the fastest growing countries and enter the pathway towards highly stratified educational systems, such as the German one. A combination of early tracking and private privatization of education reduce equality of educational opportunities. Training in vocational schools slows the expansion of the tertiary sector.

Table 4: Drivers of departure from the “Business as Usual” scenario

	Inclusive Convergence	Fragmentation
Age of Tracking	Postponed	Advanced
Financing	Public, at all levels	Cuts in public expenditure in education
Lifelong learning	Publicly financed	Privately financed
Higher education	Vocationalized	Specialized

Source: Authors.

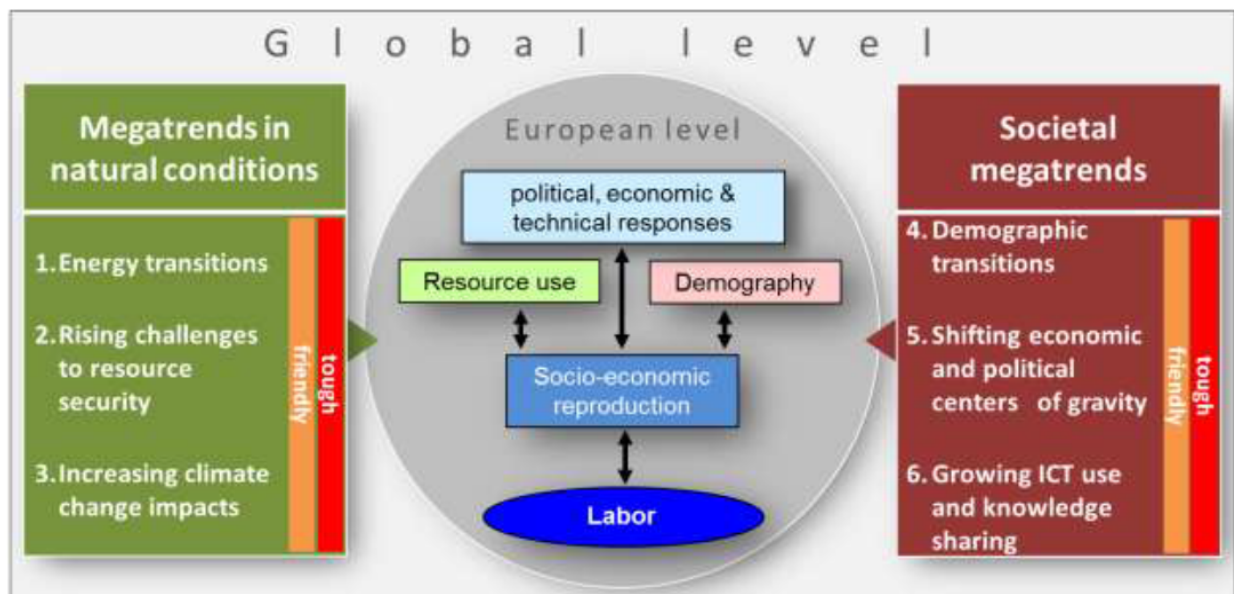
A coordinated response to the crisis assumes a policy response explicitly aimed to increase equality of educational opportunities and secure education for students regardless of their socio-economic background or abilities. These efforts are strengthened by the major vehicle of Europeanization of education, the Bologna Process. Although the implementation of Bologna process still varies significantly across countries (Lub et al., 2003; Alesi et al., 2005; Witte, 2006), the European educational systems will gradually converge towards the international model promoted by OECD, characterized by later tracking and elimination of educational dead-end pathways.

4. SYSTEMIC REVIEW OF LITERATURE

This section reviews the research outputs produced by the experts within the WP4 of the NEUJOBS project, which serve as the basis for the “Business as Usual” scenario. We focused on two broad questions. First, we examined the supply side of the skills. The main focus was on the equality of educational opportunity (Beblavý and Veselkova, 2013), expansion of the upper secondary and expectations about the expansion of the tertiary sector (Beblavý et al., 2013a) and the lifelong learning or on-job training (Beblavý, Thum and Potjagailo 2013; Thum and Beblavý, 2013). On the demand-side, we focused on the job polarization and the hollowing-out of the medium-skills (Maselli, 2012; Beblavý, Lehouelleur and Maselli, 2013) and the expansion of the education and the general up-skilling (Kureková, Beblavý and Haita, 2013a; Kureková et al., 2013; and Kureková, Haita and Beblavý, 2013b). In this section we provide a general overview of these research results and discuss how the identified trends may shape the future qualifications and skills.

4.1 Scenarios presented in this paper are informed by the scenarios of socio-ecological transition from the fossil fuel based industrialization in Europe to a new type of society (see Fischer-Kowalski et al., 2012). The transition has been accelerated by certain "global megatrends in natural conditions," which Fischer-Kowalski et al. (2012) define as energy transitions (into and way from fossil fuels). Rising challenges to resource security and increasing climate change impacts. The social part of the socio-ecological transition is accelerated by the continuation of the global demographic transition, the on-going shifts in the economic and political centers of gravity worldwide, and the growing use of information and communication technologies, including the related new forms of knowledge sharing. These megatrends are assumed to shape the global framework conditions for Europe (see Figure 4).

Figure 4: The socio-economic reproduction of Europe in a global context shaped by the ongoing socio-ecological transitions



Source: Fischer-Kowalski et al. (2012: 13)

The megatrends are then used to generate two variants of a global future world, a "friendly" and a "tough" one, and use these as global framework scenarios for the European option space. The differentiation between the two scenarios is based on the rate of change, which can be either slow and less challenging or radical and rapid (see Box 2).

Box 2: "Friendly" and "tough" variants of a global future world.

Friendly: A friendly future includes rather moderate changes which are less challenging for European policy making. It focuses on incremental global changes in the lower ranges of change found in the literature.

Tough: Our sketch of a tough global future is based on still quite likely but rather severe changes which would be highly challenging for European policy making, using the higher ranges of change found in literature, including possible abrupt changes.

Source: Fischer-Kowalski et al. (2012: 77).

The impact of the megatrends on Europe will then depend on the ways European Union will cope with the changing global context of ongoing socio-ecological transitions. "No policy change" strategy assumes that European policies will remain in a business-as-usual mode. No additional policies will be implemented to face the socio-ecological transitions. Rather, the policies will aim to defend the existing mode of production and consumption and the vested business interests related to these consumption patterns. "Ecological modernization and eco-efficiency" strategy assumes that Europe will be set on a path towards eco-efficient production systems through market-based instruments and the "internationalization of externalities". The final "sustainability transformation" strategy assumes that Europe will become a leader in promoting and implementing sustainable development. This entails a significant reduction in the use of fossil fuels and consequently changes in consumption patterns and levels. The fundamental structural change in the economy will require optimizing European welfare. Fischer-Kowalski et al. believe that business-as-usual strategy will fail under both global scenarios, whereas the success of the ecological modernization strategy will depend on the global conditions. The sustainability transformation strategy is associated with success regardless of the global conditions (see Table 5).

Table 5: Payoffs associated with European response to changing global conditions

Response scenario	Global scenario	Rate of change induced by response strategy	Friendly world gradual change	Tough world rapid change
no policy change		Low	-	--
Ecological Modernization		medium	++	-
Sustainability Transformation		High	+	++

Source: Fischer-Kowalski et al. (2012: 95).

4.2 Quantity of Education

As the universal primary and secondary education has been a reality for a considerable time in the developed countries, efforts have been directed towards higher education (UNESCO, 1989: i). These efforts have been reinforced by the growing body of work which suggests that the impact of investment in education and training on national economic growth is positive and significant, albeit difficult to quantify (for a review of literature, see Wilson and Briscoe, 2004). In light of the recognition that higher education is crucial for economic development and job creation, the European Union agreed the target that at least 40 percent of 30-34-year-olds should have a higher education qualification or equivalent by 2020. Eleven EU countries had already exceeded the 2020 target (European Commission, 2011: 68). In contrast, the lowest completion rates could be found in the Southern and Central European countries, despite the fact that they have very high secondary education completion rates. Various projections of the massification of the tertiary education suggest that higher education systems will probably continue to expand (UNESCO, 1989; Vincent-Lancrin, 2008) but the continued growth of “massification” is beset by many uncertainties (Vincent-Lancrin, 2008: 48).

Instead of examining the expansion of tertiary education directly, Beblavý et al. (2013a) examine broad trends in expansion of upper secondary education, which has to precede expansion of the tertiary education.² They assume that the general trends in the expansion of

² The study by Beblavý et al. (2013a) does not directly examine the sources of expansion. There is a theoretical debate on the drivers of expansion summarized in the theoretical section of the study. The socioeconomic functionalists believe that the demand for further is driven by economic development (see Collins, 1971; Goldin, 1998; Clemens, 2004). However, evidence does not support strong effects of national industrialization or economic development on expansion of education at any level (Meyer, 1977; Meyer et al., 1992b; Windolf, 1997). Sociological explanations view education as a source of social status (Bourdieu and Passeron, 1977; Collins, 1971; 1979). Expansion should be therefore more rapid (and less functional) when status group competition is high (Fuller and Rubinson, 1992). Furthermore, elite groups will attempt to direct expansion into

the upper secondary education, such as the speed of expansion, the process of catching up or the distribution of expansion across tracks, may inform our future expectations about expansion of the tertiary education.

The time span encompasses the post-World War II period, which witnessed a rapid expansion of European upper secondary education. The long time span limited the methodological choices. The surviving country statistics did not allow to calculate net enrollment rates. Therefore, Beblavý and Veselkova measured the speed of expansion by gross enrollment rates, which are calculated as the share of all students enrolled in a certain school level or track, relative to the total population in the official age group for the respective education level in percent. It is important to notice that the gross enrolment rates can exceed 100, due to repeaters or adult learners. The case selection corresponds to the case selection of WP4.5.2. In other words, all types of educational models and their specificities are covered.

