DELIVERABLE 5.3. EFFECTS OF MISMATCH ON INCLUSIVE GROWTH AND SOCIAL JUSTICE REPORT

Skills2Capabilities Working paper

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ABSTRACT

Deliverable 5.3. studies the associations between skills/educational mismatch and inclusive economic growth as well as perceptions of social justice. It is based on the understanding that skills/educational mismatch may have much broader effects than its economic ones. This is in line with the capability approach, which allows us to go beyond the economic and instrumental perspective towards skills formation and to consider other roles of skills/educational mismatch and how they differ in different socio-economic contexts. The report focuses on vertical educational mismatch (in its two forms – above and below) as a type of skills mismatch. The study relies on data from the European Social Survey 2018 and official statistical sources and has applied correlations and multilevel regression modelling. It is accompanied by a dataset, which contains the main indicators used in the study and their description.

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Skills2Capabilities, a Horizon Europe study, is about understanding how skills systems need to develop if they are to assist people to make labour market transitions — i.e., between jobs, employers, or sectors — and thereby reduce the level of skills mismatch which might otherwise arise.

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1. Introduction

The term skills mismatch is very broad and is used to characterise various types of labour market imbalances, such as vertical mismatch (educational and skills mismatch), horizontal mismatch (educational and skills mismatch), skills/education underutilization, over (education, qualification, skilling), under (education, qualification, skilling), skill shortages, and skills obsolescence (Cedefop, 2010a; 2010b; 2018; Desjardins & Rubenson, 2011; Desjardins, 2014; McGuinness et al., 2018). Skills mismatch has also been defined at different levels. Thus, at macro level it "refers to the gap between the (aggregate) supply and demand for skills, typically with reference to a specific geographical unit (region, country or country group), and to the fact that observed matches between available workers and available jobs offered by firms in terms of skills and/or qualifications are sub-optimal", whereas, at the micro level it captures situations "when workers have a level of skills that is different from what is required for their job" (Brunello & Wruuck, 2021: 1146).

The present report relies on two assumptions.

First, we agree with McGuinness et al. (2018: 986) that "[t]he various concepts of skills mismatch ... are very different in terms of how they manifest themselves, their measurement, their determinants and how their consequences are felt". As a consequence, we deliberately focus our analysis on one form of skills mismatch. More concretely, *we will study vertical educational mismatch as a type of skills mismatch* that refers to imbalances *(in their two directions – above and below)* between an individual's education and the education required for the job where they are employed.

CEDEFOP (2010a: 2) defines vertical mismatch as a type of skills mismatch in which "[t]he level of education or skills is less or more than the required level of education or skills". We acknowledge that although the concepts of vertical skills mismatch and vertical educational mismatch are related, they are not the same. Thus, it is possible that an individual has a higher level of education than the one required by a given job, but due to the quality of their education (insufficient or with a specific focus) their skills are not enough or appropriate for the same job. The acquired educational level is a proxy of the acquired skills also because "the knowledge and competencies mastered at the time of completion of educational programmes ... may either (a) become obsolete over time if not used, or (b) increase as workers acquire new skills outside formal education through on-the-job training, experience, self-learning, social activities or volunteering etc." (ILO, 2018: 9). Desjardins and Rubenson (2011) mention that there has been a shift in the focus from educational mismatch towards the notion of skills mismatch. We argue that all types of skills mismatch should receive a due attention from researchers and policy makers, as they capture different aspects of imbalances between individuals' abilities and capacities and the requirements of the labor market.

Second, the problem of skills mismatch looms large because of its consequences for individual well-being and a country's economic and social

development. The greatest attention on the part of both scholars and politicians has been paid to skills mismatch's effects on individual economic rewards, firms' productivity, and national economic development (e.g., Brunello & Wruuck, 2021; Roosmaa et al., 2023). As far as subjective consequences from skills mismatch are concerned, the most studied are life satisfaction and job satisfaction as a synthetic indicator of subjective well-being at work (e.g., McGuinness & Byrne, 2015; Congregado et al., 2016; Mateos-Romero & Salinas-Jiménez, 2018). We assume that the wider social consequences of skills mismatch beyond pure economic ones deserve much more attention from both academic and policy perspectives. In line with this, we will focus on the relationships between skills mismatch (vertical educational mismatch) and both macro characteristics (Inequality-adjusted HDI, Gini coefficient, level of unemployment, poverty indices) and individual ones (individuals' perceptions regarding fairness of educational opportunities and earnings).

The reasons for our selection of the vertical educational mismatch type of skills mismatch as a focus of the analyses presented in this report are both theoretical and methodological. Post-modern societies have moved from compulsory primary and secondary education to massification of higher education and even to building universal higher education systems (Schofer & Meyer, 2005; Cantwell et al., 2018). In this context, it is worth studying whether the existence of a relatively high and stable vertical educational mismatch has negative consequences for both individuals and societies and thus problematises one of the central values — and rights — in contemporary societies: education. It should also be taken into account that this mismatch could be realised in two forms – the first one refers to situations in which the individual acquired level of education is above the one required in the job, whereas the second form relates to situations when the individual level of education is below the one required in the job. Although vertical educational mismatch, and especially overeducation, is widely studied (Desjardins, 2014; McGuinness et al., 2018), to the best of our knowledge its influence on inclusive economic growth and social justice remains under-investigated.

It is important to note that there are different methods (Cedefop, 2010b) and data from several international surveys which can be used for studying this type of skills mismatch. In the following analyses, we will use micro-level data from from the European Social Survey 2018 and macro-level data from official statistical sources (Eurostat, UNESCO) and two reports: one from The Economist Intelligence Unit (2019) and another from the UNDP (2019).

The present report proceeds in the following way. Firstly, after a brief but systematic overview of the previous literature, we suggest an understanding of skills/educational mismatch through the lens of the capability approach. Secondly, we discuss the essence of inclusive growth and present results from empirical analyses of the associations between skills/educational mismatch and pace and patterns of (inclusive) economic growth. Thirdly, we introduce the concept of fairness of educational opportunities and fairness of earnings, as well as provide empirical findings of their associations with skills mismatch

and how they are embedded in different social contexts. In the concluding section, we summarise our main arguments and outline some directions for further studies.

2. A systematic glimpse at previous literature

There is a substantial body of literature on skills mismatch and their different forms, the most studied of which remains educational mismatch (Desjardins, 2014; McGuinness et al., 2018). This research can be roughly divided into five groups: (1) discussions of theoretical approaches and concepts, (2) studies on the consequences of skills mismatch, (3) explanations of cross-country differences in skills mismatch, (4) research on the determinants of skills mismatch, and (5) policy implications from skills mismatch for policy-makers and social partners (professional organisations and trade unions) (see also Cedefop, 2010b). There are some reviews of this literature that summarise the concepts and methods of measurement used and provide international evidence on trends in vertical skills/educational mismatch (with a focus on overeducation), its determinants, and its consequences, especially in relation to earnings (e.g., McGuinness, 2006; McGuinness et al., 2018; Delaney et al., 2020). Below we will briefly focus only on the first three of the identified five groups of the previous literature on skills mismatch as the most relevant to this report.

From a theoretical point of view, there are several approaches which outline different perspectives for understanding and investigating skills mismatch. Authors also differentiate between the demand (from the perspective of firms) and supply (from the perspective of individuals) sides of skills mismatch (Brunello & Wruuck, 2021; Roosmaa et al., 2023).

Well-known *human capital theory* (HCT) (Schultz, 1961; Mincer, 1958; Becker, 1994) views education and training "as the most important investments in human capital" (Becker, 1994: 17) and defines their increase as a crucial factor for economic growth. It focuses on the productive potential of human beings and assumes that individuals are responsible for the reallocation of their resources in line with economic incentives, as well as that they take into account potential risks and uncertainties when making decisions. Within this perspective, the level of human capital (acquired through formal and non-education, informal learning, or on-the-job training) is the main determinant of earnings. That is why Roosmaa et al. (2023: 6) outline that "human capital theory regards educational mismatch as a negligible and temporary phenomenon, which is corrected by the market". McGuinness (2006: 389–390) goes further, stating that "overeducation, which is associated with worker under-utilization and wage rates below the marginal product, would appear entirely inconsistent with this view of the labour market". However, he also emphasises that "[t]he overeducation phenomenon does not necessarily overturn HCT as it is entirely plausible that workers will be overeducated in the short run, whilst firms adjust their production processes in order to fully utilize the individuals' human capital or alternatively for as long as it takes workers

to find a more appropriate match through job search" (McGuinness, 2006: 390). It should be emphasised that the economy of human development, which grow out of the early human capital literature, tries to overcome the focus on the labour market returns to schooling and training. It goes beyond the reduction of human capital to cognitive ability by acknowledging the role in the labour market of such character skills as goals, motivation, preferences (Kautz et al., 2014). It also recognizes "the multiplicity of skills that characterize human diversity" and "both the market returns and the non-monetary benefits of multiple skills, including physical and mental health, social engagement, trust, altruism, selfcontrol, happiness, life satisfaction, risk aversion, and patience" (Heckman & Corbin, 2016: 343).

The *job competition model* (Thurow, 1975), *positional theory* (Hirsch, 1976), and *credentialist theory* (Collins, 1979) look for alternative conceptualisations of skills mismatch by taking into account macro-structural elements and the extent to which graduates' professional realisation is dependent not on an individual's human capital alone but is structured by existing inequalities and opportunities. Thus, a graduate's position on the labour market becomes relational, contextual, and, most importantly, conflictual (Tholen, 2015). As Hirsch (1976: 3) argues: "[t]he value to me of my education depends not only on how much I have but also on how much the man ahead of me in the job line has". This perspective leads to another explanation of overeducation. In McGuinness's (2006: 392) interpretation, "Thurow postulates that were an individual to observe his neighbor participating in education, then under the HCT framework that individual would be less likely to participate in education as supply would be higher and the return less. However, under the Job Competition Model, the same individual would now be more likely to participate as education is a defensive necessity, necessary to protect their place in the queue". Moreover, *signaling (screening) theory* (Arrow, 1973; Stiglitz, 1975) assumes that some skills are acquired by workers to signal their level of productivity to potential employers.

Although these approaches provide a better understanding of educational mismatch/educational, they focus mainly on its relationship with productivity and individual economic benefits. As we shall lay out in the following, we believe that the capability approach offers a more holistic basis for understanding skills mismatch, because, as Bryson (2015: 552) outlines, it "forces a focus on enhancing quality of life through social and economic change, as opposed to the increasingly constrained central concern of modern capitalism on achieving economic growth for its own sake".

Regarding the streams in the previous literature which look at *the determinants of skills mismatch and their cross-country differences*, Bergin et al. (2019: 35) outline that "[e]xisting evidence on the drivers of cross-country differences in overqualification is limited". In their study, Verhaest and van der Velden (2013) use several variables to explain cross-country variations in graduate overqualification among OECD countries such as educational composition, quality of education, R&D expenditure, measures of output, unemployment gaps, and employment protection legislation. They find that

cross-country differences in overeducation are explained by the quality and orientation of the educational programme, the business cycle and the relative oversupply of highly skilled labour, but not by employment protection legislation. The study of Verhaest et al. (2017) reveals that cross-country differences in vertical mismatch are largely explained by labour market imbalances.

There are few studies that focus on how skills/educational mismatch differs in countries characterised by different income levels. For example, Handel et al. (2016) find that overqualification is the main concern in low-income countries, whereas Sparreboom and Staneva (2014) emphasise underqualification of the youth population. Bergin et al. (2019) also examine skills mismatch in low- and middle-income countries. They have found that, although many of the factors influencing skills mismatch in developed and middle-income countries are the same, "the direction of the impacts tend to be quite different, which presumably reflects differences in how the phenomena are concentrated among groups with varying levels of education" (ibid., 52). Thus, "[f]or developed labour markets, a growth in per capita GDP and a reduction in unemployment generally tend to reduce overqualification, but this was not the case for middle-income countries" (ibid.). With this report we want to extend the research on how skills/educational mismatch differs in countries characterised by different income levels by suggesting that (and investigating how) both vertical-above and vertical-below educational mismatch are associated not only with GDP growth, but also with patterns of this growth.

Studies on *the consequences of skills/educational* mismatch refer mainly to jobs' economic rewards. McGuinness et al. (2018: 11) argue that "one of the most studied aspects of overeducation is its effect on wages, and the evidence consistently points to a wage penalty for overeducated individuals, relative to individuals with the same education in matched employment", and "overeducated individuals earn 13.6% less than matched individuals". Other studies which have investigated graduates in Denmark and the United Kingdom (Allen & van der Velden; 2001; Chevalier & Lindley, 2009) also revealed that there are significant penalties for overeducation.

Among the subjective consequences of skills/educational mismatch, researchers pay most attention to job satisfaction and level of happiness. Many studies show that overeducation results in lower job and life satisfaction (see, e.g., Verhaest & Omey, 2006; Peiró et al., 2010; Diem, 2015; Piper, 2015; Congregado et al., 2016). Some authors report more nuanced findings, arguing that this is only the case when overeducation is also accompanied by overskilling (see, e.g., Green & Zhu, 2010; Sloane & Mavromaras, 2020). According to Mavromaras et al. (2012) and McGuinness and Byrne (2015), overeducation is only associated with lower job satisfaction for females. Fleming and Kler (2014) further specify that this effect is especially strong for females without children at home. It is important to emphasise that job satisfaction is generally measured with one simple indicator which does not differentiate between the various aspects of the. The present report further enriches the set of possible subjective consequences of skills/educational

mismatch and assumes that skills/educational mismatch is associated also with individual assessment of fairness of educational opportunities and own earnings.