In case of speed of the expansion, two hypothetical benchmarks were set: massification of education characterized by a transition from 20% to 50% gross enrollment rates and universalization of education characterized by a transition from 50% to 80% gross enrollment rates (Trow, 2005: 64 sets the boundaries as 15% for a transition from elite to mass and 50% as a transition from mass to universal).

The results suggest that countries expanded their upper secondary sectors at various speed and that laggards were able to catch up relatively fast, once the limiting conditions were removed. For example, underdeveloped Slovakia was able to catch up with the more developed Czech lands in approximately two decades. In 1953, there was a significant regional difference in gross enrollment rates – 45% in the Czech lands and 21% in Slovak lands. Yet, the gross enrollment rates reached 80% by 1978 in both lands.

These results suggest that universalization of upper secondary sector was faster than universalization of the primary or lower secondary schooling. Wils and O'Connor (2003) proxy enrollment with literacy acquisition and find that the typical country in the postwar 20th century took 35-80 years to make a transition from 10% net primary enrollment to 90%. Clemens (2004) used a more precise proxy, i.e. the number of people of any age enrolled in primary school divided by the size of the population under the age of 15, analogous to but not precisely equal to gross enrollment (the denominator includes infants). His results imply that the typical country after 1960 took about 28 years to get from 75% of the worldwide maximum level of that enrollment statistic to 90% of the maximum. Before 1914 it took about 41 years to get from 75% of the worldwide maximum value of net primary enrollment to 90% of the maximum. These findings support the hypothesis that laggards are able to catch up relatively fast with the leaders of expansion.

It is possible to derive several lessons about consequences of the educational expansion. As the enrollment rates exceed 80%, we observe two trends. First, the demand for part-time secondary or post-secondary non-tertiary education in Slovakia and the Czech Republic declines and the demand for flexible forms of more prestigious tertiary education rises (Veselková, 2013). The demand for post-secondary education thus shifts almost exclusively to the tertiary level. It is possible to hypothesize that this shift occurs as a result of a combination of two factors: elimination of the quotas on the number of students in tertiary education and a

vocational sector. Finally, institutionalist explanations emphasize the convergence towards the best practice (Meyer et al., 1992b: 129, see also Ramirez and Boli, 1987).

better signaling function of tertiary education as opposed to post-secondary non-tertiary education. Second, the generalization of the upper secondary schooling seems to have spilled to the bachelor studies. For example, in Germany, the specialization occurs only at Master or PhD level (Zymek, 2009). Both of these findings suggest that it is reasonable to assume that students will be staying on in education longer and longer.

The expansion of the upper secondary education favored general education, which tended to grow at the expense of vocational education. This significantly enlarged the pool of students eligible for tertiary studies. Beblavý, Teteryatnikova and Thum (2013) illustrate how the massification of tertiary education could decrease the average time spent studying. As more students enter college, the average ability of the enrolled college students decreases. However, colleges aim to keep their average grade constant and therefore lower their requirements. This enables students with fixed ability to lower their studying time and reduce the average studying time of the students enrolled in college.³ The authors show how these dynamics differ across different European countries. Whereas working while studying at university increases the time-to-degree and may interfere with learning, the acquired work experience may also improve employment opportunities and increase wages after the graduation (Ehrenberg and Sherman, 1987; Häkkinen, 2006; Golden and Baffoe-Bonnie, 2011). Work experience may increase skills (US Bureau of Labor Statistics 2005) provided that work hours are moderate and in higher quality jobs (Staff and Schulenberg, 2010).⁴

A similar trend is observed at the tertiary level: expansion of tertiary education in Europe occurred hand in hand with a redistribution of students across different fields of study. On the individual, micro-level, the differentials in educational attainment are attributed to the rational educational choices based on the calculation of potential benefits, costs and the probability of success associated with additional schooling (Breen and Goldthorpe, 1997; Boudon, 1974; Gambetta, 1987; Erikson and Jonsson, 1996). The decision to continue education at the tertiary level – and the pressure for further expansion of the tertiary education system – therefore depends on the net returns to education. Starting with the seminal work of Becker (1967), there has been a growing number of studies that examine returns to investment in education (for a review of literature, see Psacharopoulos and Patrinos, 2004). For example, in OECD countries, returns to an additional year of tertiary education are on average above 8% and vary in a range from 4 to 15% among countries (Boarini and Strauss, 2010). However, looking at average values is not satisfactory (Dickson and Harmon, 2011).

Beblavý, Lehouelleur and Maselli (2013) therefore ask a simple question: is it worth studying engineering or art? To answer this question, they calculate net present value of university studies for five European countries. Reference populations are the 2000 cohort of graduates in France and Italy and the 2002/3 cohort in Hungary, Poland and Slovenia. They find that with the exception of Italy investment in education is largely repaid after five years. However, field of study is a source of within inequality in the higher education graduates group: both resources needed during university and returns five years later depend on the field of study. Surprisingly, it is not STEM faculties that ensure the highest return on investment. Rather, social science graduates enjoy the highest returns. In contrast, graduates of art, humanities and education enjoy the lowest net present value. These findings suggest that the expansion of enrolment in fields of study such as economics, business or law is driven by a rational choice.

3 One should note that there is no consensus on the main sources of the decline in college students' studying time. For the review of the relevant literature, see Beblavý, Teteryatnikova and Thum (2012).

4 Furthermore, long studying hours are associated with clinical depression (Lee and Larson, 2000). The initial level of studying hours matters.

This is particularly true in Central and Eastern European countries. Gender is an additional source of heterogeneity: being a woman and enrolling into STEM is the worst option in Italy, France, Slovenia and Hungary. However, one should bear in mind that returns to education may be country-specific. For example, Sum's (cited in Rampell, 2011) analysis of answers in the Labor Department's American Community Survey of 2009 show that a typical graduate who finds a job requiring a college degree earns 26 756 USD, the typical graduate who finds a job that does not require a degree earns approximately 11 000 USD less. The highest earnings can be found in engineering (35 548 USD), Math/Computer Science (34 100 USD) and Business (32 397 USD). In contrast Area Studies, Physical Science and Humanities graduates earn the least (19 419 USD, 20 687 USD and 20 953 USD respectively). This survey does not take into account costs of education, as Beblavý, Lehouelleur and Maselli (2013) did. This might change the payoff matrices.

Self-selection of students into humanities rather than STEM leads to claims that we will or already face shortage of skilled scientists, who are crucial to the economy (Harrison, 2012; Tabarrok, 2011). Thus, although there are more students in the U.S. colleges than ever before, there are less computer science graduates than 25 years ago (Tabarrok, 2011). The number of graduates stagnated also for other science majors. Alternative view of the predicted workforce shortages in STEM suggests that shortages in STEM workers vary by geographic locale (Hagedorn and Purnamasari, 2012) or they do not exist at all (Smith and Gorard, 2011).

Is it possible to navigate students into preferred majors? The empirical evidence suggests that it is very difficult. Policy-makers in the communist Czechoslovakia were able to effectively direct the expansion of the secondary education into vocational tracks thanks to a combination of highly centralized educational system and a system of administrative quotas on the number of students in general upper secondary tracks Veselková (2013). In the post-communist period, the ability of policy-makers to manage expansion was undermined by the emergence of quasi-markets. Private institutions were more than eager to meet the demand unmet by public providers of education. The surge in student enrolments in private education is characteristic also for the tertiary level. Regionally, it concentrated in the part of Europe where the establishment of private higher education institutions was prevented for several decades (Teixeira, 2009: 238). One of the major forces that contributed to the expansion of the private higher education has been the continuous and strong expansion of this sector globally (ibid: 239).

The fast expansion of the private education and the willingness to bear some or all of the costs of higher education suggests that tuition fees are a poor instrument to incite students to redistribute towards science majors. Using the data on all U.S. public 4-year colleges and universities from 1991 to 2006, Hemelt and Marcotte (2011) show that a 100 USD increase in tuition and fees would lead to a decline in enrolment of about 0.25 percent, with larger effects at research universities. The weak response of enrolment to increases in tuition fees are probably a result of a weak impact of tuition fees on rate of return to education (Stark, 2007; Walker and Zhu, 2011). A degree from the most expensive colleges translates into the highest premia in the labor market. For example, the median starting salary for Ivy Leaguers is 32% higher than that of liberal-arts college graduates -- and at 10 or more years into graduates' working lives, the spread is 34%, according to the survey (Wall Street Journal, 2008). The further expansion of the tertiary education will thus most likely be driven by the rational cost-benefit analysis of individuals.