3. Skills/educational mismatch through the lens of the capability approach

This report makes use of the capability approach as a theoretical basis. The capability approach is first introduced by the Nobel-prize-winning economist Amartya Sen and the political philosopher Martha Nussbaum (Sen, 1992, 1999; Nussbaum, 2000, 2011). It goes beyond human capital theory in the case of education and is also one of the leading paradigms for the analysis of a person's well-being (Nussbaum & Sen, 1993; Sen, 1997a). Freedoms and opportunities that people have in choosing a life they have reason to value are at the centre of this approach. Sen (2009: 233) defines 'capability' a kind of freedom which refers to "our ability to achieve various combinations of functionings that we can compare and judge against each other in terms of what we have reason to value". In turn, the concept of 'functionings' reflects the various things that a person may value being or doing. More concretely, functionings are *achieved beings and doings* of a person s/he has reason to value. Without going into details about the essence of the capability approach[1], below we briefly present a perspective for understanding and studying skills and skills mismatch based on this approach.

Bryson (2015: 559-560) highlights several advantages that the capability approach provides in studying skills: "it is multi-dimensional allowing that 'well-being cannot be reduced to income, or happiness or any single thing' (Alkire and Deneulin 2009, 22); it sees education as central to human flourishing; it recognises that skill alone is not enough to ensure achievement or well-being; and it offers a frame for analysing the purpose of skill as well as the influences on achieving that purpose".

From the capability approach perspective, skills are "*central ingredients of capabilities*" and "major sources of well-being and flourishing in society" (Heckman & Corbin, 2016: 344, emphasis added). If we have in mind the recognised skills (for example, the credential for acquired qualification), they could also be regarded as desired functioning, i.e. achievement (Bryson, 2015: 560).

Skills have both intrinsic and instrumental value. Their intrinsic value reflects the understanding of skills possession as an integral part of human development, as far as "[h]aving skills, being skilled, and engaged in some vocation, having or being educated, and engaging in or receiving pieces of training adds to one's well-being" and "can potentially motivate youngsters around the world to discover new horizons" (Thapa, 2021: 154). In turn, the

[1] For a systematic overview of the capability approach see, for example, Robeyns (2017), Boyadjieva and Ilieva-Trichkova (2021).

instrumental value of skills relates to their role in increasing people's capabilities for gaining "better work, occupation, and gainful employment and income", "which can further contribute to the improvement of living standards (ibid.). Acknowledging both the intrinsic and instrumental value of skills means that skills mismatch should also be regarded as having both intrinsic and instrumental aspects and consequences.

According to Støren and Arnesen (2011) unemployment is the most severe form of skills/education–job mismatch. Within the capability approach, it is acknowledged that unemployment may have different reasons and it can also be a result of individual refusal to accept a job, which does not ensure a capability-enhancing activity (Laruffa, 2020). From this perspective involuntary, or externally forced unemployment, should be defined as the most damaging form of skills-job mismatch.

Reflecting on the consequences for individuals stemming from involuntary unemployment, Sen (1999: 94) outlines that it "is not merely a deficiency of income that can be made up through transfers by the state (at heavy fiscal cost that can itself be a very serious burden); it is also a source of far-reaching debilitating effects on individual freedom, initiative and skills... it leads to losses of self-reliance, self-confidence and psychological and physical health". Massive unemployment leads to diverse penalties other than low income, such as: loss of freedom and social exclusion, skill loss, psychological harm, ill health, motivational loss, loss of human relations, loss of social values and responsibility (Sen, 1997b: 160-163). Taking into account this view of unemployment as a cause for capability deprivation which goes beyond income deficiency, we propose to view *skills mismatch as imbalances or a lack of correspondence between individuals' skills and those skills required in the labour market, leading to capability deprivation with wider consequences at individual and societal level than reduced economic benefits alone*.

It is also important to emphasise that, within the capability approach, analyses "go well beyond the study of the skills embodied in agents—their "internal capabilities"—to consider the social and political institutions that inhibit or promote the expression of skills—their "external capabilities" (Heckman & Corbin, 2016: 342). Applying this understanding to the study of skills mismatch implies we must consider that *the effects of skills mismatch are also influenced by the socio-economic and political environment*. That is why we will pay attention to the social embeddedness of the influence of skills mismatch and on individual perceptions of social justice regarding educational opportunities and earnings.

It is beyond doubt that, out of all the types of skills mismatch, the concept of overeducation — which was introduced in 1976 by Richard Freeman in a study based on US experience — has received the most attention in the literature (see Cedefop, 2010b). However, understanding of the essence and findings about this phenomenon remains "far from straightforward", mainly due to measurement issues and difficulties in adequately capturing the relationship

between occupations and their educational requirements (Cedefop, 2010b: 14).

We argue that the very term "overeducation" is incorrect, as it reduces the complexity of benefits from education to the labour market. We further claim that when a person has a job that requires a lower level of education, this does not mean that s/he is overeducated because s/he can use the acquired education in other social spheres. It is important to be emphasized that the capability approach conceives education as one of the dimensions of human life and human development which is important both for its own sake and for its contribution to the expansion of capabilities in other spheres of life (Nussbaum, 2011; Chiappero-Martinetti & Sabadash, 2014). Skills/educational mismatch is not an absolute phenomenon; it always refers to a concrete job and depends on individual job preferences. To account for education–job discrepancies, we will use the term "vertical skills/educational mismatch" instead of "overeducation". We also acknowledge that there are two forms of vertical skills/educational mismatch: when the individual skills are either above or below the level required for a given job. We designate the first situation as vertical-above *skills/educational mismatch* and the second as *vertical-below skills/educational mismatch*.

Relying on the above theoretical discussion, we define *vertical skills/educational mismatch as a lack of correspondence between one's level of acquired skills/education/qualification, on the one hand, and the level of skills/education/qualification required for a job, on the other, which can lead to capability deprivation with wider consequences for individual (such as their well-being, active citizenship or perceptions of fairness of earnings and educational opportunities) and societies than economic benefits alone (e.g., pace and patterns of economic growth)*.

Taking into account the brief review of existing literature and the outlined capability approach perspective towards (vertical) skills/educational mismatch*, in this report we focus on vertical educational mismatch (with its both forms – above and below) as a type of skills mismatch by asking the following* ***research questions (RQ)s:***

RQ1: How does vertical educational mismatch relate to pace and patterns of economic growth?

RQ2: How does vertical educational mismatch relate to perceptions of fairness of educational opportunities?

RQ3: How is the association between vertical educational mismatch and subjective assessments of the fairness of people's educational opportunities embedded in different economic and political contexts?

RQ4: How does vertical educational mismatch relate to perceptions of fairness of own earnings?

RQ5: How is the association between vertical educational mismatch and subjective assessments of the fairness of people's earnings embedded in different economic and political contexts?

4. Data and research strategy

4.1. Data and measures

The analyses are based on two types of data: individual and country-level.

As for the individual-level data, we have used the European Social Survey for 2018 (ESS Round 9: European Social Survey Round 9 Data, 2018). We have chosen this wave because it includes a special rotating module devoted to justice and fairness, and there are special questions about fairness of earnings and subjective assessments of the fairness of educational opportunities, which we use as dependent variables in our analyses. More specifically, we have used data for 29 European countries and limited the age of respondents to 25–64 years. This age range was chosen so as to give everyone the chance to have attained their highest level of education and to have had some experience with the labour market. We have also limited the data to those who reported having paid work in the last 7 days. We worked with three analytical samples: the first one referred to the analyses by occupational groups[2] and comprised 22,545 individuals. Due to missing categories in some of the variables included in the models, we worked with 20,602 cases for the models for fairness of net pay; in the case of the models for fairness of educational opportunities, there were 21,480 cases. The countries included were Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Montenegro, the Netherlands, Norway, Poland, Portugal, Serbia, Slovakia, Slovenia, Spain, Sweden, and Switzerland.

As for the data at country-level, we have used the official statistics (Eurostat, UNESCO) and two reports from The Economist Intelligence Unit (2019) and the UNDP (2019).

Analysing literature on skills mismatch, Muñoz de Bustillo Llorente et al. (2018: 979) outline that, although "the methodology for measuring education and skill mismatch matters, yielding low correlations between the incidence using different methodologies", "the impact of over-education on labour market outcomes seems to be quite consistent, irrespective of the method employed". The most widely applied methods for measuring skills/educational mismatch are workers' self-assessment (e.g., Boll et al., 2014; Cedefop, 2018; 2021), the realised matches approach (e.g., Muñoz de Bustillo Llorente et al., 2018; Roosmaa et al., 2023), and the job analysis approach (Flisi et al., 2014).

Aiming to be as objective as possible while simultaneously covering as broad a part of the country populations as possible, we will use the realised matches approach. This is a statistical method which "consists in defining the required

2 More specifically, we differentiate between four occupational groups distinguished based on ISCO broad categories at the single-digit level: high-skilled white-collar workers (ISCO 1–3), low-skilled white-collar workers (ISCO 4–5), high-skilled blue-collar workers (ISCO 6–7), and low-skilled blue–collar workers (ISCO 8-9).

education level as a function of a measure of central tendency of the educational level of the workers, job, comparing afterwards the education of the employees with such benchmark. The approach estimates the required level of education using a central tendency measure of the distribution. The mean or the modal level of education is used as the required level of education for the job. One considers that there is educational mismatch if the actual education of the worker is greater than this threshold" (Muñoz de Bustillo Llorente et al., 2018: 980).

We have selected the realised matches approach because it is indicated to acknowledge skills upgrading due to technological change or new formal qualification requirements (Capsada-Munsech, 2019). Additionally, the mode is used as a threshold instead of the mean in order to account for critiques which suggest that the use of the mean could lead to asymmetry in estimation of the mismatch and because it is less sensitive to outliers (Mendes de Oliveira et al., 2000; Sloane, 2003; Muñoz de Bustillo Llorente et al., 2018).

Following Roosmaa et al. (2023), we calculated the modal level of education based on four ISCED 2011 categories of workers (ISCED 0–2 primary education and less; 2 upper-secondary; 3 post-secondary non-tertiary; 4 short-cycle tertiary education and higher) separately for each ISCO-08 two-digit occupation group in each country. However, as we argue, it is not in line with the capability approach to talk about over and undereducation, we thus classify the individuals as being vertically mismatched above if their attained education is one level above the mode for their occupation; they are defined as matched if their educational level is equal to the modal level of education and vertically mismatched below if their acquired education is below the mode for their occupation.

To measure the pace and patterns of economic growth, we use the following indicators[3], taken as of 2018:

- *Real GDP growth rate*. It is measured in terms of chain-linked volumes, as a percentage change from the previous period. GDP (gross domestic product) is a measure of economic activity, defined as the value of all goods and services produced less the value of any goods or services used in their creation. The calculation of the annual growth rate of GDP volume is intended to allow for comparisons of the dynamics in economic development both over time and between economies of different sizes. For measuring the growth rate of GDP in terms of volume, the current GDP is valued according to prices from the previous year, and the thus-computed volume changes are imposed on the level of a reference year; this is called a chain-linked series. Accordingly, price movements will not inflate the growth rate. Source: Eurostat. Data code: tec00115 [Extracted on 19.10.2024].

[3] See Section 5 of the report for a further explanation and justification of these indicators.

- *Inequality-adjusted HDI*. It is designed to adjust adjusts the Human Development Index value for inequality within countries in each of its components (health, education, and income) (UNDP, 2019: 35). This index looks beyond the average progress of a country in terms of longevity, education, and income to show how these achievements are distributed among its residents (ibid.: 297). It ranges between 0 and 1, where the value of 1 means the best possible level of human development when inequality is accounted for (ibid.: 308–309).
- *Gini coefficient of equivalised disposable income*. It is considered to be the best-known and the most common measure of income inequality and the higher the Gini coefficient, the more unequal the income distribution in a given country is (Alkire and Santos, 2009; Zeliazkova, 2024). More specifically, it ranges between 0 and 100 and gives the extent to which the distribution of income within a country deviates from a perfectly equal distribution. A value of 0 means that income is distributed equally across the population, whereas 100 means that only one person receives all the income in the country (Living conditions in Europe - income distribution and income inequality - Statistics Explained). Source: Eurostat. Data code: ilc_di12 [Extracted on 01.10.2024].
- *At-risk-of-poverty rate by poverty threshold*. It is an income and living conditions indicator, which measures the at-risk-of-poverty rate (cut-off point: 60% of median equivalised income after social transfers). Its unit of measure is a percentage; the higher it is, the greater is the poverty in a given country. Source: Eurostat. Data code: ilc_li02 [Extracted on 04.10.2024].
- *Persons at risk of poverty or social exclusion*. It is used as a measure of poverty linked with the EU2030 targets. Its unit of measure is also a percentage. Source: Eurostat. Data code: ilc_pecs01 [Extracted on 04.10.2024].
- *In-work at-risk-of-poverty rate*. It refers to the percentage of persons in the total population from 18 to 64 years of age who declared themselves to be working (employed or self-employed) and who are at risk of poverty (i.e., with an equivalised disposable income below the risk-of-poverty threshold, which is set at 60% of the national median equivalised disposable income (after social transfers). Source: Eurostat. Data code: ilc_iw01 [Extracted on 04.10.2024].
- *Unemployment rate*. It refers to the percentage of unemployment among the total population aged 20 to 64 years. Source: Eurostat. Data code: une_rt_a [Extracted on 12.09.2024].

4.2. Variables

As for the perceptions of fairness of educational opportunities and fairness of earnings, we measure them at individual level and use two dependent variables in this report. The first dependent variable is linked to the following question: "*To what extent do you think this statement applies to you? Compared to other people in [country], I have had a fair chance of achieving the level of education I was seeking*". Respondents rated this statement on an 11-point Likert scale, where 0 means "does not apply at all" and 10 means "applies completely". This variable reflects assessments regarding the fairness of educational opportunities. The second dependent variable indicates whether a person judges their remuneration as fair. The variable is linked to the question: "*Would you say your net pay is unfairly low, fair, or unfairly high?*". The answer scale consists of nine points. In this case, 0 means that pay is fair, -4 indicates extremely unfairly low pay, and 4 indicates extremely unfairly high pay.

Our main independent variable is *vertical educational mismatch*, which has three categories: 0 — no mismatch; 1 — vertical-above educational mismatch; and 2 — vertical-below educational mismatch.

We also included the following as independent variables at individual level: *occupational groups* (four categories — 1 = high-skilled white-collar workers (ISCO 1–3); 2 = low-skilled white-collar workers (ISCO 4–5); 3 = high-skilled blue-collar workers (ISCO 6–7); and 4 = low-skilled blue-collar workers (ISCO 8–9); *the highest level of education,* measured with the International Standard Classification of Education (ISCED) classification, 2011 version (four categories — 1 = ISCED 0–2; 2 = ISCED 3; 3 = ISCED 4; 4 = ISCED 5–8); *the highest level of parents' education* as an indicator of social background (0 = no parents having higher education; 1 = at least one parent having higher education); *gender* (0 = male; 1 = female); and *age* (continuous).

In order to study the social embeddedness of the relationship between subjective assessments of the fairness of educational opportunities and fairness of earnings and vertical mismatch, we selected some important indicators of economic and political contexts. More concretely, we included the following independent variables at the country level:

- *GDP per capita*. We have used this as an indicator of a country's economic development. More specifically, we have used the GDP per capita, PPP (current international USD), extracted from the UNESCO Institute for Statistics [UIS]). As of 2018, the highest value of GDP was in Ireland at $84,918, and the lowest was in Serbia at $17,717.
- *Democracy index*. We included this index as an indicator of the political context. This index ranges from 0 to 10 and is composed of 60 indicators grouped into five categories: electoral process and pluralism; civil liberties; functioning of government; political participation; and political culture (The Economist Intelligence Unit, 2019). As of 2018, among the 29 countries in our analysis, the

democracy index was highest in Norway: 9.87; it was the lowest in Montenegro: 5.74.

All variables are presented in a separate dataset, which includes also a short description of each of them.

4.3. Research strategy

The report applies correlations and multilevel regression modelling for the data analysis. The correlations are used in Section 5, whereas the multilevel modelling was used in Sections 6 and 7.

Multilevel modelling was chosen as it allows us to model data at different levels such as those of individuals and groups (for more details, see Rabe-Hesketh & Skrondal, 2012). Multilevel regression is also considered a more preferable technique than ordinary regression if the intraclass correlation (ICC) value of the null model is higher than 0.05 (see Hox, 1998). Furthermore, the number of groups in our analysis is 29, above the minimum number of 25 groups that is required for applying multilevel linear models (Bryan & Jenkins, 2016). The analyses were conducted in Stata 14 using the xtreg command.

As a first step, we estimated a null model representing a baseline model with only the intercept. The ICC in the empty model (Model 0) is 0.108 for fairness of educational opportunities and 0.121 for fairness of earnings. This shows that 10.8% of the variation in fairness of educational opportunities and respectively 12.1% of the variation in fairness in earnings is due to differences between the countries where people live.

As a next step, we estimated the same set of models for both dependent variables. Model 1 includes vertical educational mismatch. In Model 2, all independent variables at individual level are included. In Model 3, we added an interaction term between vertical educational mismatch and the occupational groups. Then Models 4a and 5a include the country-level characteristics, added one by one; whereas Models 4b and 5b include cross-level interaction terms separately between GDP per capita, democracy index, and vertical educational mismatch.

4.4. Limitations of the analyses

Our analyses have the following main *limitations*. Firstly, for some of them, we were not able to use the most recent data, due to: a) the lack of recent data which would allow us to apply our theoretical understanding of the main concepts; and b) the constraints related to using data from international surveys before spring 2025 (as in the case of the second wave of the Cedefop European Skills and Jobs Survey from 2021). Secondly, the analyses presented allow for a discussion about the associations between variables, but they do not imply causality. However, although associations do not reveal causality, they indicate the existence of a relationship between the studied variables. Lastly, we do not have a variable which considers the time when the respondent had this occupation.

5. Vertical educational mismatch and inclusive growth

It is well proven that economic growth positively influences average quality of life: "[t]wo centuries of growth have reduced the percentage of people living in extreme poverty — from 19 out of 20 people in 1820 to 2 out of 20 people in 2015". However, it is also acknowledged that "vast income differences across countries leave millions still languishing in poverty" and that "within-country inequality has risen in many advanced economies (AEs) and several large emerging markets" (Cerra, 2022: 1–3). In addition to income inequalities, there are significant inequalities in wealth and opportunities. Thus, in mid-2019, "the richest 10% own 82% of global wealth and the top 1% alone own 45%" (Credit Suisse, 2019: 2). In turn, inequalities in opportunities capture the existence of important disparities in access to education, health, and financial services which influence inequalities in income and wealth. However, as prominent authors have shown, the social price of inequalities is very high (Stiglitz, 2012; Piketty, 2014). Recently, mainly inspired by the capability approach, there has been an ongoing discussion on the essence of human development and its measurement, which emphasises the need to consider a broader array of aspects of both objective and subjective human well-being (Stiglitz et al., 2009; Comin, 2017).

The above data and discussion — which clearly show that although economic growth has the power to reduce poverty, it is not enough to overcome inequalities in income, wealth, and opportunities among people nor to enhance human development in all its aspects — serve as rationale for the development of the concept of inclusive growth. However, there is still no consensus in the literature on a common understanding of inclusive growth. It should be noted that there are some other concepts that seem to approximate inclusive growth. The "pro-poor" concept tries to capture the mean growth rate of those below the poverty line (Ravallion & Chen, 2003; Klasen et al., 2024), while the World Bank's concept of "shared prosperity" refers to increasing the incomes and welfare of the bottom 40 percent of society (Cerra, 2022: 10).

The concept of inclusive growth highlights "that not only is growth with equity possible, but also growth and poverty and inequality reduction can be instrumental to each other" (Ranieri & Ramos, 2013: 1). According to Ianchovichina and Lundstrom (2009: 2), inclusive growth "refers *both* to the pace and pattern of growth, which are considered interlinked, and therefore in need to be addressed together". McKinley (2010) argues that inclusive growth requires achieving sustainable growth that expands economic opportunities and ensures broader access to these opportunities for all members of society. Anand et al. (2013) highlight that for "growth to be sustainable and effective in reducing poverty, it needs to be inclusive" and that "inclusiveness — a concept that encompasses equity, equality of opportunity, and protection in market and employment transitions — is an essential ingredient of any successful growth strategy". The definition of inclusive growth suggested by Cerra (2022: 8–9) has three components: "(1) strong economic growth that is (2) inclusive

and (3) sustainable". Inclusion is thus defined by four general objectives: benefit-sharing, opportunity, participation, and empowerment.

Recently, inclusive growth has moved to the forefront of the policy agenda. In response to growing inequalities in income and other dimensions of well-being, the OECD launched an initiative on Inclusive Growth in 2012. "The objective was to help governments find ways to make economic growth more inclusive, so that it translates into meaningful gains in living standards across key dimensions of well-being and different socioeconomic groups" (James et al., 2017: 7). The World Economic Forum released its "Inclusive Growth and Development Report 2017" with the aim to provide a practical guide for policymakers and stakeholders seeking to develop a strategy of greater synergy between economic growth and fairer living standards for all (Samans et al., 2017). The idea of inclusive growth has received a prominent place in the UN 2030 Agenda: for example, the SDG 8 points to "promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all".

The European Commission also emphasises the link between a high-employment economy and social cohesion, which "means empowering people through high levels of employment, investing in skills, fighting poverty and modernizing labor markets, training and social protection systems so as to help people anticipate and manage change, and build a cohesive society" (European Commission, 2020). Considering the impact of the Covid-19 pandemic on rising inequality and poverty rates, a recent World Bank report (2021) alerts that inclusive growth is at a crossroads and urges countries in Europe to develop special policies to ensure a green, resilient, and inclusive recovery.

Following Cerra et al. (2022: xi, 9), we accept that inclusive growth is a multidimensional phenomenon which refers to a "strong and sustainable economic growth whose benefits are widely shared", i.e., economic growth leading to "broadly sharing improvements in living standards and well-being among all groups in society".

Several authors, mainly economists (McKinley, 2010; Anand et al., 2013; Cerra, 2022; Cerra et al., 2022; Hazmi et al., 2022), have suggested different ways for measuring inclusive growth. They refer to accounting for poverty, income inequalities, access to education, health, and finance resources. The UN Trade and Development organisation (UNCTAD, 2022) has developed an Inclusive Growth Index (IGI) with four pillars (economy, living conditions, equality, environment) and 27 indicators. In general, all suggested measures of inclusive growth refer to income growth and income distribution. Based on this, in the following analysis related to our *RQ1* about the association between vertical educational mismatch and the pace and patterns of economic growth, we will use real GDP growth rates to measure the pace of economic growth together with the Inequality-adjusted HDI, the Gini coefficient of equivalised disposable income, the level of unemployment, the at-risk-of-poverty rate by poverty threshold, the persons at risk of poverty or social exclusion, and the in-work at-risk-of-poverty rate as measures of the

patterns (inclusiveness) of economic growth. Generally, we expect that skills mismatch will be negatively associated with GDP growth and positively associated with the indicators of patterns (inclusiveness) of economic growth.

5.1. Vertical educational mismatch and pace of economic growth

Although it is acknowledged that GDP has several shortcomings as a measurement of economic activity and welfare (Stiglitz et al., 2009; 2010; Cerra, 2022), it remains the most widely recognised indicator of economic growth. GDP is widely used in different studies which reveal its strong relationship with human development (e.g. Capriati, 2022). In the section on previous literature of this report it was outlined that several authors had found significant relationship between the growth of GDP and the level of overeducation/qualification (e.g. Bergin et al., 2019). That is why we also use real GDP growth rates, but only as one of the measures of countries' economic growth.

Our analyses, however, have not identified any statistically significant association between the levels of mismatch, vertical (above and below) educational mismatch in a given country, and the real GDP growth rate in that country for any of the four occupational groups or for the population aged 25–64 who have paid work. This unexpected finding may suggest that other factors – e.g. innovations, investments, labour market policies, level of education of county's population – are crucial determinants of GDP growth.

5.2. Vertical educational mismatch and patterns of economic growth

As already highlighted, GDP as a measure of economic progress has been criticised for not considering such important aspects of growth as its distribution, unpaid domestic labour, or its negative effects on the environment (Stiglitz et al., 2010). Recently, there has been a clear tendency of expanding research on the so-called Beyond-GDP agenda (e.g., Chancel et al., 2014; Biggeri & Mauro, 2018; Hoekstra, 2019). Relying mainly on the human development paradigm and the capability approach[4], the Beyond-GDP agenda tries to suggest additional measures to better capture the multidimensionality of people's and societies' well-being.

In its 20th Human Development Report, the UNDP introduced the Inequality-adjusted Human Development Index to take into account the losses in human development due to inequality in health, education, and income (UNDP, 2010). A report by the International Commission on the Measurement of Economic Performance and Social Progress also emphasises the importance of assessing inequalities in a comprehensive way (Stiglitz et al., 2010). The

[4] Indicative in this respect is the fact, that during the 20th HDCA Conference "*Crises, Capabilities and Commitment*", which took place in Kolkata, India, September 24–26, 2024, a special roundtable was organised with the aim to engage both academics and practitioners in a debate on the current state and future of the Beyond-GDP agenda.

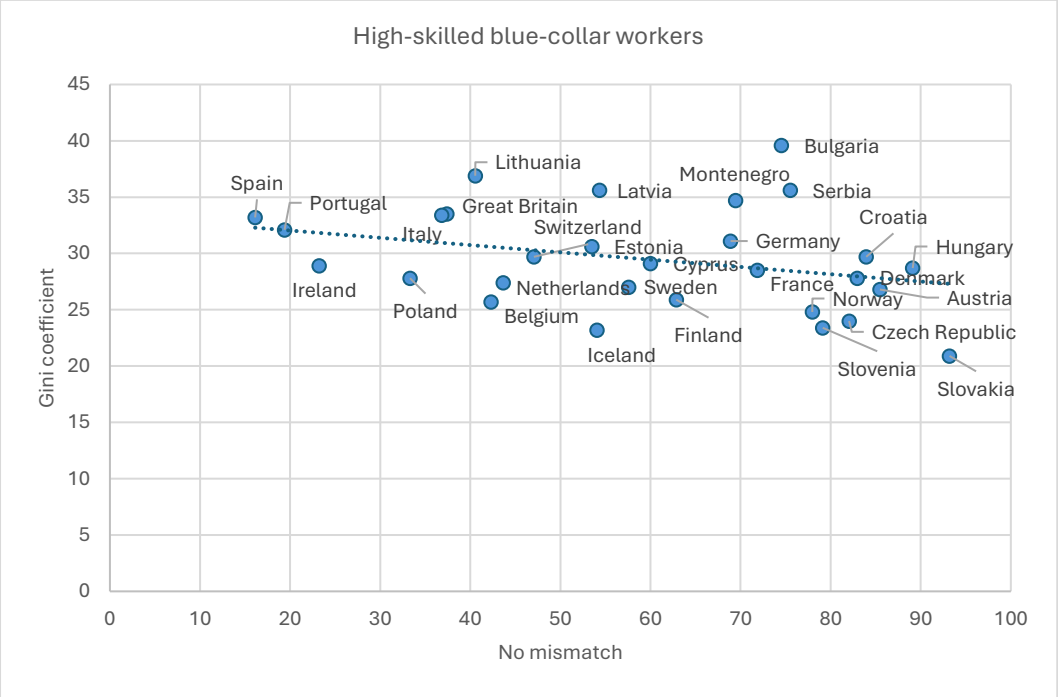
authors critically assess the limits of GDP as a measurement of the well-being of societies, highlighting, for example, that GDP overlooks economic inequality (i.e., the fact that most people can be worse off even though average income is increasing).