4.3 Lifelong learning

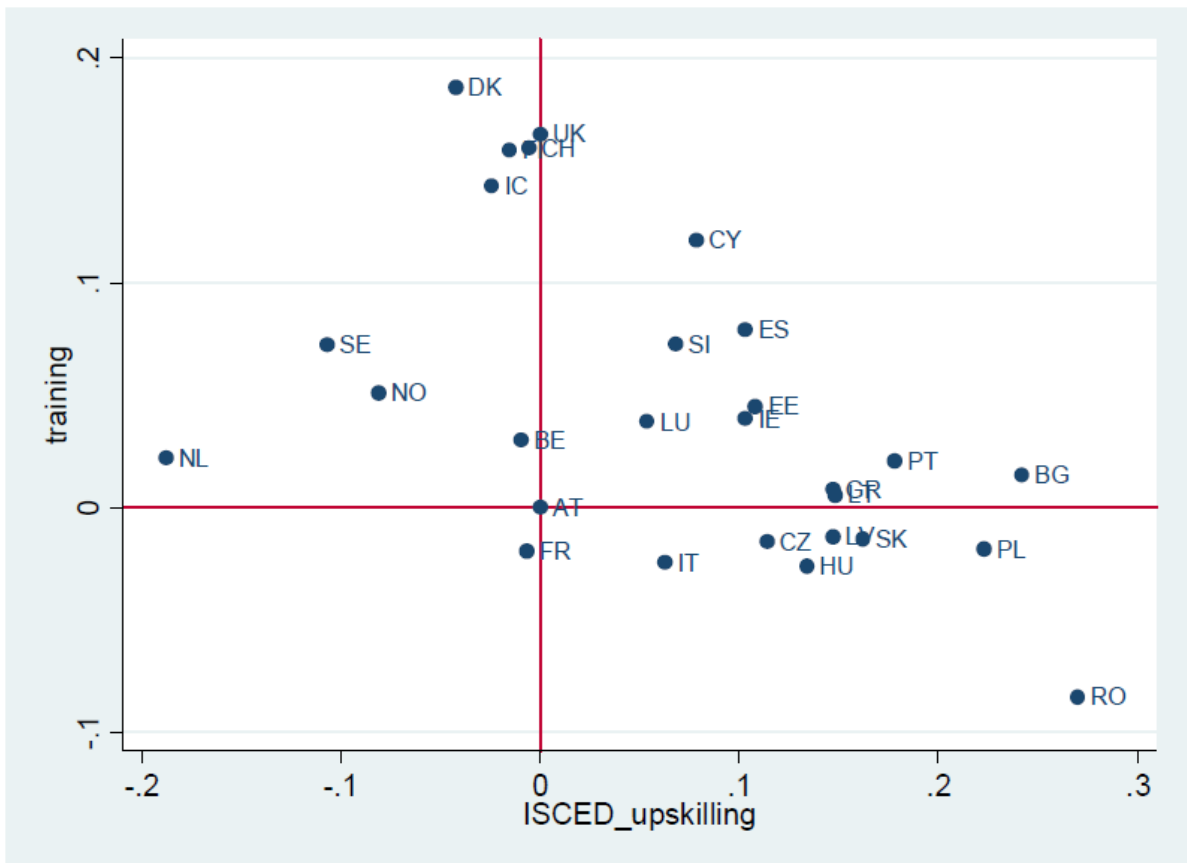
Adult learning and a resulting up-skilling of the population is seen as a key factor for employment, innovation and growth as the vast literature on “lifelong learning” suggests. Thum and Beblavý (2013) examine an important driver for investing in adult learning. They used the German Socioeconomic Panel to empirically test the effects of various types of social capital on the decision to participate in different forms of lifelong learning. They find that most of social capital measures have a significant and positive impact on the probabilities for investing in various types of adult learning. Across all measures of adult learning they have identified that increasing the perceived importance to be socially active by one unit increases the probability of participation in adult learning by the most (17%) and one additional friend by the least (0.04%). This result suggests that Granovetter’s (1973) theory of weak and strong ties not only holds for employment but also in the context of adult learning. The supportiveness of the social network increases the probability of participating in adult learning by nearly as much as an additional unit in the perceived importance to be politically and socially active. Sociability increases the probability by more than reciprocity.

Beblavý, Thum and Potjagailo (2013) examine different aspects of the lifelong learning, i.e. adult on-job or informal training and formal training leading to an increase in ISCED. The main aims of the paper were to examine (1) whether the lifelong learning differs across age cohorts and (2) whether adult learning takes place in terms of ISCED level upskilling and/or only in terms of training. To answer these questions they constructed synthetic panels based on the European Labour Force Survey 2000-2010 waves for 27 European countries.

The results imply that older age cohorts are less likely to participate in training. However, this effect is less significant for ISCED up-skilling. The probability of getting a higher-education degree after 20-year old sharply decreases with age. However, this does not hold true for lower ISCED levels: getting an upper-secondary degree is more frequent for people with greater on-job experience. Furthermore, lifelong learning is determined also by individual characteristics. Whereas men and immigrants are more likely to get an upper-secondary degree in their adult life, natives are more likely to achieve tertiary educational achievement. Contrary to the existing literature, these results imply that higher educated individuals tend to participate less in training than other education ranges.

Although individual characteristics, such as age, gender, education level and professional activity account for a large part of country heterogeneity, the preference of training to formal ISCED upgrading and vice versa suggests that these individual characteristics are mediated by institutional setting. When the countries were grouped by the level of up-skilling either through training or formal ISCED upgrade, three types of countries – relative to the base country Austria – emerged: those that score high on both dimensions and those who score high on one dimension but not the other (see Figure below).

Figure 5: Training and ISCED up-skilling in comparison



Source: Beblavý, Thum and Potjagailo (2013: 23)

The results do not enable to examine the sources of these differences. Nevertheless, it is possible to speculate that countries displaying high training rates as well as high ISCED upskilling rates are either characterized by a high level of up-skilling of both types or by a training leading to degrees that increase ISCED levels. Scandinavian countries and Netherlands score high on the training dimension but low on the ISCED up-skilling. This may be a result of education levels that are already high or training that does lead to degrees that upgrade ISCED level. Relatively high levels of upskilling but low levels of training can be found in the Visegrad Four countries, Romania and Italy. This suggests that the formal degree is valued high in the labor market. These patterns of up-skilling have implications for equality. Firms tend to invest in training of those workers, whose training leads to the highest increase in dividends, i.e. managers and skilled workers (van Wieringen, 1999). The position of low-skilled, older or immigrant workers will be therefore more favorable in countries with a tradition of publicly funded lifelong and adult learning. Furthermore, it is reasonable to assume that with the expansion of the tertiary education and the growing competition from educated younger cohorts, older cohorts and/or less educated workers will seek further education to remain competitive in the labor market.

4.4 Equality of educational opportunities

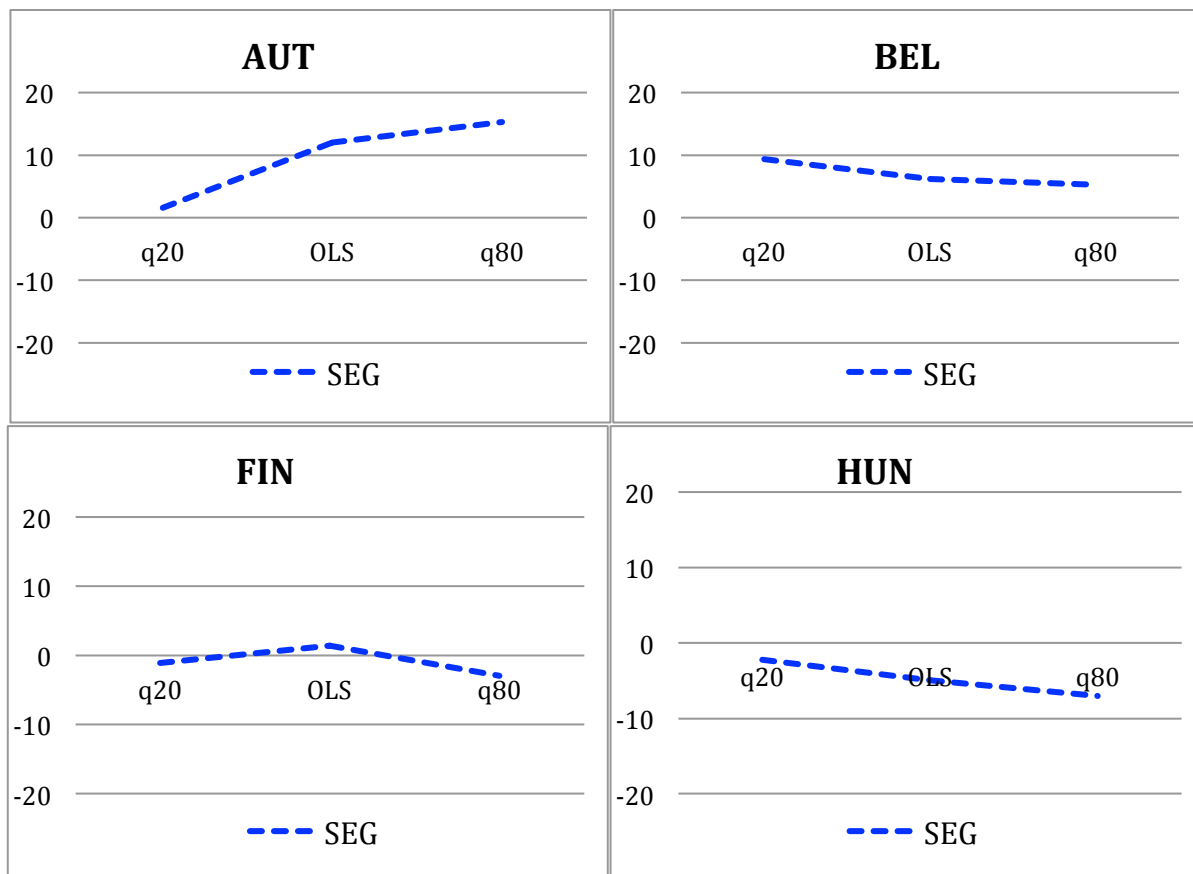
The dramatic expansion of mass education during the past century (Boli et al., 1985; Meyer et al., 1992a; UNESCO 1989) has not been accompanied by the corresponding expansion of equality of educational opportunities (Shavit and Blossfeld, 1993; Pfeffer, 2008), i.e. decoupling of educational success from the family background. Findings of Beblavý and Veselkova (2013) and Beblavy et al. (2013a) support the view that although elite, mass and

universal access to education are sequential stages of educational expansion, they do not inevitably replace one another. Beblavý and Veselkova (2013) document examples of elite forms of education stubbornly surviving in the mass and universal stages (elite grammar schools in the United Kingdom, Gymnasia in Germany and multi-year gymnasia in the Czech Republic and Slovakia). These examples suggest that expansion – if not accompanied by policies aimed at greater equality of educational opportunities – will reproduce social stratification despite greater participation in upper secondary schooling.