In order to overcome some of the limitations of GDP as an indicator of societies' well-being, we pay attention to patterns of economic growth — more concretely, to inequalities in people's well-being and social inclusiveness. In this regard, we rely on the following measures: the Inequality-adjusted HDI, Gini coefficient of equivalised disposable income, level of unemployment, at-risk-of-poverty rate by poverty threshold, persons at risk of poverty or social exclusion, and in-work at-risk-of-poverty rate. We have included several measures of poverty in order to capture its different aspects. Thus, some authors (e.g. Zeliazkova, 2024) suggest that at-risk-of-poverty rate by poverty threshold measures the depth of poverty, whereas the indicator persons at risk of poverty or social exclusion actually measures the width of poverty. As we focus on the employed people, we have also added a measure of the width of poverty specifically for the working population: in-work at-risk-of-poverty rate. To the best of our knowledge, there are no previous studies on the relationship between skills mismatch and most of the identified in this report measures of patterns of economic growth. Some studies (e.g. Bergen et al., 2019) have found a positive association between overqualification and the unemployment rate. Taking into account the previous research and our theoretical framework, we expect that the two forms of vertical educational mismatch will differ in their associations with the pace and patterns of economic growth and that the situation of no mismatch will be positively related with the measures of inclusive economic growth.

Our analyses have identified several statistically significant associations between the levels of mismatch, vertical mismatch above and vertical mismatch below in a given country, and part of the measures of economic growth patterns for some of the four occupational groups or among the population aged 25–64 who have paid work. We will be presenting here only those that are significant at levels of $p < 0.01$, 0.05 or 0.10.

First, we have found that there is a negative correlation between the Gini coefficient and the percentage of no mismatch for high-skilled blue-collar workers (Pearson's $r = -0.315$ at $p < 0.10$). This shows that as the proportion of no mismatch in a given country gets higher, economic inequalities get lower (see Figure 1).

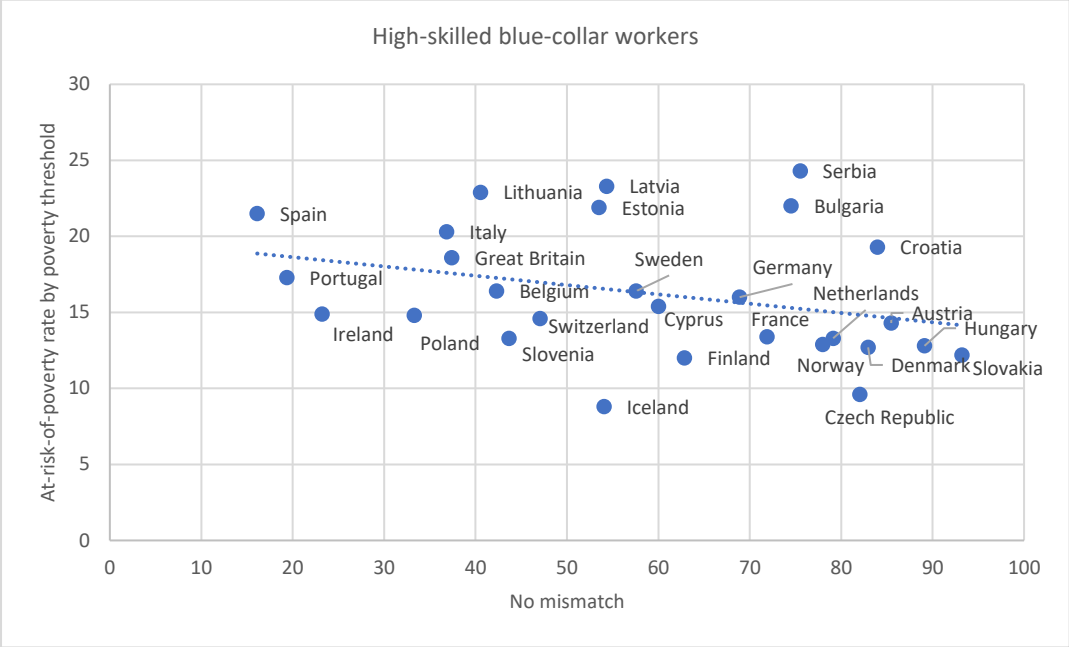
Figure 1. Scatterplot of percentage of no mismatch against Gini coefficient for high-skilled blue-collar workers as of 2018 for 29 countries



Source: Own calculations based on ESS Round 9 (2018) and Eurostat. Data code: ilc_di12 [Extracted on 01.10.2024].

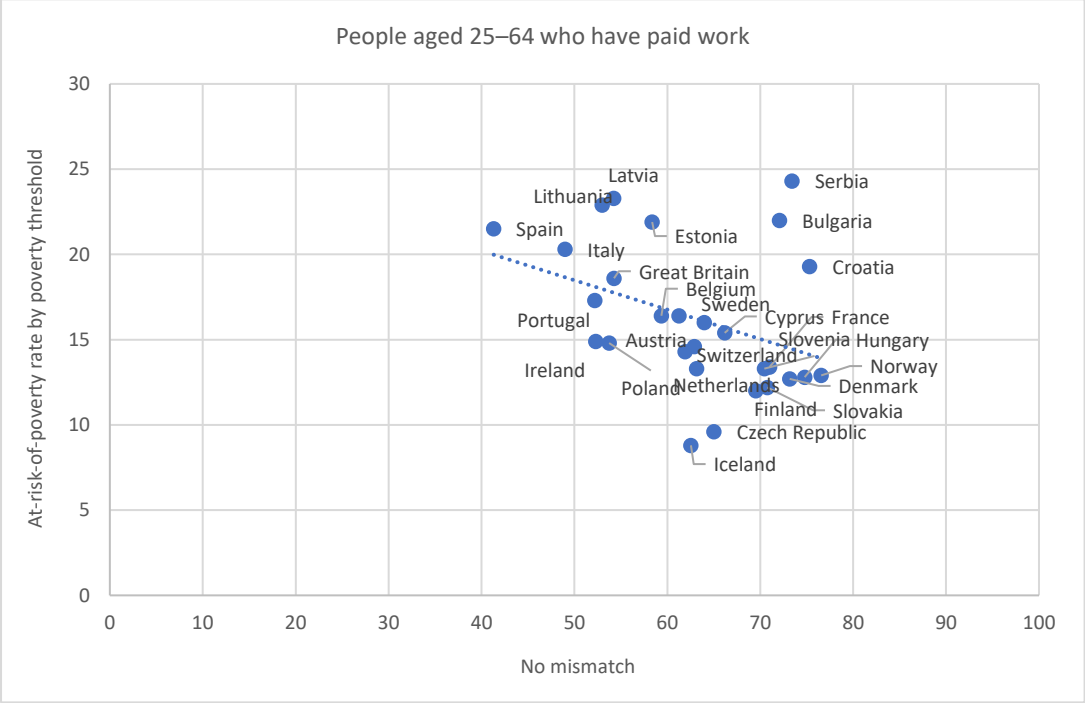
Furthermore, our analysis shows that there is a negative correlation between the proportion of no mismatch and the at-risk-of poverty rate by threshold (Pearson's $r = -0.320$ at $p < 0.05$) both among the people aged 25–64 who have paid work and in the case of high-skilled blue-collar workers (Pearson's $r = -0.320$ at $p < 0.10$). It means that a higher level of no mismatch for these two groups is associated with lower at-risk-of-poverty values (see Figures 2 and 3).

Figure 2. Scatterplot of percentage of no mismatch against at-risk-of-poverty rate by poverty threshold for high-skilled blue-collar workers as of 2018 for 28 countries



Source: Own calculations based on ESS Round 9 (2018) and Eurostat, Data code: ilc_li02 [Extracted on 04.10.2024]. *Note*: There was missing data for the at-risk-of-poverty rate by poverty threshold in Montenegro.

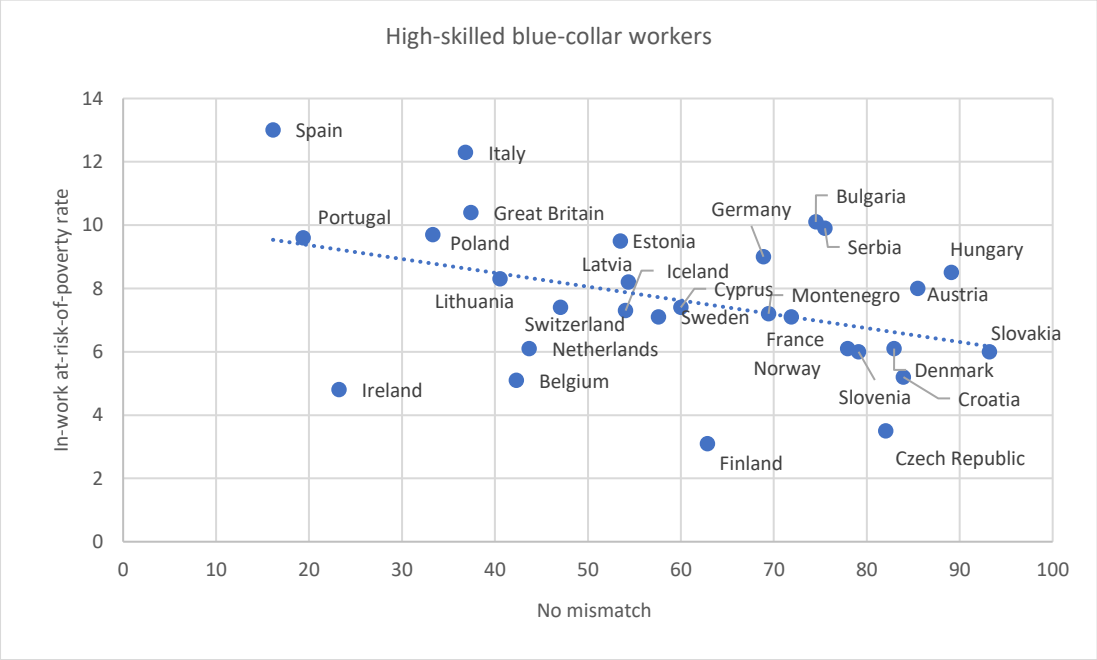
Figure 3. Scatterplot of percentage of no mismatch against at-risk-of poverty rate by threshold for people aged 25 –64 who have paid work as of 2018 for 28 countries



Source: Own calculations based on ESS Round 9 (2018) and Eurostat, Data code: ilc_li02 [Extracted on 04.10.2024]. *Note*: There was missing data for the at-risk-of-poverty rate by poverty threshold in Montenegro.

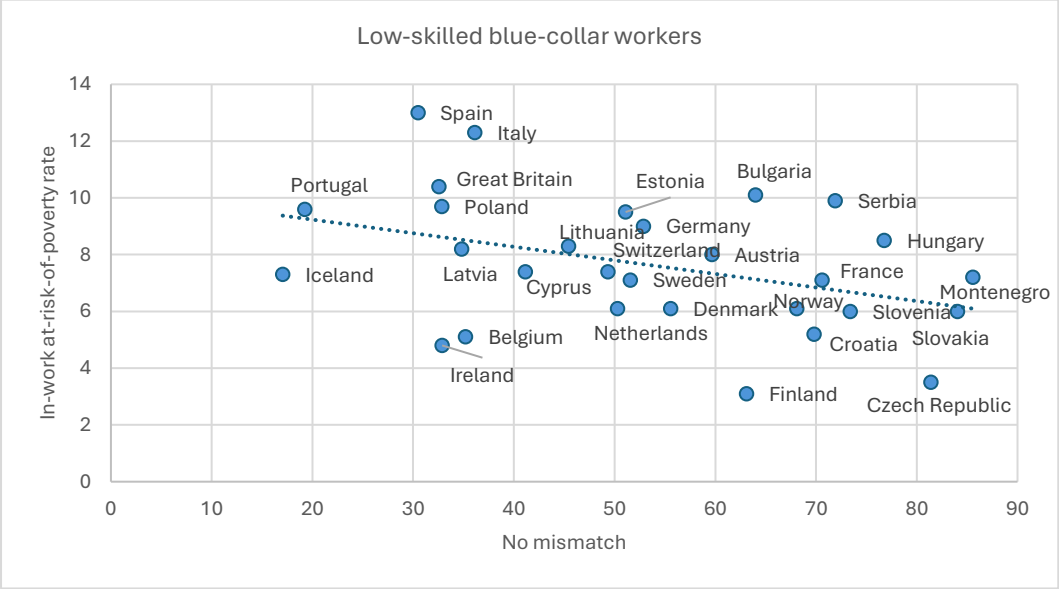
We also found negative correlations between the in-work at-risk-of-poverty rate and the percentage of people in a given country who have no mismatch in the case of high-skilled blue-collar workers (Pearson's r = -0.407, significant at $p < 0.05$), low-skilled blue-collar workers (Pearson's r = -0.394, significant at $p < 0.05$), and the whole population of people aged 25–64 who have paid work (Pearson's r = -0.509, significant at $p < 0.01$). This shows that the higher the level of no mismatch among the high-skilled blue-collar group, the low-skilled blue-collar group, and these people aged 25–64 who have paid work in a given country, the lower the level of in-work poverty (See Figures 4–6).