Two types of education policies are linked with equality of educational opportunities, i.e. decoupling of educational success from the family background: the age of tracking and the early childhood education (see, for instance, OECD, 2001b; 2004; 2006; 2007; 2010 and Schütz, Ursprung and Woessmann, 2005; Hanushek and Woessmann, 2005 and Woessmann, 2009). There is a growing body of literature which suggests that the sooner the students are tracked, the more their family background will have an impact on their student performance (Hanushek and Woessmann, 2006; Pfeffer, 2008; Schütz et al., 2008; OECD 2004; 2007; 2010; Woessmann, 2009). This strand of literature emphasizes that individual cost-benefit analysis of additional schooling is mediated by institutional setting: perceived costs of an education or the probabilities of succeeding at university may differ according to the organization of schooling (Pfeffer, 2008; Kerckhoff, 1995; Breen and Jonsson, 2005: 227-8). Early selection hampers equality of educational opportunities and favors selection of children from lower socio-economic background to vocational tracks. Vocational education is thus a double-edged sword for the poor. Although it boosts wages at the lower end of the income distribution, it at the same time precludes advances up the career ladder, when such training, especially in tracked systems, limits access to university (Ansell, 2010: 150; Arum and Shavit, 1995). As such, it limits future life chances because educational attainment is a powerful predictor of future earnings or longevity (Card, 1999; Ashenfelter et al., 1999, Crystal and Waehrer, 1996; Deaton and Paxson, 1998; O’Rand, 2002). In highly stratified educational systems – characterized by early and irreversible selection of students to a number of tracks – the future of the child may thus be decided as early as the age of 10.

Beblavý et al. (2013b) add to this debate by examining the association between within-school ability grouping and equality of educational opportunities for differently performing students. They study the issue at a country level for 4 OECD countries (Austria, Belgium, Hungary and Finland), selected on the basis of how conditional PISA performance distributions react to ability grouping. Results shown in Figure 6 demonstrate very different results for the countries concerned. This applies both to average results and results for low and high performers. In Belgium low performers are more strongly concerned with inequality effects of within-school ability grouping, whereas in Austria the high performers are more concerned with these inequality effects. In Hungary, within-school ability grouping is positively correlated with equality and more so for the high performers. In Finland within-school ability grouping does not show to have a significant relation with equality. In other words, effects of tracking are so deeply mediated by other characteristics of the education system that policy-makers should avoid global generalizations and focus on specific country situation.

Figure 6: Effect of socioeconomic gradient for children of different ability - Austria, Belgium, Finland and Hungary



Source: Beblavý et al. (2013b)

Beblavý and Veselkova (2013) studied the equality of educational opportunities from the policy perspective. They examined why countries adopt or do not adopt pro-equality educational policies. Their research focused on the policy process, which introduced various elements of less selective (or comprehensive) schooling, such as later age at which children are selected to various tracks, elimination of dead-end educational pathways or increased mobility between tracks. They relied on a comparative case study of five European countries with varying degrees of success in introduction of less selective educational systems in the period following the World War II: success (Sweden), failure (Germany), formal implementation of the reform and informal transfer of selection to the private schooling sector (United Kingdom), success followed by the reversal (Czechoslovakia), and success associated with increased dropout rates (Spain).

There has been a gradual improvement in the equality of educational opportunities in the post-World War II period. Educational systems today are less selective than they were 60 years ago. Nevertheless, there are still significant differences among countries, or rather among various educational models. General preference towards selection is still strong within German educational model, which favors early selection of students into academic and vocational tracks. The movement towards increased equality of educational opportunities has been accompanied by a counter-movement, which attempts to re-introduce earlier selection along the lines of increased efficiency. The importance of competition as the main driver of educational quality has been promoted under the umbrella of neoliberalism and gained prominence in the national discourses of countries, which faced economic downturn or financial crises, such as Sweden in the 1990s (Peterson, 2012).

What are the main drivers of the movement towards earlier or later selection? Beblavý and Veselkova (2013) differentiate between two types of factors, which roughly equal to extraordinary circumstances vs. business as usual. Extraordinary circumstances, or critical junctures, represent events that are beyond the policy control. Typical examples include an economic crisis or a regime change. They open “windows of opportunity” (Kingdon, 1994), which may or may not be used by policy entrepreneurs, who attempt to translate these external shocks into policy change (Cortell and Peterson, 2002). Above mentioned reorganization of educational systems along neoliberal lines is a typical example of the shift in the “policy paradigm” (Hall, 1993) in the face of widespread perception of policy failure.

External shocks are difficult or impossible to predict. From the policy perspective, it is therefore more interesting to study the policy process during ordinary times. We document three factors that enabled the introduction of less selective schooling. First, left-leaning parties tended to be in favor of less selective schooling more than the right-leaning political parties. Election of a strong, leftist government enabled comprehensivization of educational systems in the post-World War II Sweden and post-Franquist Spain (although there, the regime change and the eagerness to negate the past played some role, see Peterson, 2012 and Pensiero, 2013). The Labor Party initiated the process of reorganization of educational system towards less selective schooling also in the United Kingdom (Toubeau, 2013). Communist Party in the Czechoslovakia introduced “unified school” up to the age of 15 within one year from the *coup d'état* in 1948 (Veselkova, 2013).

Second, Beblavý and Veselkova document that the dissemination of research has an impact on the prevailing beliefs about the human intelligence or about the link between the age of tracking and the educational performance. They document international circulation of pedagogical knowledge and models in three broad waves. In the beginning of the twentieth century, the educational discourse was dominated by the ideas of the progressivist movement, which quickly spread to the rest of the world. Comprehensive schooling at the secondary level was for the first time introduced in the United States. Direct influence of the progressivist movement was documented in three out of five case studies (Germany, Sweden and Czechoslovakia). However, with a single exception of Sweden, these ideas did not translate into policy change despite several decades of research dissemination, rise of reformists to decision-making positions or experience with experimental schools. Furthermore, whereas reform attempts inspired by progressivist movement in Germany or Czechoslovakia culminated in the period prior to the World War II or immediately afterwards, the Swedish reform stretched from the 1950s to the 1960s.

In the post-World War II period, the prevailing beliefs about intelligence changed. Traditionally, it was believed that there are various types of intelligence suited for various types of education. Bright pupils should be educated separately from slower students and this separation benefits both groups. These beliefs were present in the United Kingdom, Sweden, Czechoslovakia and Germany. The British tripartite system rested on the widely held belief, propagated by the educational psychologist Cyril Burt (1933) that intelligence was an innate mental ability, that could be assessed through intelligence tests, and which bore a strong relationship with social class. These ideas were reflected in the White Paper that preceded the 1944 Education Act: “all children should receive the type of education for which they are best adapted (Board of Education, 1943: 29).” The change in the sentiment came with a paradigm shift in the field of psychology at the end of the 1950s. The prevailing theories of innate intelligence were discredited and the emphasis was placed on social factors (Vernon, 1950; 1960). This perspective found resonance in subsequent official reports, including the

landmark Robbins and Newsom Reports (1963) which claimed that all children had an equal opportunity to “develop intelligence. Thus, the distilling of a new orthodoxy the psychology of intelligence, coupled with mounting evidence on the unsatisfactory operation of the tripartite system, created the setting for the reforms aiming to abolish tracking (Toubeau, 2013).

Both German and the German-influenced Czechoslovak educational models rested on the belief that weak students could make the strong weaker and thereby reduce quality (on the German case, see Robinsohn and Kuhlmann, 1967: 323; on Czechoslovak case, see Veselkova, 2013). These ideas can be traced back to the philosopher Alexander von Humboldt (1769-1859), a founding father of the *Gymnasium*. The dominating beliefs changed in the 1970s with the “Copernican education rebound” (*Kopernikanische Bildungswende*) took place: the belief in an innate predestination for the different school types was replaced by the belief in a universal ability to be educated (Lenhard, 2002: 8). This is the climate in which the idea of the comprehensive *Gemeinschaftsschule* came up.

The growing importance of equality as an aim of education in the postwar period was documented also by Fiala and Lanford (1987) who examined aims of education for approximately 125 countries. Equality, including equality of educational opportunity, was mentioned in 12% of examined documents in 1955 and in 23% in 1965.

Most recently, it was the PISA Programme of the OECD, which has shown an unprecedented impact on the national educational discourses (Grek, 2009). In Germany, the PISA shock influenced educational discourse and led to a wide-ranging reform agenda, shifted curriculum development process towards principles such as outcome control, competence orientation or external assessment, and strengthened the role of empirical research in academic discourse (Ertl, 2006). Similarly, in the Czech Republic, results of the first PISA testing (OECD, 2001b) debunked the myth that Czech students were above-average and reinforced the belief that educational policy should address the problem of early tracking (Kotásek, 2009; Holub, 2007; 2010). The strategic document White Paper published shortly afterwards therefore called for introduction of mechanisms in order that the education system does not further reproduce existing inequalities (Ministerstvo školství, mládeže a tělovýchovy České republiky, 2001: 18). These developments were mirrored also in Slovakia, where both the right-leaning and the left-leaning Ministers of Education endorsed recommendations of OECD to reduce early stratification in the educational system (Ministerstvo školstva, vedy, výskumu a športu Slovenskej Republiky, 2002: 13; Ministerstvo školstva Slovenskej republiky, 2007). In response, the Slovak cabinet decided to introduce the quotas on the number of children that would be allowed to enroll to elite multi-year secondary schools.