Figure 4. Scatterplot of percentage of no mismatch against in-work at-risk-of-poverty rate for high-skilled blue-collar workers as of 2018 for 29 countries



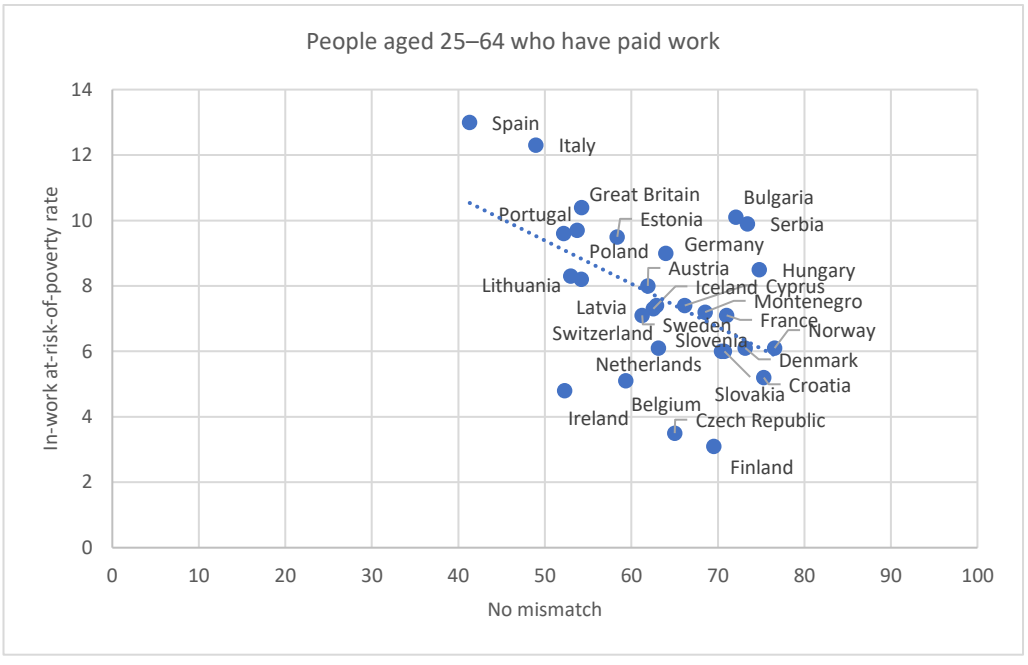
Source: Own calculations based on ESS Round 9 (2018) and Eurostat. Data code: ilc_iw01 [Extracted on 04.10.2024].

Figure 5. Scatterplot of percentage of no mismatch against in-work at-risk-of-poverty rate for low-skilled blue-collar workers as of 2018 for 29 countries



Source: Own calculations based on ESS Round 9 (2018) and Eurostat. Data code: ilc_iw01 [Extracted on 04.10.2024].

Figure 6. Scatterplot of percentage of no mismatch against in-work at-risk-of-poverty rate for people aged 25–64 who have paid work as of 2018 for 29 countries

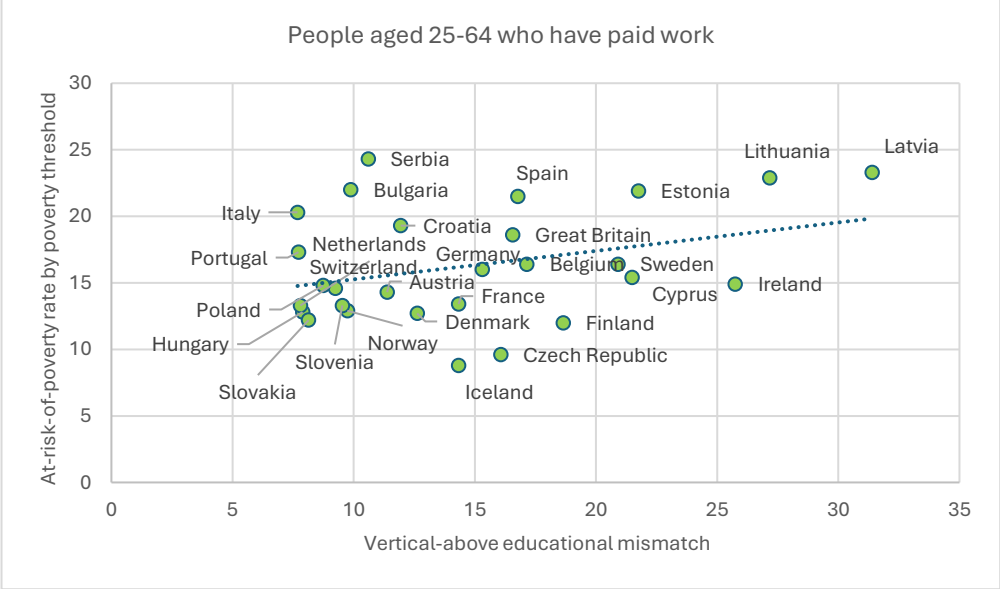


Source: Own calculations based on ESS Round 9 (2018) and Eurostat. Data code: ilc_iw01 [Extracted on 04.10.2024].

As regards the vertical-above mismatch, we found only statistically significant correlations with some of the indicators for patterns of growth at a 10% significance level.

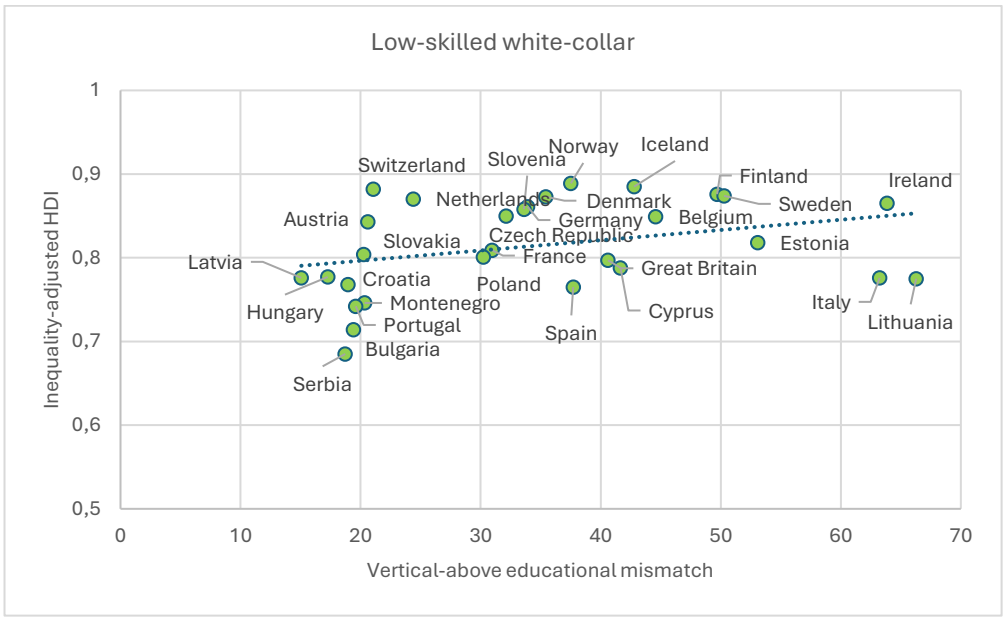
Figures 7–9 illustrate weak positive correlations between the at-risk-of-poverty rate by poverty threshold and the percentage of people 25–64 who have paid work in a given country who have vertical-above educational mismatch (Pearson's r =0.326, significant at $p < 0.10$), as well as between the Inequality-adjusted HDI and vertical-above educational mismatch among the low-skilled white-collar group (Pearson's r =0.330, significant at $p < 0.10$) and the high-skilled blue-collar group (Pearson's r = 0.323, significant at $p < 0.10$). This shows that as vertical-above educational mismatch among the population 25–64 who have paid work increases, the at-risk-of-poverty rate by poverty threshold and level of in-work poverty also get higher. The results furthermore show that the higher the percentage of vertical-above educational mismatch among low-skilled white-collar workers and high skilled blue-collar workers, the higher the Inequality-adjusted HDI.

Figure 7. Scatterplot of percentage of vertical-above educational mismatch for people aged 25 –64 who have paid work against at-risk-of-poverty rate by poverty threshold as of 2018 for 28 countries



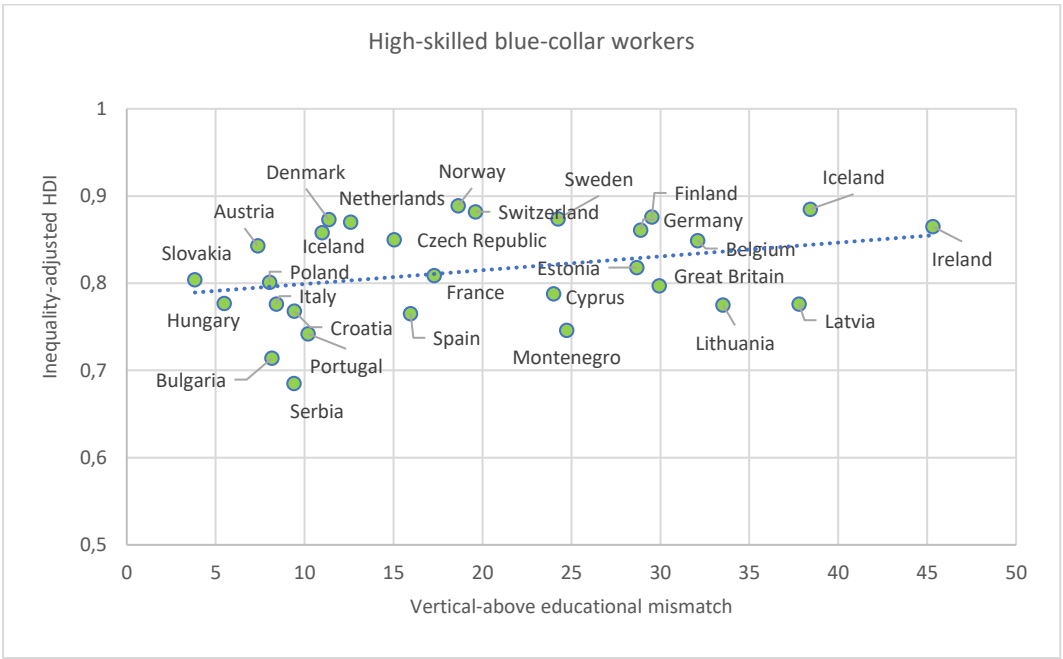
Source: Own calculations based on ESS Round 9 (2018) and Eurostat, Data code: ilc_li02 [Extracted on 04.10.2024] *Note*: There was missing data for the at-risk-of-poverty rate by poverty threshold in Montenegro.

Figure 8. Scatterplot of percentage of vertical-above educational mismatch against Inequality-adjusted HDI for low-skilled white-collar workers as of 2018 for 29 countries



Source: Own calculations based on ESS Round 9 (2018) and UNDP (2019).

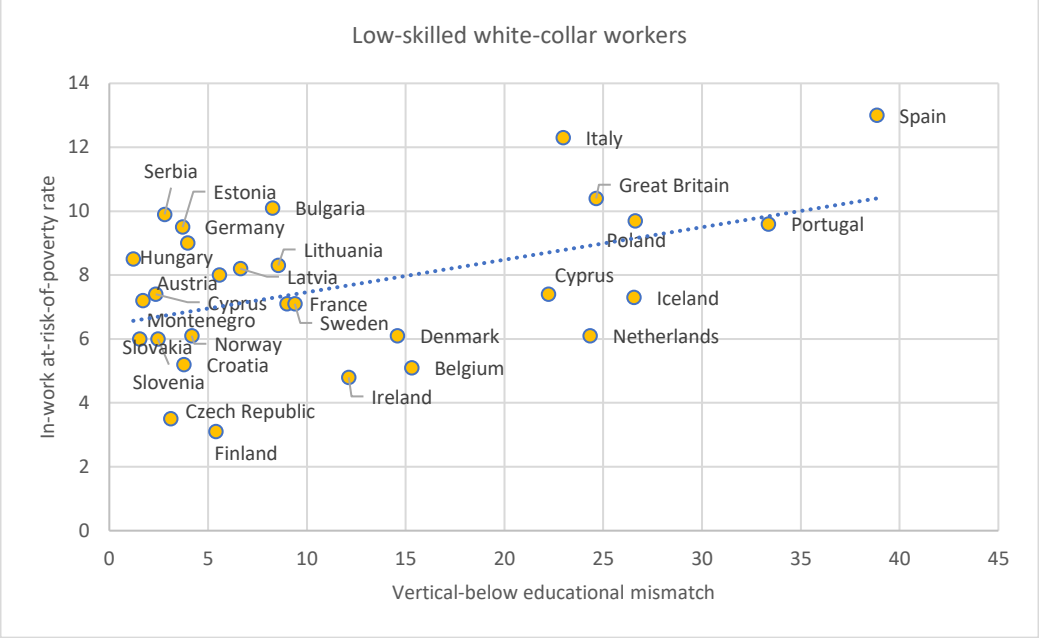
Figure 9. Scatterplot of percentage of vertica-abovel educational mismatch against Inequality-adjusted HDI for high-skilled blue-collar workers as of 2018 for 29 countries



Source: Own calculations based on ESS Round 9 (2018) and UNDP (2019).

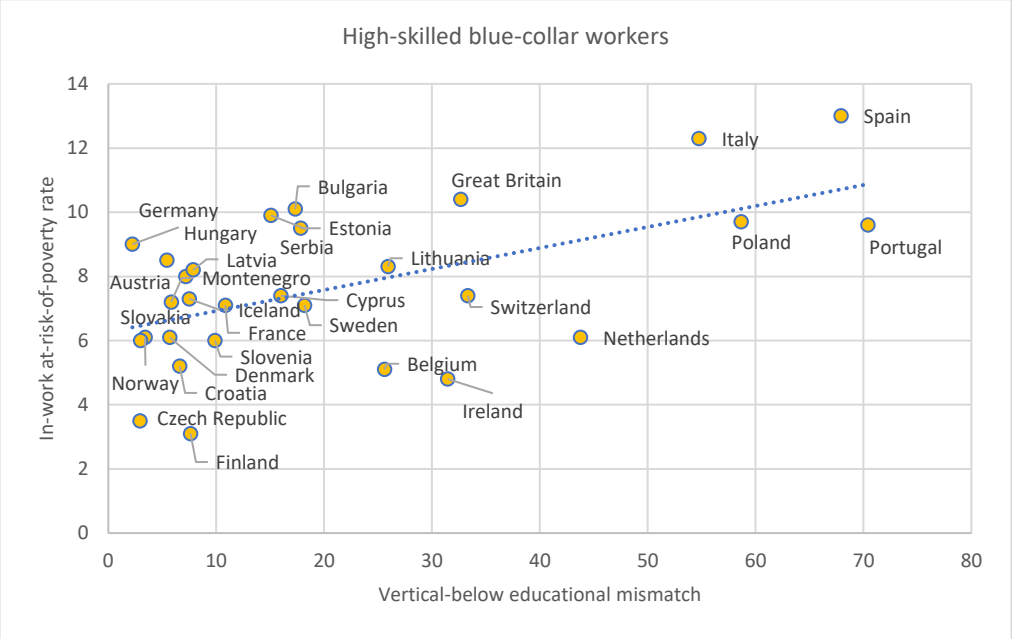
We found moderate positive correlations between the in-work at-risk-of-poverty rate and the percentage of people in a given country with vertical-below educational mismatch in the case of low-skilled white-collar workers (0.465, significant at $p < 0.05$), high-skilled blue-collar workers (Pearson's $r = 0.560$, significant at $p < 0.01$), low-skilled blue-collar workers (Pearson's $r = 0.498$, significant at $p < 0.01$), and the whole population aged 25–64 who have paid work (Pearson's $r = 0.612$, significant at $p < 0.01$). This shows that for all occupational groups, except for the high-skilled white-collar group and for the population 25–64 who have paid work, when the level of vertical-below educational mismatch grows higher in a given country, the level of in-work poverty also increases (see Figures 10–13).

Figure 10. Scatterplot of percentage of vertical-below educational mismatch against in-work at-risk-of-poverty rate for low-skilled white-collar workers as of 2018 for 29 countries



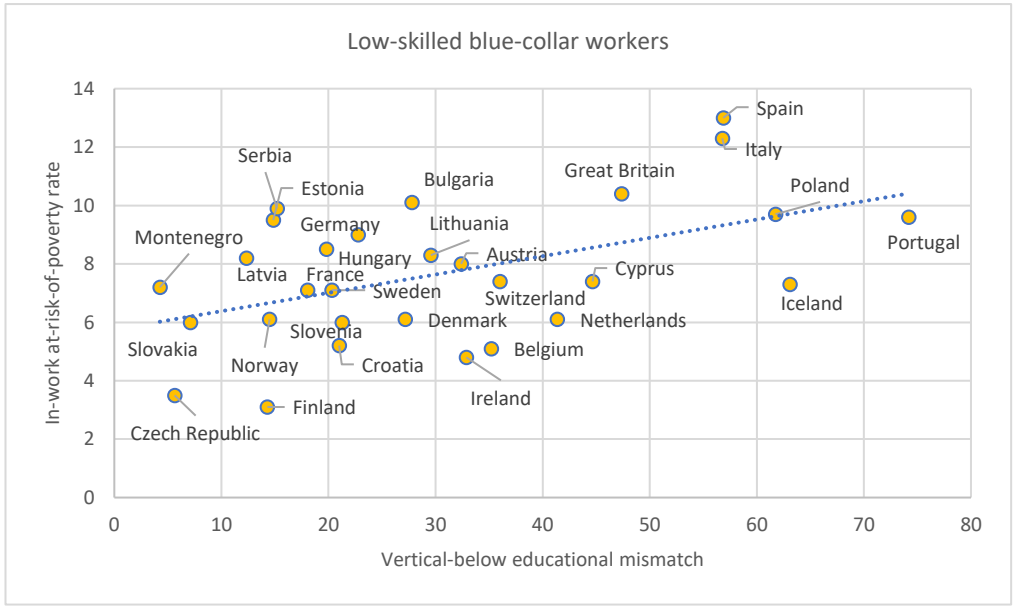
Source: Own calculations based on ESS Round 9 (2018) and Eurostat. Data code: ilc_iw01 [Extracted on 04.10.2024].

Figure 11. Scatterplot of percentage of vertical-below educational mismatch against in-work at-risk-of-poverty rate for high-skilled blue-collar workers as of 2018 for 29 countries



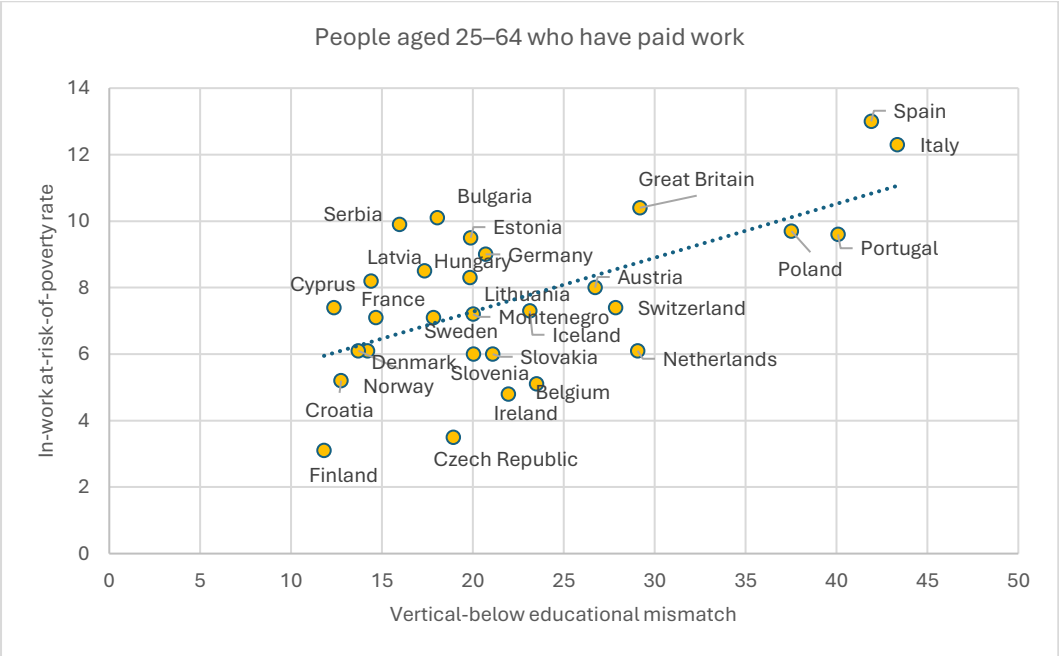
Source: Own calculations based on ESS Round 9 (2018) and Eurostat. Data code: ilc_iw01 [Extracted on 04.10.2024].

Figure 12. Scatterplot of percentage of vertical-below educational mismatch against in-work at risk-of-poverty rate for low-skilled blue-collar workers as of 2018 for 29 countries



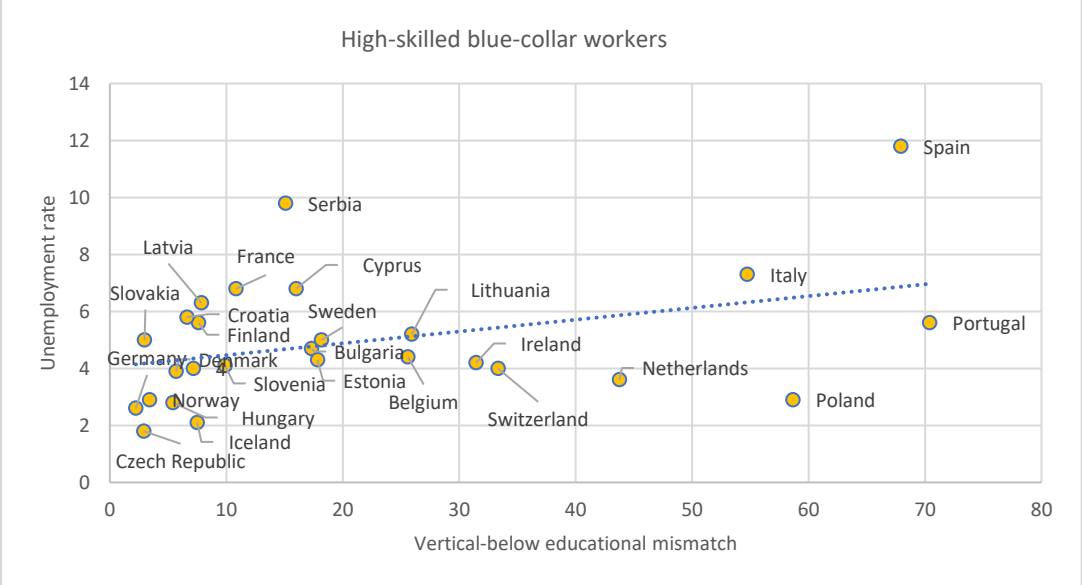
Source: Own calculations based on ESS Round 9 (2018) and Eurostat. Data code: ilc_iw01 [Extracted on 04.10.2024].

Figure 13. Scatterplot of percentage of vertical education-job mismatch below against in-work at-risk-of-poverty rate for people aged 25–64 who have paid work as of 2018 for 29 countries



Source: Own calculations based on ESS Round 9 (2018) and Eurostat. Data code: ilc_iw01 [Extracted on 04.10.2024].

Figure 14. Scatterplot of percentage of vertical-below educational mismatch against unemployment rate for high-skilled blue-collar workers as of 2018 for 27 countries



Source: Own calculations based on ESS Round 9 (2018) and Eurostat. Data code: une_rt_a [Extracted on 12.09.2024]. *Note*: There was missing data on unemployment for Great Britain and Montenegro.

We also found a moderate positive correlation between the level of unemployment in a given country and the share of vertical-below mismatch in the case of high-skilled blue-collar workers in a given country (Pearson's r = 0.383, significant at $p < 0.05$). This shows that as vertical-below educational mismatch gets higher for this occupational group, the level of unemployment tends to increase (See Figure 14).

6. Vertical educational mismatch and social justice

6.1. Vertical educational mismatch and fairness of educational opportunities

The capability approach views living as a combination of various "doings and beings" (Sen, 1993). At the heart of this approach are the freedoms and opportunities that people have in choosing a life that they have reason to value. It is also important to highlight that outcomes ("functionings") are less significant than "opportunities". Because of this, the very way human capabilities are realised is crucial for the better conceptualisation and measurement of human and social development.

According to the capability approach, unjust inequality relates more to freedom to achieve rather than actual achievements. As Sen (1992: 148) puts it: "[i]f the social arrangements are such that a responsible adult is given no less freedom (in terms of set comparisons) than others, but he still wastes the opportunities and ends worse off than others, it is possible to argue that no unjust inequality may be involved".

The capability approach perspective implies that one's attained educational level and years of schooling are not a sufficient measure and that inequalities also have to be considered when it comes to education. According to Drèze and Sen (2002: 6), "[t]his crucial role of social opportunities is to expand the realm of human agency and freedom, both as an end in itself and as a means of further expansion of freedom ... We shall be particularly concerned with those opportunities that are strongly influenced by social circumstances and public policy". Sen (2009: 296) also argues that any theory of justice "has to be alive to both fairness of the processes involved and to the equity and efficiency of the substantive opportunities that people can enjoy".

The vital importance of the fairness of educational opportunities reflects the fact that educational inequalities are among the most important determinants of economic disparities and differences in individual civic participation. There are two important characteristics of educational inequalities: they are strongly influenced by people's social background, and they are cumulative (e.g., Rubenson, 1998; Di Prete & Eirich, 2006). That is why the issue of the legitimacy of educational inequalities becomes indispensable for any study of education. However, the legitimacy of inequalities in education is not self-evident.

Boyadjieva et al. (2024) reveal that higher perceived unfairness of educational opportunities is associated with lower levels of active citizenship. Their findings also demonstrate the social embeddedness of the link between the perception of fairness of educational opportunities and active citizenship — thus, this negative association is mitigated when people are living in high-trust societies and in countries which are more economically and democratically developed.

Taking into account the above discussion, in this section we will try to answer our *RQ2* and *RQ3* about the association between vertical educational mismatch with subjective assessments about the fairness of people's opportunities to achieve the level of education they desire, as well as how this association is embedded in different economic and political contexts. On the basis of our previous research (Boyadjieva et al., 2024) we expect that vertical educational mismatch will be negatively associated with subjective assessments about the fairness of educational opportunities and that this association will depend on the specificity of the wider economic and political contexts.

Table 1 presents the results from the multilevel linear regression models concerning whether a person considers that they had a fair chance of achieving the level of education they were seeking. Model 1 indicates that being vertically-below mismatched is associated with lower levels of perceived fairness of educational opportunities than for the group of people who are experiencing no mismatch. We could say that it is also largely true for those vertically-above mismatched, although with less certainty ($p < 0.10$). However, when we add the independent variables in Model 2, the coefficients for both types of mismatch lose significance, which mean that they are explained by the added individual level variables. Thus, the estimates show that the lower an occupational group is, the lower is their level of perceived fairness regarding educational opportunities. At the same time, the higher their level of attained education, the higher the perceived fairness of educational opportunities. We also found a positive association between assessments of fairness of educational opportunities and having a high social background. We did not find evidence of a relationship between age and subjective assessments of fairness of educational opportunities, but we observed that being a female is associated with lower levels of fairness perceptions regarding educational opportunities in comparison to being a male.