Finally, the shift in the prevailing beliefs about intelligence is a necessary but not a sufficient condition for the policy change towards less selective schooling. The convergence towards international model or the best practice advocated by international organizations, such as OECD or UNESCO, is problematic in countries with strong national academic traditions (Ramirez, 2006). The strong tradition of the German *Gymnasium* works as an obstacle to reorganization of the secondary schooling (Ertl and Philipps, 2000).

However, implementation of the reform aimed at less selective schooling is complicated also by other factors, notably the stable social and political balance of forces: parents with high socio-economic status and teachers from elite academic tracks vehemently oppose comprehensivization of education. Their typical defense strategy is to reframe the issue of

later tracking as socialist or detrimental to the development of gifted children. It is therefore crucial for policy makers to avoid the capture of the public discourse by opponents of the reform. An example of the successful strategy was the successful framing of comprehensive schooling as a means for the mobilization of the country's resources and the pathway to wealth creation by the British Labour Party in the 1960s (Toubeau, 2013: 7).

The comparative study also illustrated unintended consequences of comprehensivization of schooling. In Spain, the comprehensivization of secondary schooling up to the age of 16 was accompanied by increased dropout rates, especially among immigrant children. More than 50% of the performance gap between immigrants and native students is accounted for by the student's socioeconomic background, and up to 20% is accounted for by the characteristics of the school attended. Among school characteristics, the average peers' parental education is the key factor (Zinovyeva et al., 2008). As the share of immigrant pupils on the school population reached 15% by 2000s, these results are alarming (Pensiero, 2013).

Based on the above, it is possible to identify two broad trends that are likely to affect future levels of equality of educational opportunities. First, there has been a gradual shift towards greater equality of educational opportunities during the past century. Continuing advocacy of later tracking by international organizations, such as OECD or UNESCO, will create incentives for governments to converge towards the "best practice". However, the impetus is weaker in countries with strong academic traditions. Furthermore, the case of Czechoslovakia documents that the policies based on later tracking are not irreversible.

Second, the continuing privatization of educational systems will work as the counterforce to the above trend. As a result of neoliberal revolution, the monopoly of state as the provider of the education has eroded and we witness an increasing "privatization of the public sphere" (Marshall and Anderson, 1994: 177; Meyer and Rowan, 2006: 2). Free school choice may undermine efforts to increase equality of educational opportunities because if "schools and children are free to seek each other out: with some caveats, this leads to perfect segregation by child quality" (Robertson and Symons 2003). In England, sorting by ability and by income is greater, where there is more choice to attend other than the residential school (Burgess et al., 2004). In Sweden the school choice not only raised differences between schools and school areas in ability but also in social and immigrant status (Söderström and Uusitalo, 2005).

These two broad counterforces will be accompanied by several smaller factors of change. First and foremost, migration will pose a serious challenge for equality of educational opportunities. As already noted, immigrant pupils perform worse than domestic children. They face higher dropout rates either because they adhere to cultural stereotypes of their community or they opt to take a job. These jobs are often of poor quality and define the future possibilities of these children.

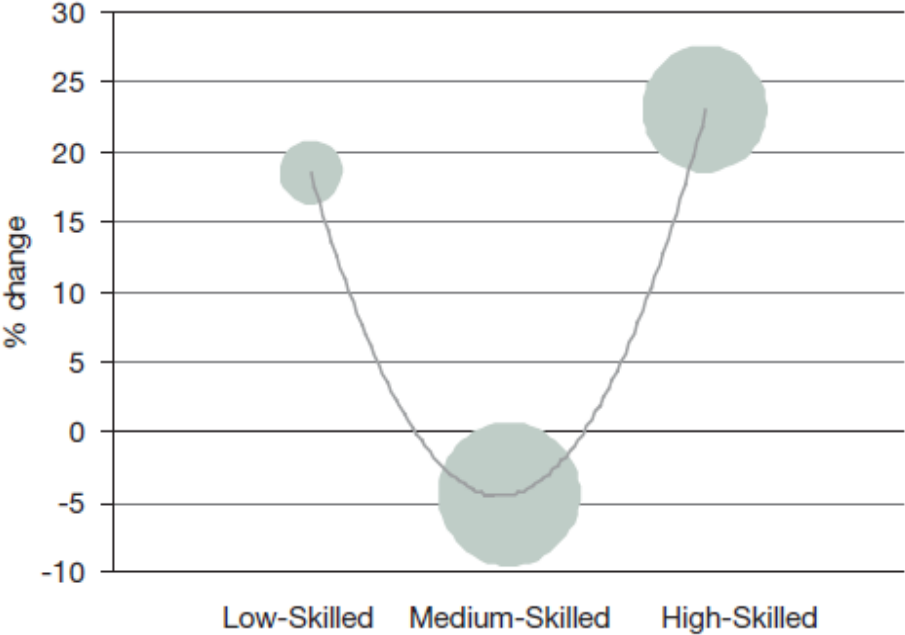
Aging populations may work as an enabling condition for equality of education. General education is less costly than vocational education. Facing increased costs on pensions and elderly care, governments may choose to reorganize educational systems along comprehensive lines to lessen intergenerational conflict (Busemeyer et al., 2009).

4.5 Job polarization

During the decade 1998-2008 occupational polarization emerged across Europe, with a rising demand at the upper and lower ends of the occupational skills distribution (CEDEFOP, 2011).

The share of elementary occupations in total employment increased from 8.7% in 2000 to 9.6% in 2008 (ibid: 8) These findings are supported also by Maselli (2012), who analyzes labor demand and supply with respect to skills and tasks and attempts to anticipate what type of skills mismatch EU countries will encounter during the next decade. The emphasis is placed on education expansion and the impact of technology on labor market. Her analysis starts with the restatement of Levy and Murnane’s (2004) thesis of the job polarization, according to which the labor demand is polarized with respect to wages, i.e. it grows stronger for both low-paid and high-paid jobs while shrinking in the middle. Figure below illustrates the phenomenon in EU27 between 2000 and 2010. What we would normally expect is that demand for workers rises as the skill content of these occupations increases in a linear fashion. The picture is instead U-shaped, as predicted by job polarization, and it is the result of an approximately 20% increase in the demand for low-skilled and high-profile occupations between 2000 and 2010 and a 4.5% decrease in the demand for middle-skilled occupations. Polarization occurred in 17 out of 27 EU countries. Diversified occupational polarization across countries and its concentration of polarization in service sectors was documented also by CEDEFOP (2011).

Figure 7: Job polarization in EU27, 2000-2010



Source: Maselli (2012: 23); based on Eurostat - Labour Force Survey data

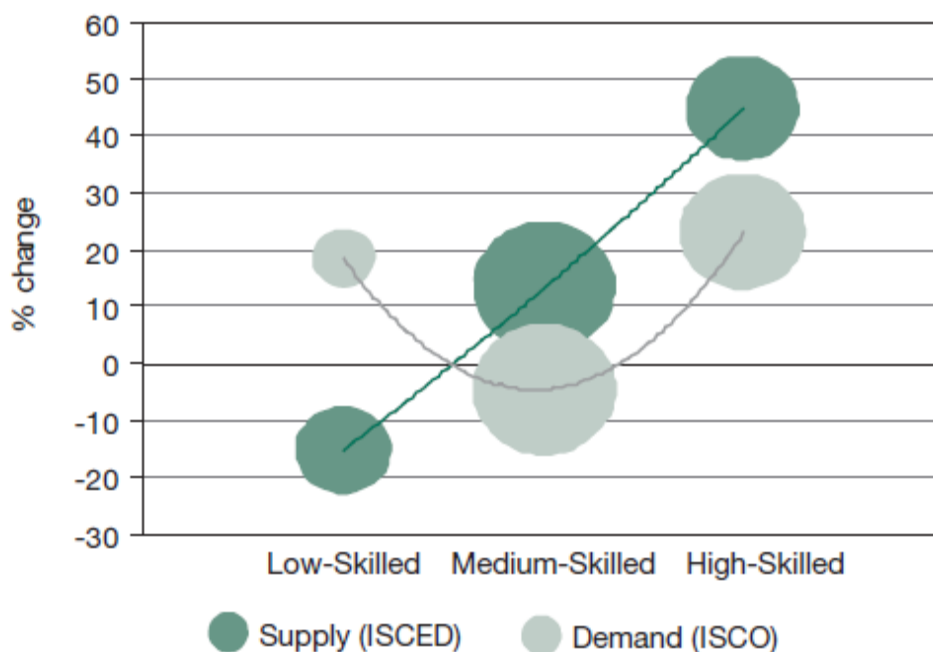
Figure 8 depicts the match between the labor demand and labor supply. The share of middle-skilled occupations in total employment is 50.4%, and the share of the labor supply with a secondary degree is 48.2%. However, these trends are moving in opposite directions: the latter has grown by 13.2% while the former has declined by 4.5%. The share of low-skilled workers is small (22.2%) and rapidly decreasing (-15.2%), most probably due to a phasing out of the older and less educated generation from the labour force. The percentage of low-skilled occupations increased by 18.4%, resulting in a 9.8% share of these types of jobs in the economy. A third of the total labour force is highly educated, and the size of this group grew by 44.9% over the period 2000-2010. Meanwhile, demand for these workers grew more modestly (23%) but still accounted for 39.8% of total employment. However, one should bear in mind that there are significant differences between countries (see table 6 below).

Table 6: Dynamic and static by country

Static	Dynamic				
	Short- age of low- skilled	Low- skilled unem- ployment	Middle- skilled “displace- ment”	Over- qualifi- cation of high- skilled	Equili- brium
Equili- brium	PL		DE, ET, LV, LT, HU, AT, SI, SK, UK	BG, IE	EU27, BE, FI, RO, SE, FR
Tension		EL, IT, PT, MT, DK		CY	CZ, NL, LUX

Source: Maselli (2012: 28)

Figure 8: Demand and supply of work with respect to skills/tasks in the EU27, 2000-2010



Source: Maselli (2012: 26); based on Eurostat - Labour Force Survey data

The existing literature identifies several possible drivers of polarization: skill-biased technological change, educational expansion, growth of the service sector, trade liberalization, or employer preferences and organizational change (for a review of literature, see Maselli, 2012 or Kureková, Haita and Beblavý, 2013b). CEDEFOP (2011) attributes the occupation polarization in Europe to three factors: macroeconomic and structural changes (between sectors); the demand-driven increase in specific service activities (e.g. private household); and the increasing labor supply of non-national workers. CEDEFOP (2011) suggests that the relative increase in elementary occupations is bound to persist in the near future because of the continuous shift towards a tertiary-based economy. CEDEFOP (2012) forecasts that by 2020 there will be job opportunities in all occupations but their distribution will be uneven.

New jobs will be concentrated in higher and lower skill level jobs, with slower growth in middle occupations.

Job polarization is a key contributor to inequality. The concentration of wage growth among high-skilled workers combined with disproportionate job growth at the upper and lower ends of the skill distribution has resulted in a more unequal economic environment in the United States (Abel and Deitz, 2012). The literature on educational expansion suggests that with a general expansion of education, the demand for less educated declines (Solga, 2002). As low-skilled are becoming a minority, they are perceived as 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. 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. 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. It is therefore reasonable to assume that with the expanding educational sector, we will see a continuing replacement of low-skilled by medium-skilled.

For the medium-skilled, this means that they might temporarily assume positions for which they are overqualified. The overeducation and the mismatch in the labor market receive a great deal of policy attention (for a review of theoretical perspectives on overeducation, see Tsang and Levin, 1985). However, Ramos et al. (2009) argue that even when qualified workers are unable to find a suitable job, they are still more productive at the aggregate level than their unqualified counterparts. This implies that there is a good case for public investment in education and its further expansion even though a number of recent studies fail to provide favorable evidence regarding the link between human capital and growth. Ramos et al. (2009) warn that regions might not benefit directly from their investment in the education in the context of high geographical mobility.

The final lesson to be derived is that the skills content of the low-skilled jobs has increased, leading to the phenomenon of up-skilling (see Kureková, Haita and Beblavý, 2013a; 2013b). Low-skillness should be therefore viewed as a fluid concept, whose definition depends on the context. Job polarization may be therefore a misleading concept because the low-skillness encompasses a wide range of jobs.

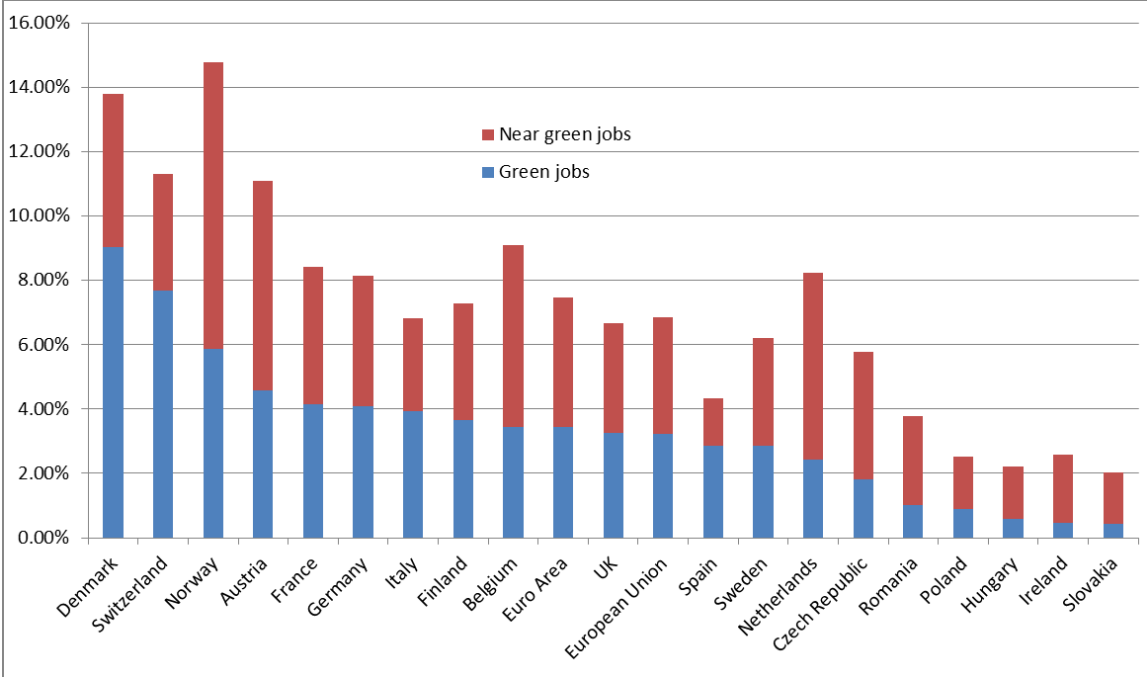
4.5 Green Skills

Greening of the economy could reverse job polarization trends. Whereas the ITC revolution had mostly benefited high-skilled job-seekers (Maselli, 2012; Massari et al., 2013), the greening of the economy could favor both high-skilled and medium-skilled workers (Colijn, 2013; Dierdorff et al., 2009; Martinson et al., 2010).⁵ However, a lot depends on the pace and the depth of the greening of the European economies. For example, Colijn (2013) argues that only 3.25% of the total number of jobs demanded in the European Union in 2012 were "green", i.e. supporting the use of renewable energy or a reduction in the use of non-renewable energy. When taking into account "near green" jobs, i.e. jobs that work in support

⁵ However, this view is challenged by the conclusions Cambridge Econometrics (2011), which suggest that the potential for green jobs lies primarily with high and low-skilled jobs only.

of the green economy, approximately 6.9 percent of jobs demanded were in or supporting the green economy. Figure 9 depicts green and near green job as a percentage of total demand by country. The demand for the green jobs is the highest in Scandinavian countries, whereas Central and Eastern European countries are lagging behind.⁶

Figure 9: Green and near green job demand as a percentage of total demand by country



Source: Colijn (2013).

Note: Countries with fewer than 800 observations were omitted from the sample.

Furthermore, Colijn (2013) argues that the types of jobs which are green are concentrated in certain sectors, such as farming, fishing and forestry, architecture and engineering and construction and extraction. More than ten percent of jobs in these sectors have a green component. Jobs that are purely green include engineers, managers and installation workers, maintenance and repair workers. This suggests that the greening of the economy is driven by people developing technology and those working around them. The positive relationship between green jobs and technological skills implies that the greening of the economy could provide a counterweight to the hollowing out of the medium-skilled jobs.

4.7 Up-skilling of low-skilled

Kureková, Haita and Beblavý (2013a) identify the skills and characteristics demanded in the Slovak labor market in selected low- and medium-skilled occupations. The labor demand was analyzed at the micro-level and relied on the analysis of job ads from the Slovak job portal Profesia. Slovakia was chosen as a case study because the country suffers from mismatches, structural unemployment and high unemployment rates especially among the less educated and the youth. When looking at the types of skills are demanded in the low- and medium-

⁶ Note that these results may be influenced by the characteristics of the dataset. Colijn (2013) used the data of 117 000 European job advertisements collected from the websites of large companies between December 2011 and November 2012. This implies that multinationals and large firms, as well as export-oriented economies are overrepresented in the sample.

skilled occupations, experience was the single most requested skill (52%), followed by knowledge of foreign languages (38%), responsibility (29%), communication skills (28%) and flexibility (24%). Demand in service occupations was more skill intensive, i.e. a greater range of skill, aptitudes and qualities were expected in a successful candidate.

When looking at the formal educational level, employers expect secondary education without leaving examination (3 year specialized vocational study) as a minimum standard in the majority of analyzed occupations. However, employer's expectations about minimum education requirement varied, with the variance being higher in case of new occupations as opposed to codified or traditional service or industry occupations. In a number of new occupations, such as courier, caretaker or au-pair, employers requested complete secondary education (4 year general or specialized with leaving examination). This suggests that demand in the labor market might have adapted to the supply which continues to be better and better educated; this is reflected in an initially higher formal qualification expected even in the medium-skilled labor market segment, at least in comparison to the more typical medium-skilled occupations. In contrast to the above, there are also examples of underqualification in case of new occupations. For example, the lowest, primary education level prevailed for the security guard, who belongs to service workers (ISCO 5).

A comparative look at the issue of the type of skills demanded in the low-skilled sector is offered by Kureková et al. (2013). Analysis of online job adds from EURES website in three different small economies – Czech Republic, Denmark and Ireland – suggests that the specific skill-set demanded in service occupations differs from other, mainly industry-connected jobs, in the greater focus given to non-cognitive social skills and personal characteristics. There is a great variation in the content of skill demand across the analyzed labor markets. The Czech and Danish labor markets are much more formalized and formal education and specialized training matter to a great degree. The explanation is related to the 'dual' skill formation regime that characterizes these economies which connects employers to skill formation processes to a greater degree than in Ireland.