These estimates are consistent in the rest of the models (3–5b). In Model 3, we added the interaction effect between vertical mismatch and occupational groups. To facilitate interpretation, this interaction effect is plotted in Figure A1 of the Appendix. Our estimates show that there is only one statistically significant interaction effect: among high-skilled blue-collar workers with vertical-below mismatch, indicating that the level of perceived fairness of educational opportunities among the high-skilled blue-collar group is lower when they are vertically-below mismatched. The same could be claimed with

less certainty (90 percent confidence: $p<0.10$) for the low-skilled blue-collar group.

Estimates in Model 4a show that a country's level of economic development (measured by GDP per capita) is positively associated with fairness of educational opportunities. This result is consistent with Model 4b. At the same time, Model 4b indicates that there is a negative interaction term between GDP and vertical-above educational mismatch, indicating that the level of perceived fairness of educational opportunities becomes lower among those vertically-above mismatched when GDP gets higher. To facilitate interpretation, this interaction effect is plotted in Figure A2 of the Appendix. In contrast, a positive interaction term can be observed in the case of those vertically-below mismatched (at 10% significance level), indicating that the level of perceived fairness regarding educational opportunities among this group become higher when the country's GDP gets higher.

Estimates in Model 5a show that a country's level of political development (measured by the democracy index) is positively associated with fairness of educational opportunities. This result is consistent with Model 5b. At the same time, Model 5b indicates that there is a negative interaction term between the democracy index and vertical-above educational mismatch, indicating that the level of perceived fairness of educational opportunities becomes lower among those vertically-above mismatched when the democracy index gets higher. In contrast, a positive interaction term can be observed among those vertically-below mismatched, indicating that their level of perceived fairness of educational opportunities become higher when the democracy index gets higher. To facilitate interpretation, this interaction effect is plotted in Figure A3 of the Appendix.

Thus, in both cases, we found evidence for the moderating effect of context on the relationship between fairness of educational opportunities and the type of vertical educational mismatch.

Table 1. Results for multilevel linear regression models concerning whether a person considers they had a fair chance of achieving the level of education they sought, coefficients and standard errors in parentheses

	Model 1	Model 2	Model 3	Model 4a	Model 4b	Model 5a	Model 5b
Vertical mismatch, Ref. No mismatch							
Vertical-above mismatch	-0.079+	-0.094	-0.041	-0.094	-0.090	-0.095	-0.086
	(0.046)	(0.069)	(0.121)	(0.069)	(0.069)	(0.069)	(0.069)
Vertical-below mismatch	-0.846**	-0.002	0.094	-0.004	-0.004	-0.003	0.003
	(0.040)	(0.073)	(0.093)	(0.073)	(0.073)	(0.073)	(0.073)
Occupational groups, Ref. High-skilled white-collar							
Low-skilled white-collar		-0.329**	-0.237*	-0.327**	-0.324**	-0.325**	-0.324**
		(0.069)	(0.100)	(0.069)	(0.069)	(0.069)	(0.069)
High-skilled blue-collar		-0.383**	-0.233*	-0.381**	-0.376**	-0.380**	-0.372**
		(0.075)	(0.106)	(0.075)	(0.075)	(0.075)	(0.075)
Low-skilled blue-collar		-0.923**	-0.801**	-0.918**	-0.913**	-0.916**	-0.909**
		(0.076)	(0.106)	(0.076)	(0.076)	(0.076)	(0.076)
Highest level of education Ref., ISCED 0–2							
ISCED 3		0.983**	0.862**	0.985**	0.984**	0.990**	0.994**
		(0.082)	(0.118)	(0.082)	(0.082)	(0.082)	(0.081)
ISCED 4		1.274**	1.213**	1.271**	1.268**	1.274**	1.273**
		(0.118)	(0.137)	(0.118)	(0.118)	(0.118)	(0.118)
ISCED 5–8		1.658**	1.640**	1.655**	1.657**	1.657**	1.667**
		(0.128)	(0.144)	(0.128)	(0.128)	(0.128)	(0.128)
Parents' highest level of education Ref., None of the parents have higher education							
At least one parent has higher education		0.381**	0.381**	0.376**	0.378**	0.373**	0.374**
		(0.038)	(0.038)	(0.038)	(0.038)	(0.038)	(0.038)
Gender, Ref. Male							
Female		-0.069*	-0.068*	-0.067*	0.068*	-0.067*	-0.067*
		(0.032)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)
Age		-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Individual level interactions: Occupational groups, Ref. High-skilled white-collar							
Low-skilled white-collar× Vertical-above mismatch			-0.146				
			(0.161)				
High-skilled blue-collar× Vertical-above mismatch			-0.209				
			(0.182)				
Low-skilled blue-collar× Vertical-above mismatch			-0.073				
			(0.183)				
Low-skilled white-collar× Vertical-below mismatch			-0.069				
			(0.173)				
High-skilled blue-collar× Vertical-below mismatch			-0.370*				
			(0.179)				
Low-skilled blue-collar× Vertical-below mismatch			-0.309+				
			(0.168)				
Country-level features and cross-level interactions							
GDP				0.297**	0.298**		
				(0.064)	(0.066)		
GDP × Vertical-above mismatch					-0.095*		
					(0.044)		
GDP × Vertical-below mismatch					0.066+		
					(0.039)		
Democracy index						0.382**	0.374**
						(0.060)	(0.061)
Democracy index × Vertical-above mismatch							-0.099*
							(0.047)
Democracy index × Vertical-below mismatch							0.102*
							(0.040)
Constant	7.735**	6.629**	6.645**	6.660**	6.661**	6.663**	6.653**
	(0.149)	(0.158)	(0.173)	(0.158)	(0.159)	(0.158)	(0.157)
ICC	0.106	0.022	0.025	0.023	0.024	0.022	0.022
Observations	21480	21480	21480	21480	21480	21480	21480

Source: Own calculations based on ESS Round 9 (2018) for 29 countries.

6.2. Vertical educational mismatch and fairness of own earnings

The vital significance of fair earnings distribution stems from the fact that income inequalities are among the most important determinants of disparities and differences in people's quality of life. According to D'Ambrosio et al. (2018), unfair perceived earnings inequality is also associated with a lack of work effort and of active political participation.

An analysis by Stoilova and Ilieva-Trichkova (2023), based on data from the European Social Survey, shows the existence of gender differences in perceptions of fairness of earnings and that these differences are greater among women with a lower level of education and those working in the public sector. Their findings also reveal the social embeddedness of perceptions of fairness regarding income inequalities. Thus, they "demonstrate that in more economically developed countries and those with a high gender gap in part-time employment, gender differences in the subjective assessments of fairness of net pay between men and women are much lower than in less economically developed countries, and where the gender gap in part-time employment is low" (ibid.: 278).

Adriaans and Targa (2023) also use data from the European Social Survey to investigate gender differences in pay evaluations by studying fairness evaluations of respondents' earnings and the underlying conceptions of fair earnings. They find that in 15 out of the 28 analysed countries, women reported more intense levels of perceived unfairness in own earnings.

In a recent study, Moya and Adriaans (2024) argue that the way individuals perceive the fairness of their pay has important implications for individuals and society. They outline that perceptions of pay injustice are linked to several negative outcomes, such as diminished well-being, poor health, increased stress, and depressive symptoms, as well as negative effects in the workplace domain.

Taking into account the above considerations, in this section we will try to answer our *RQ4* and *RQ5* about the association between vertical educational mismatch and subjective assessments of the fairness of earnings, as well as how this association is embedded in different economic and political contexts. Based on the above mentioned studies we expect that vertical educational mismatch will be negatively associated with subjective assessments of own earnings and that this association will depend on the specificity of the wider economic and political contexts.

The results from the multilevel linear regression models concerning whether people perceive their net pay as fair are presented in Table 2. Model 1 indicates that being vertically-above or below mismatched is associated with lower levels of perceived fairness of net pay than when belonging to the group who are experiencing no mismatch. However, when we add the independent variables in Model 2, the coefficient for vertical-above mismatch loses significance, which mean that they are explained by the added individual level variables; whereas in the case of vertical-below mismatch, we can observe that the coefficient became positive, albeit at a significance of $p < 0.10$,

meaning we could claim with 90% confidence that being vertically-below mismatched is associated with higher levels of perceived fairness of net pay than when there is no mismatch.

Similarly to the case of fairness of educational opportunities, the estimates show that the lower the status of the occupational group, the lower the level of perceived fairness of net pay; and the higher the level of attained education, the higher the perceived fairness of net pay. We also found a positive association between assessments regarding fairness of net pay and having a high social background. We did not find evidence of a relationship between age and fairness perceptions about educational opportunities, but we found that being a female is associated with lower levels of perceived fairness of net pay in comparison to being a male. In Model 3, when we added the interaction term between vertical educational mismatch and occupational groups, the significance of those being vertically-below mismatched was lost. The estimates show that there is only one statistically significant interaction effect: in the case of high-skilled blue-collar workers and vertical-below mismatch, indicating that the level of perceived fairness of net pay among the high-skilled blue-collar group is lower than in the case of those who are vertically-below mismatched. To facilitate interpretation, this interaction effect is plotted in Figure A4 of the Appendix.

Estimates in Models 4a and 5a show that a country's level of economic development (measured by GDP per capita) and political development (measured with the democracy index) are positively associated with fairness of net pay. This means that in countries which are more economically and politically developed, there is higher perceived fairness of net pay among the people who are working in these countries, given the other covariates. Models 4b and 5b indicate that there are no significant cross-level interaction terms between GDP or the democracy index and the types of mismatch, indicating that we did not find evidence for the moderating effect of context on the relationship between fairness of net pay and types of educational mismatch.

Table 2. Results for multilevel linear regression models concerning whether a person perceives net pay as fair, coefficients and standard errors in parentheses

	Model 1	Model 2	Model 3	Model 4a	Model 4b	Model 5a	Model 5b
Vertical mismatch, Ref. No mismatch							
Vertical-above mismatch	-0.073**	-0.032	-0.086	-0.032	0.030	-0.033	-0.029
	(0.027)	(0.042)	(0.073)	(0.042)	(0.042)	(0.042)	(0.042)
Vertical-below mismatch	-0.120**	0.076+	0.088	0.074+	0.074+	0.075+	0.075+
	(0.023)	(0.044)	(0.056)	(0.044)	(0.044)	(0.044)	(0.044)
Occupational groups, Ref. High-skilled white-collar							
Low-skilled white-collar		-0.165**	-0.157**	-0.164**	-0.164**	-0.163**	-0.163**
		(0.042)	(0.061)	(0.042)	(0.042)	(0.042)	(0.042)
High-skilled blue-collar		-0.204**	-0.185**	-0.203**	-0.203**	-0.202**	-0.201**
		(0.045)	(0.064)	(0.045)	(0.045)	(0.045)	(0.045)
Low-skilled blue-collar		-0.298**	-0.307**	-0.295**	-0.296**	-0.295**	-0.295**
		(0.046)	(0.064)	(0.046)	(0.046)	(0.046)	(0.046)
Highest level of education Ref., ISCED 0–2							
ISCED 3		0.179**	0.123+	0.181**	0.181**	0.183**	0.184**
		(0.049)	(0.071)	(0.049)	(0.049)	(0.049)	(0.049)
ISCED 4		0.235**	0.179*	0.233**	0.233**	0.235**	0.234**
		(0.071)	(0.083)	(0.071)	(0.071)	(0.071)	(0.071)
ISCED 5–8		0.376**	0.333**	0.374**	0.372**	0.376**	0.376**
		(0.077)	(0.087)	(0.077)	(0.077)	(0.077)	(0.077)
Parents' highest level of education Ref., No parent has higher education							
At least one parent has higher education		0.148**	0.151**	0.145**	0.146**	0.144**	0.144
		(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Gender: Ref. Male							
Female		-0.258**	-0.260**	-0.256**	-0.257**	-0.257**	-0.257**
		(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Age		-0.0005	-0.0006	-0.0005	-0.0005	-0.0006	-0.0006
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Individual level interactions: Occupational groups, Ref. High-skilled white-collar							
Low-skilled white-collar× Vertical-above mismatch			0.023				
			(0.097)				
High-skilled blue-collar× Vertical-above mismatch			0.150				
			(0.110)				
Low-skilled blue-collar× Vertical-above mismatch			0.080				
			(0.110)				
Low-skilled white-collar× Vertical-below mismatch			0.010				
			(0.105)				
High-skilled blue-collar× Vertical-below mismatch			-0.222*				
			(0.108)				
Low-skilled blue-collar× Vertical-below mismatch			-0.036				
			(0.101)				
Country-level features and cross-level interactions							
GDP				0.362**	0.367**		
				(0.045)	(0.040)		
GDP × Vertical-above mismatch					-0.027		
					(0.027)		
GDP × Vertical-below mismatch					-0.003		
					(0.023)		
Democracy index						0.338**	0.340**
						(0.043)	(0.041)
Democracy index × Vertical-above mismatch							-0.032
							(0.028)
Democracy index × Vertical-below mismatch							0.011
							(0.024)
Constant	-1.191**	-1.259**	-1.209**	-1.221**	-1.220**	-1.229**	-1.229**
	(0.095)	(0.101)	(0.103)	(0.098)	(0.096)	(0.098)	(0.097)
ICC	0.128	0.043	0.023	0.034	0.025	0.033	0.029
Observations	20602	20602	20602	20602	20602	20602	20602

Source: Own calculations based on ESS Round 9 (2018) for 29 countries.