However, as both Maselli (2012) and Kureková, Haita and Beblavý (2013b) remind us, low-skillness is not a static state, it is a dynamic process. In the past, we observed the de-skilling of some occupations, such as accounting, and up-skilling of others, such as journalism. Kureková, Haita and Beblavý (2013b) conceptualize low-skillness as a process rather than just regarding it as a status characterizing the workers alone. Such an approach enables them to problematize the existing conceptualizations of the low-skillness, which typically do not move beyond the measurement of the low-skilled through the lowest attained level of qualification (ISCED 0-2). However, such a conceptualization ignores the heterogeneity of the low-skilled. To overcome these deficiencies, Kureková, Haita and Beblavý propose an alternative typology. In addition to the typically included 'low-educated', their 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 (see Table 7). Examples include people with obsolete skills, displaced workers or 'temporarily low-skilled' migrant workers. As their focus is on the use of the skills, they proxy the skills by ISCO rather than ISCED.

Table 7: 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: Kureková, Haita and Beblavý (2013b).

The proposed categories are then used to empirically test the quantitative differences across the EU countries. The aim is to understand how the low-skilled differ within them and how

structural processes and individual characteristics interact in various ways in the dynamic labor market. The main findings are listed below:

- the formal qualification levels are valued differently in different labor 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. This implies that people with the same educational level are employed in occupations of different skills requirements across the EU labor 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.
- Competition for jobs takes place within the age cohorts across different levels of formal education, and not between age cohorts. 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 Kureková et al. (2013b) found that it is more the young workers who tend to suffer in the labor market. Specifically, the young are always at more risk of unemployment than the old, regardless of the qualification level.
- The service sector is favoring 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 labor demand of the country. This is in contrast to the literature which argues for the presence of skill polarization and decline in middle-level occupations. The findings 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 Kureková et al. (2013b) 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. They 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 labor market into inactivity by the end of their working life. 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 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.

5. FUTURE SCENARIOS OF QUALIFICATIONS AND SKILLS IN THE EU

Based on the research outputs presented above, we present three scenarios of the qualifications and skills in the EU from the perspective of quantity and equity. The reference scenario assumes extrapolation of the trends identified in the previous section. In contrast to the reference scenario, we propose two other scenarios, the “Inclusive convergence” scenario and the “Fragmentation” scenario. The major point of departure is the policy response towards the existing trends in the quantity and equity of education (see above). In the “Inclusive convergence” scenario, we assume an emergence of the general consensus on the importance of equality of educational opportunity. In contrast, the “Fragmentation” scenario assumes erosion of comprehensive schooling in light of increasing fiscal pressures, marketization of education and search for cost-effective solutions in education.

1. “Business as usual”

The reference scenario is based on extrapolation of existing trends identified in the WP4. In regard to equality of educational opportunities, we expect the replication of existing differences among national educational systems. Whereas there might be a gradual convergence towards an international model advocated by OECD, strong academic traditions will serve as an obstacle to the convergence (Ramirez, 2006). For example, the traditional position of the Humboldtian Gymnasium as the stronghold of economic success is an important factor for the persistence of the tripartite system (Ertl and Philipps, 2000). The efforts to prolong comprehensive schooling of all children in the same classroom will be undermined by the growing importance of private schooling or continuing residential segregation. Thus, whereas we will witness a gradual expansion of the higher education, the benefits of expansion will not be available to all. In countries with highly stratified educational systems – characterized by early selection of students to a number of tracks and a low mobility between the tracks – it will be children from families with higher socioeconomic status that will benefit the most from the expansion. Furthermore, the expansion of higher education will lead to the strengthening of the two-tier system. As Trow (2006) points out, universal education is not incompatible with earlier phases of expansion. In this scenario, we assume gradual expansion of the higher education system. New local universities, both public and private, will spring to life to meet the demand for higher education. However, there will be surviving islands of elite higher education institutions, competing in the international education market for international students and international research grants. Just as the elite Gymnasias survive in German upper secondary system, Oxbridge type of universities will survive in the higher education. As the results of the WP4.5.1 suggest, access to these types of institutions will be easier for students with higher socio-economic status. To sum up, there will be a general up-skilling of the population. The number of population with higher education degree will increase but access to the higher education will depend on the nature of the national educational system.

2. Inclusive convergence

This scenario assumes the general convergence towards the international model advocated by OECD. The broad consensus will emerge that inequality of educational opportunities has a detrimental effect on educational performance of children from lower socioeconomic background. The ideas about positive effects of later tracking will spillover from the research output to the policy debate. “No child left behind,” will be the new motto of the educational

policy. The convergence towards the Anglo-Saxon or Swedish model of comprehensive schooling will speed up. The age of tracking will be postponed and children will be educated together for the most part of their primary and secondary studies. Of course, there will still be a minor “elite” upper secondary schooling within the universal sector but the policy makers will try to further elimination of dead-end educational pathways and ensure that whatever educational choice the student takes, this choice will not be irreversible. A number of intermediate schools linking vocational upper secondary studies and higher education will increase. There will be a massive increase in the demand for the higher education. To accommodate students with all kinds of abilities, we will witness increasing vocationalization of the higher education. The general upper secondary education and vocationalization of higher education will somewhat ease the fiscal burden associated with reorganization of education towards inclusiveness. Older age cohorts will be encouraged to participate in the lifelong learning and they will gladly do so, as they will face an increased competition from educated younger age cohorts. Learning for jobs will create further pressure on the vocationalization of higher education curricula. Research will thus happen at a small number of universities. In this scenario, we will witness a general up-skilling of the labor force. Although there will always be a certain number of students who lack abilities or motivation to continue their studies and drop out after the completion of the compulsory education, the number of the low-skilled will dwindle. This will have two important consequences. First, as a result of the general up-skilling of the population, the skill shortages in this scenario will be the mildest. However, the small size of the low-skilled labor pool will lead to the phenomenon of *stigmatization by negative selection* (Solga, 2002). The unemployment risk of the low-skilled will increase dramatically. With regard to skills demand, the impact of general upskilling is not clear. CEDEFOP (2010: 70) suggests that it is possible that many jobs - independently of whether they are increasing or decreasing in number - require more highly-skilled people than in the past. Kurekova et al. (2013a) suggest that labor demand might adapt to the general upskilling. Finally, the hollowing-out of the medium-skills jobs documented by Maselli (2012) might be reversed by the greening of the economy, which tends to concentrate in the engineering sector (Colijn, 2013, see also below).

3. Fragmentation

This scenario assumes a backlash against the international educational model promoted by OECD or UNESCO. We witnessed re-introduction of early tracking in the post-communist Czechoslovakia; we witnessed weakening of the comprehensive schooling under the label of increased efficiency in Sweden of the 1990s and 2000s. These examples suggest that the comprehensivization of schooling is not a one-way street and the trend may be reversed. There are two forces that may trigger this scenario. First, there is a trend of an increasing “privatization of the public sphere” and eroding position of state as the sole provider of education (Marshall and Anderson, 1994: 177; Meyer and Rowan, 2006: 2). Second, the continuing financial and economic downturn may open the window of opportunity for radical reshaping of educational systems. An economic crisis enabled a neoliberal turn in Sweden of the 1990s. Growing budget pressures and the need to cut the public deficits may lead to the search for increased efficiency and the growing participation of the private sector in the funding of education. Furthermore, governments may look for alternatives to the “best practice” advocated by international organizations. In their search for panacea to the sluggish growth, governments may mimic the educational systems of the leaders in economic development. In contrast to the previous scenario, where majority of countries gradually converge towards the Swedish model, in this scenario countries converge towards the German tripartite system based on early tracking of students. The decline in equality of educational

opportunities will have important consequences for the expansion of the higher education. Chances of children from families with low socioeconomic status to obtain a higher education degree will be reduced. As a result, the expansion of the higher education will be the smallest compared to other scenarios. This will have two consequences. On the one hand, vocational training may ease transition from school to job. On the other hand, it precludes future life chances because educational attainment is a powerful predictor of future earnings or longevity. This may have severe repercussions especially in the absence of public investment in lifelong learning. Furthermore, the deepening globalization and competition will lead to the differentiation of higher education institutions, which will exclusively focus on teaching or on research. It is reasonable to assume that the participation in the lifelong learning will be smaller compared to the previous scenarios as a result of budget pressures. The upskilling of low-skilled will therefore fall on private companies and individual efforts. As shown in the WP4.3.4, various measures of social capital are positively correlated with the probability of investment in lifelong learning. In other words, friends and networks can play a reinforcing role in the up-skilling process. It is possible to speculate that in highly stratified systems that lead to emergence of distinct networks comprising of people with certain level of educational attainment, people surrounded by friends without higher education or without motivation to invest in learning are less likely to look for ways of up-skilling that people surrounded by the “right” networks and friends exerting peer pressure to invest in learning. To sum up, there will be a slow-paced expansion of the higher education. The up-skilling of younger cohorts will be accompanied by a relatively large pool of low-skilled. However, their position in the labor market may be complicated by the hollowing-out of the medium-skilled jobs. It is reasonable to assume that high-skilled will assume jobs of low-skilled, driving low-skilled out of the labor market.

The presented scenarios are compatible with both friendly and tough variants of a global future described by Fischer-Kowalski et al. (2012). In other words, the alternative futures of European qualifications and skills can unfold in both an environment characterized by a moderate and rapid socio-ecological transition. What matters is the European policy response. This implies that our scenarios can be viewed as complementary to three European Response scenarios described by Fischer-Kowalski et al. (2012). First, there are two "indifference" scenarios, which assume no change in existing policies. For Fischer-Kowalski et al., the "no policy response" scenario represents a very bleak future, in which the failure of policy-makers to cope with the ongoing socio-ecological transition undermines the welfare system and democracy. On our side, extrapolation of the existing trends in education is associated with an uneven increase in the equality of education. Whereas the overall quantity of education will be on the rise, the benefits of the educational expansion will be available to children from families with low socio-economic background only in countries with less segregated schooling.