7. Discussion and conclusions

The present report studies some effects of skills/educational mismatch on inclusive economic growth and social justice using data from the European Social Survey 2018 and official statistics. More concretely, it focuses on the relationships between vertical educational mismatch (in its two forms – above and below) and both macro characteristics (the pace - GDP growth rate - and pattern of economic growth – Inequality adjusted HDI, Gini coefficient, level of unemployment, poverty indices) and individual ones (individuals' perceptions about fairness of educational opportunities and earnings).

At the theoretical level, we have argued that the dominant approaches in studies on skills mismatch place it mainly in relation with productivity and individual economic benefits. In searching for a more comprehensive theoretical perspective, this report draws on the heuristic potential of the capability approach. We define skills/educational mismatch as imbalances between individuals' skills/education and the skills/education required in the labour market, leading to capability deprivation with wider consequences at the individual and societal level than reduced economic benefits alone. Focusing on vertical educational mismatch, i.e., imbalances in which individuals' educational level exceed or is below the one needed for a given job, the report also pays attention to the social embeddedness of the effects of this type of skills mismatch on individual perceptions of social justice regarding educational opportunities and earnings.

In relation to our *RQ1 and in accordance with our expectations*, our findings suggest that no mismatch can be viewed as a sign of inclusive growth. Thus, among the entire population aged 25–64, higher levels of no mismatch are associated with lower values of both the at-risk-of-poverty rate and the in-work poverty rate.

Roosmaa et al. (2023) have convincingly shown that there are substantial differences in skills/educational mismatch between occupational groups. Our findings further reveal that the effects of skills mismatch at individual and societal level vary among different occupational groups. More concretely, our results suggest that the market labour situation of the high-skilled blue-collar occupational group has a crucial role for the economic inclusive growth in a given country. Thus, higher levels of no mismatch for this group are associated with lower values of income inequalities, at-risk-of-poverty rates, and in-work poverty rates in the countries where they work. In addition, when vertical-below educational mismatch gets higher for this occupational group, levels of unemployment tend to increase; whereas when vertical-above educational mismatch gets higher, the Inequality-adjusted HDI also increases. We suggest that these results reflect the fact that the existence of adequate and well-qualified high-skilled blue-collar workers is an important factor for the development of key economic sectors, such as energy, production, construction, agriculture, and manufacturing.

The obtained results demonstrate that vertical - either above or below - educational mismatch is related with capability deprivation at both individual and societal levels. For example, we found that as the vertical-above educational mismatch among the population 25–64 who have paid work increases, the rates of both at-risk-of-poverty and in-work poverty also become higher. Among the occupational groups, the findings show that a higher percentage of vertical-above educational mismatch for low-skilled white-collar workers and high skilled blue-collar workers is correlated with a higher Inequality-adjusted HDI.

Regarding our *RQ2* and *RQ4*, we found that in line with our expectations at the individual level, being vertically-above or below educationally mismatched is associated with lower levels of perceived fairness of educational opportunities and net pay than being in the group of people who are experiencing no mismatch. It is very important to highlight that, in response to our *RQ3* and *RQ5* and as expected, the analyses reveal that the social environment could moderate the relationship between vertical educational mismatch and subjective assessments of educational opportunities, albeit not in the same direction for all cases of mismatch. Thus, we witnessed a positive moderating effect of GDP on perceived fairness of educational opportunities in the case of vertical-below educational mismatch — positive subjective assessments regarding fairness of educational opportunities grow higher when GDP increases. However, we also found that the level of perceived fairness of educational opportunities gets lower among people who are vertically-above mismatched when the democracy index gets higher and GDP increases. A plausible explanation for these results could be related to the fact that, as a rule, more democratic and economically developed countries favour the development of more critical individual attitudes, along with rewarding those individuals with higher expectations and aspirations (e.g. Heyne, 2016).

Our study raises several additional questions and allows us to outline some directions for future research. Firstly, further analyses are needed to explain some of our findings, e.g., the lack of a statistically significant association between levels of vertical educational mismatch and the real GDP growth rate in a given country. Secondly, the relationship between skills/educational mismatch and inclusive growth could be studied in a more dynamic way, i.e., for other time periods. Thirdly, it is worth investigating how skills/educational mismatch affects different dimensions of individual well-being, for example, their self-esteem, aspirations, active citizenship or well-being at work. Fourthly, it would be interesting to reveal if other macro factors (e.g., the level of innovation or the level of individualism/collectivism) moderate the relationship between skills/educational mismatch and subjective fairness assessments about people's opportunities to achieve a desired level of education and net pay. Fifthly, it will be worthwhile to enrich the measures and indicators used, for example, by measuring skills/educational mismatch subjectively through self-assessment, additional indicators e.g. non-monetary for measuring poverty or using a composite index for inclusive growth (McKinley, 2010). Sixty, a fruitful direction for future studies is the

investigation of the relationship between other forms of skills mismatch, e.g. skills shortages, skills gap or skills obsolescence, on the one hand, and inclusive economic growth and social justice, on the other.

As already outlined, Sen (1999: 18) defines development as "the expansion of the "capabilities" of persons to lead the kind of lives they value — and have reason to value". From this perspective, income and wealth are not desirable for their own sake "but because, typically, they are admirable general-purpose means for having more freedom to lead the kind of lives we have reason to value" (ibid.: 14). If we apply this reasoning to skills mismatch, we could claim that overcoming skills mismatch is not desirable for its own sake; rather, it is a means to avoid the deprivation of people's capabilities and enable them to lead the kind of lives they have reason to value. One of the key questions in this regard is feasibility.

In a recent study, Bonvin and Laruffa (2024: 13) develop the idea of transformative institutions and policies and try to reveal "what conditions are to be fulfilled to implement transformative institutions and policies in a capability perspective, i.e. institutions that promote citizens' freedom to live a life they have reason to value and contribute to more capability-friendly economies and societies". They emphasise that the expansion of objective opportunity sets should go hand in hand with an increased subjective sense of opportunity and that mismatch between objective and subjectively perceived possibilities of action leads to depriving individuals from the capability to aspire. The authors (ibid.: 6) also suggest that, in such a situation of mismatch between these two sets, "[t]ransformative social institutions are then called to restore such capability to aspire, creating the conditions for people to … imagine alternative more emancipatory futures".

Our study provides evidence supporting the idea that human development requires a simultaneous expansion of both objective opportunity sets and subjective sense of opportunity — while avoiding mismatch between them. We agree with the thesis that transformative social institutions are those that "not only expand objectively the sets of available opportunities and rights, but they also create in their beneficiaries an enhanced sense of opportunity and entitlement" (Bonvin & Laruffa, 2024: 7). Our findings have allowed us to enrich this conclusion with the argument about the importance of the embeddedness of social actions and institutions. Regarding skills/educational mismatch, this means that its embeddedness in the wider social environment should always be taken into account when assessing its effects on individual and societal wellbeing, as well as in elaborating policies for addressing it.

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Appendix

Figure A1. Average marginal effects with 95% CIs of Model 3 in Table 1

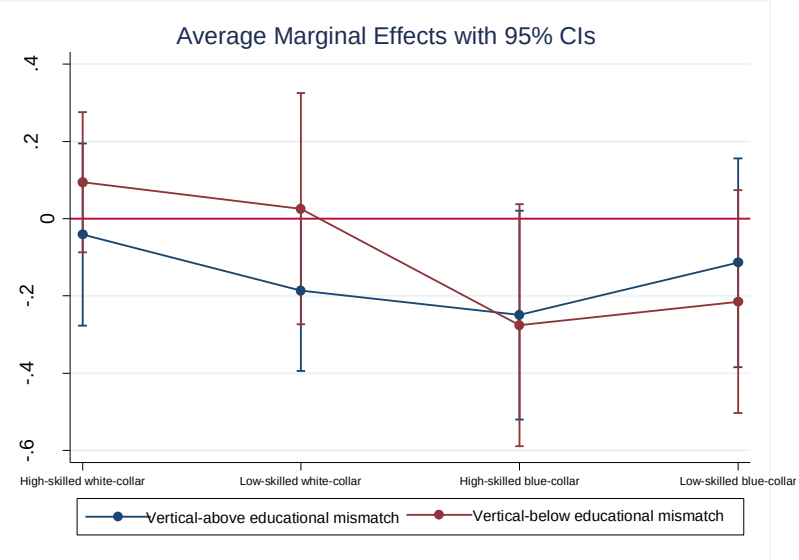


Figure A2. Average marginal effects with 95% CIs of Model 4b in Table 1

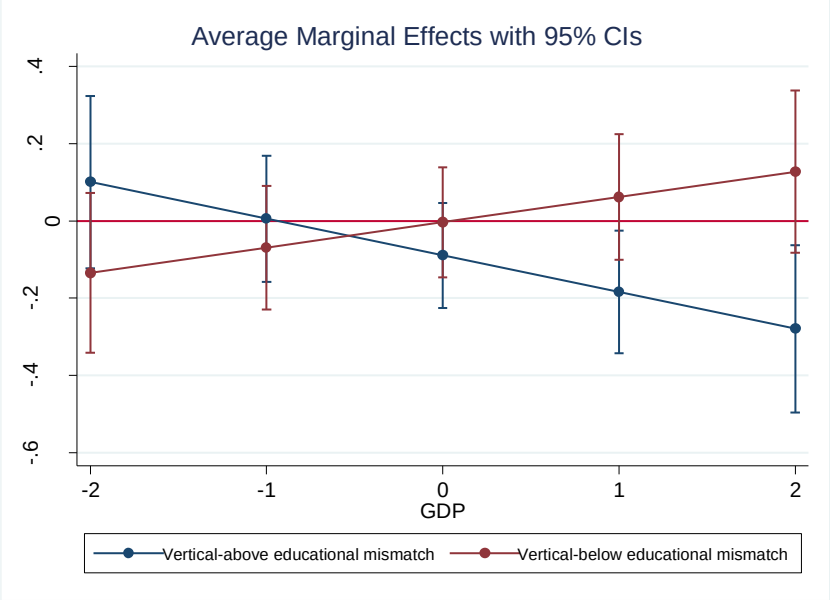


Figure A3. Average marginal effects with 95% CIs of Model 5b in Table 1

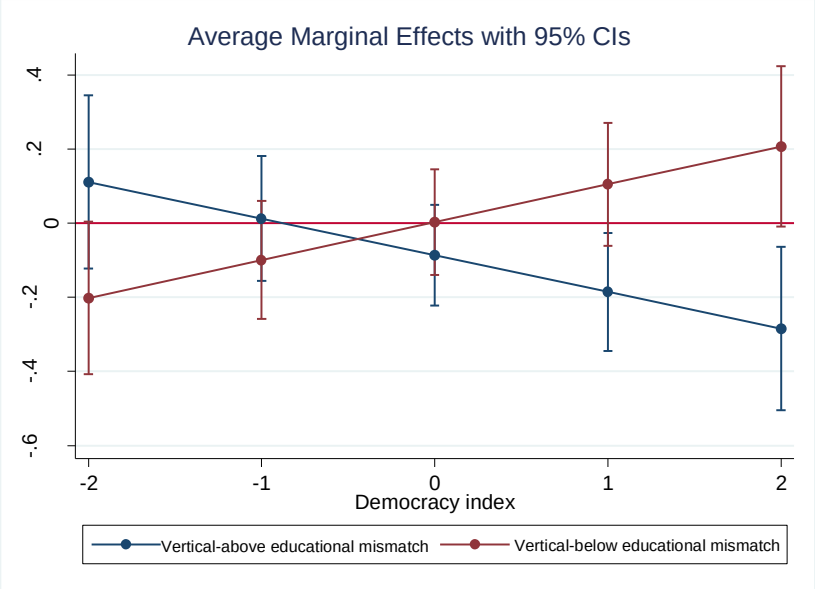
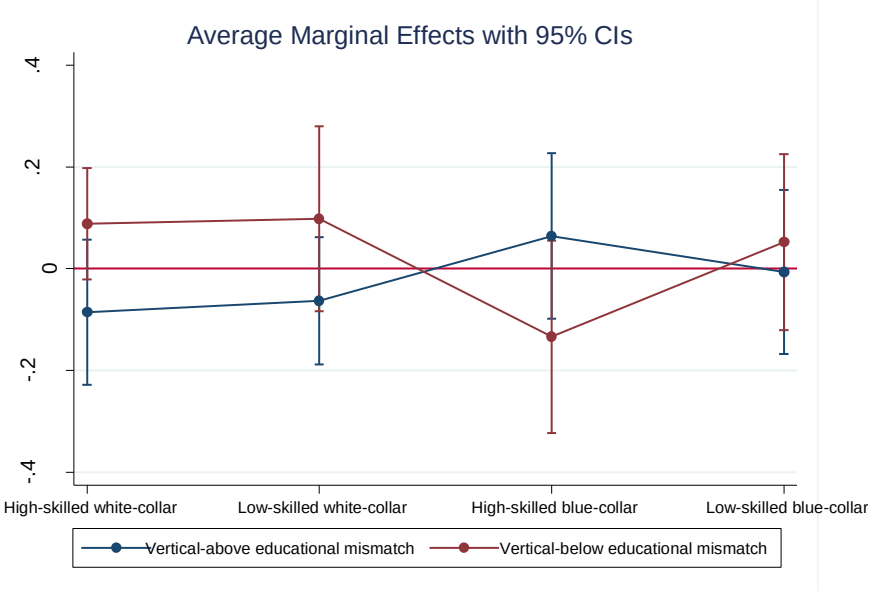


Figure A4. Average marginal effects with 95% CIs of Model 3 in Table 2



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