"Ecological modernization and eco-efficiency" scenario assumes that the greening of the economy will be market-driven. Policy-intervention will be limited to the supply-side market based instruments. Whereas Fischer-Kowalski et al. view this scenario as mildly positive, they warn about distributional issues, particularly unequal access to resources. Increasing marketization as a result of growing budget pressures or adjustment of education to the needs of the business is characteristic of our "Fragmentation" scenario. This scenario is associated with the highest inequality of educational opportunity and a more modest expansion of publicly-financed education. The upskilling of the low-skilled or adult learning will include mostly on-the-job training. However, the market-driven greening of the economy may reduce

the hollowing-out of medium-skilled jobs, as green jobs tend to include people developing technology and those working around them.

Finally, both the "Sustainability Transformation" scenario and "Inclusive convergence" scenario assume a significant social and economic transformation. Fischer-Kowalski et al. argue that in addition to leaner and smarter consumption, "sustainability transformation" inevitably requires taking into account social justice. Europe will undergo a cultural transformation of a utopian scale and strive for a more equal welfare distribution in Europe as well as internationally. This is fully compatible with the "Inclusive convergence" scenario, in which the broad consensus about the importance of equality of educational opportunities sets Europe on the path towards inclusive education, including adult education. This scenario is thus associated with the highest increase in quantity and equality of education. However, it is important to note that the general upskilling may have serious consequences for the marginalization and social exclusion of the dwindling group of low-skilled.

The above discussion illustrates that alternative futures cannot be easily ranked. There is no ultimate hierarchy of futures, which ranges from the worst to the best possible outcome. The process of educational expansion is not a linear process, which necessarily leads to better outcomes. Each policy intervention is associated with social consequences and each possible future is associated with a different set of new challenges and problems, which need to be addressed.

6. CONCLUSIONS

In this paper we propose scenarios of the future composition of ISCED qualifications and skills for 2025 from the perspective of quantity and equality. We pay particular attention to equality of education opportunities, massification of the tertiary sector, its drivers and consequences, lifelong learning, job polarization and the meaning of the low-skillness. Given the complexity of these issues and an increased uncertainty given by the ongoing economic downturn, we rely on "intuitive logics". Narrative scenarios also enable us to effectively communicate a vast amount of information produced as a part of the NEUJOBS project.

We propose three scenarios. "Business as Usual" scenario represents an extrapolation of the current trends. The tertiary sector gradually expands but islands of elite tertiary education survive in the massified tertiary system. There is a general up-skilling of the population but access to the higher education depends on the characteristics of an individual national system. The remaining two scenarios describe radical departures from the current trend. The pathway towards these extreme cases is triggered by the policy response to the ongoing sovereign debt crisis.

In the "Fragmentation" scenario, countries respond to growing fiscal pressure by a search for cost-effective solutions to education. Publicly funded provision of soft and generic skills is delegated from tertiary institutions to vocational institutions. States give blessing to the ongoing privatization of the public schooling. Alternatively, governments look for the best practices in the fastest growing countries. Early tracking is re-introduced in line with the German model. As a result, the expansion of the tertiary sector is hampered or is socially differentiated. However, policies in support of the vocational education help to counteract the job polarization. At the same time, investment in adult training will be left to private organizations, which tend to underinvest in education of the most vulnerable part of the workforce, the low-skilled, the older and the immigrant workers.

In contrast, the “Inclusive convergence” scenario assumes a society-wide consensus that no child should be left behind. An initiative similar to the Bologna process will harmonize national upper secondary systems, which will converge towards Anglo-Saxon or Swedish comprehensive model of schooling. The generalization of the upper secondary education will enlarge the pool of students eligible for tertiary studies and this way contribute to the fast expansion of the tertiary sector. With a general up-skilling of the workforce, there is a great risk of marginalization and social exclusion of the low-skilled.

The main advantage of the "intuitive logics" approach is that it enables to use every available piece of information about the future (Mietzner and Reger, 2005: 227), and as such it offers insight into those aspects of the social reality which lie beyond numeral and statistical modelling (CEDEFOP, 2008: 20-21). Our scenarios therefore respond to the call of CEDEFOP (2010: 76) to take into consideration the broader political and social context, which the figures cannot show. Furthermore, the narrative approach allows for estimates, "gut feelings" and uncertainty evaluations in addition to "objective data" (Kosow and Gassner, 2008: 63). Therefore, it enables us to overcome the data comparability problem (for the discussion of challenges associated with the comparability of Europe-wide skills dataset, see CEDEFOP, 2013a and Dzhengozova and Humpl, 2013).

Our results deviate from CEDEFOPs quantitative projections in three important respects. First, on the supply side, CEDEFOP (2009) predicts that the proportion of the population with a university degree will increase. Furthermore, the expansion of the higher education is expected to be independent of the speed with which the world economy returns to pre-crisis rates of growth. However, the alternative futures presented in this paper suggest that the expansion of the higher education will be mediated by the policy intervention in education systems. Similarly to Salmi (2009), we argue that the growing fiscal concerns associated with the "Fragmentation" scenario might contribute to the delegation of the training from the publicly funded higher education to the publicly funded vocational education. The demand which is not met by the publicly funded higher education might be met by the private sector. However, this would negatively affect equality of educational opportunities. The above-discussed "Inclusive convergence" and "Fragmentation" scenarios thus represent two extreme situations: the expansion of the higher education is the fastest in the former and the slowest in the latter.

Second, we emphasize that it is not only the expansion of higher education that matters. In the past century, the expansion of educational opportunities was not accompanied by the corresponding expansion of equality of educational opportunities (Shavit and Blossfeld, 1993). The stratification of the education system, especially the timing and rigidity of student selection, is associated with inequality of student performance (Hanushek and Woessmann, 2006; Pfeffer, 2008; Schütz et al., 2008; OECD, 2004; 2007; 2010; Woessmann, 2009). Equality of educational opportunities ranges from high (Fragmentation) through uneven (BaU) to low (Inclusive convergence) in our scenarios. The highly stratified systems characteristics of "Fragmentation" scenario will therefore pose a threat to social mobility and hamper expansion of higher education.

Fourth, our scenarios shed some light on the future development of the job polarization. According to CEDEFOP's quantitative projections (2010: 69-70), the demand for skilled non-manual occupations is expected to rise slightly and the demand for skilled manual occupations is expected to decline substantially. This phenomenon is known as job polarization. Our

scenarios suggest that greening of the economy might provide a counterweight to the hollowing out of the medium-skilled jobs, as these tend to concentrate in the engineering sector (see Colijn, 2013).

Finally, our scenarios represent three possible futures of European education systems and skill composition of the labor force. It must be noted that scenarios are not forecasts. Rather they shed light on certain aspects of the future and this way encourage policy-makers to consider the possible futures and associated uncertainties.

Both the underlying research and the resulting scenarios contain an essentially unlimited potential supply of messages for policy-makers, but we pick some that we want to emphasize:

Do not be complacent with regard to polarization.

There are powerful forces pushing for more polarization, particularly in the labour market. In most European countries, destruction or lower growth of routine, middle-skill jobs can be observed. This has important implications also for the low-skilled as the displaced middle-skilled individuals are more likely to compete and push them out. As employers adjust job content and requirements to this fact as well as gradual upskilling of the population, nominally “low-skilled” jobs can be surprisingly demanding. Polarization is likely to increase socio-economic inequalities within societies along ethnic, gender and age lines.

However and by the same token, do NOT give in to skill polarization.

Experience of European countries shows that early childhood education and other “predistribution” policy measures can play an important role and it also appears to be increasingly uncontested as a policy prescription. If coupled with access to adult learning and other policies outside the education domain,

Effective policy-making requires sophisticated understanding of nuances of the “education – labour market” link in a rapidly changing environment.

For example, we demonstrated that there is increasing complexity in what a “low skilled” person is and how well (or not) she fares in the labour market. The accelerating upskilling of populations in developed countries points to a not-too-distant future where higher education will be somewhere between mass and universal phenomenon. At the same time, the importance of experience likely to grow with implications for prospects of labor market entrants. There are two potential ways for policy-makers to react. They can either recall the “good old days” and try to stop or reverse, for example, massification of the tertiary education or they can try to adjust to the new reality, but ensure that it leads to better quality of human capital and better labour market results.

Do not confuse “greening” of the economy with “inclusive convergence”.

There is an implicit tendency to associate more sustainable economic strategy and “greening” with more equity. Our research does not provide evidence for an automatic link though there is a potential that the policy-makers can use since “greening” can support many medium-skilled jobs.

For tertiary education, focus on what people study and the quality rather than overall participation.

As tertiary education massifies, the attention of policy-makers should refocus from overall participation rates to what individuals study and why. As our research showed, returns to tertiary education already differ substantially by field of study though not always in the ways

that follow conventional wisdom. Understanding the “black box” of tertiary education will be more and more important as time goes on.

If you want the same results, do not always follow the same policies in every country

European policy-makers also need to be mindful of different ways in which national systems deal with the need for upskilling. Our research showed that a popular remedy to increase equity - less selection in secondary education, particularly later division of children into separate tracks is problematic. Its effectiveness depends on a country and the target group, while education systems are extremely difficult to shift even on a long-term basis. Similarly, different countries have different ways of upskilling its adult population – Nordic countries are more successful in overall participation, whereas Central and Eastern European ones have lower, but “deeper” participation in the sense that a much higher proportion of its adult learners “go back to school” – i.e. get a diploma.

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