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3. Vocational education and labor market outcomes

Thijs Bol and Andrea Forster

INTRODUCTION

Over the past century, scholars have investigated the effects of education on labor market outcomes. Traditionally, this literature has focused on the level of education, for example, investigating whether people with a college degree have higher wages than those without a college degree (Goldin & Katz, 2009; Hout, 2012), or investigating to what extent this effect is "causal" (Card, 1999). While a large body of literature has focused on the education level's effects on labor market outcomes, in the past decades, there has been increasing attention to the type of education: *what* is the focus of education, what skills are taught, and how were the programs set up?

In this chapter, we focus on vocational education. While we expand more on its definition in the remainder of this chapter, it is important to emphasize that vocational education is often characterized by focusing on the type of education that students have attained, irrespective of the level (although these two are sometimes conflated). Vocational education can generally be described as highly occupation-specific education that provides students with an educational qualification that is clearly tied to a narrow position in the labor market. An example could be an upper-secondary degree in plumbing, where the students are taught a relatively small set of specific skills that allow them to become plumbers.

How common is vocational education? Figure 3.1 presents an overview of the importance of vocational education across different countries using the most common definition in the literature: enrollment in upper secondary vocational education. Using this definition, we see large cross-national variation in the prevalence of (upper-secondary) vocational education. In some countries (Germany, Slovak Republic, Finland), almost half of the recent graduates have an upper-secondary vocational degree. But vocational education is completely absent in other countries—at least in upper-secondary education.

However, it is not just the presence of vocational education that varies across education systems. Vocational education can be acquired in different ways, and these often differ greatly across countries. Some vocational education and training (VET) is provided in schools, where students are taught specific skills in the classroom. However, vocational education is often provided in a combination of school and work, where some skills are acquired directly on the job. Educational programs and education systems differ in the balance between these two ways of providing vocational

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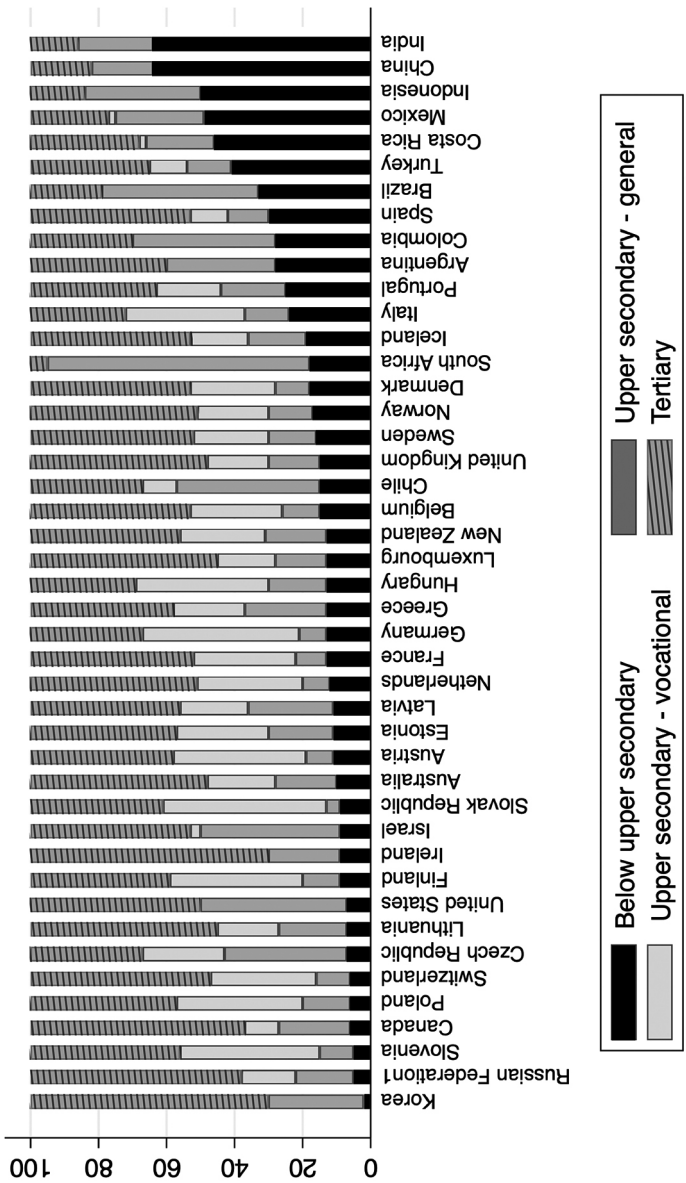

Source: OECD (2020).

Figure 3.1 *Educational attainment of 25–34-year-olds (2019)*

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education, as we will discuss in more detail below. Some education systems provide vocational education in so-called dual systems, where on-the-job training in the form of (paid) internships plays a large role. Other systems provide occupation-specific skills but do so in more school-based settings.

In this chapter, we discuss recent literature that studies the labor market outcomes of vocational education. This chapter will be a combination of a discussion of existing research and a more critical discussion of an important—but often taken-for-granted—question: what do we mean by vocational education? The existing literature very often relies on a dichotomy between vocational and general education—just as we did in Figure 3.1 and this introduction. We argue that this idea, where the counterfactual to "vocational" is "general," is too simplistic. Sociology, for example, would be considered a general educational qualification: it is not very narrow and provides students with a wide array of different possibilities in the labor market. However, Medicine or Engineering would be equally treated as general while they convey a much narrower set of skills. As we will discuss below, both the definition of what is seen as vocational education and the counterfactual to vocational education are often not discussed in detail. We argue that this is not simply a methodological or measurement issue but also reflects the sometimes limited theoretical discussions in the literature on vocational education.

In the remainder of this chapter, we will discuss the theoretical underpinnings of vocational education, its effects on labor market outcomes from both a short—and long-term perspective, and finally, some directions that we believe the field should take to further advance our research on vocational education.

WHAT IS VOCATIONAL EDUCATION (NOT)?

When discussing vocational education and its consequences, we first need to talk about what vocational education is – and equally important – about the counterfactual: what is vocational education *not*? The definition of vocational or occupation-specific education varies across research traditions – a fact that also contributes to seemingly contradictory conclusions when looking at the effects of vocational education on labor market outcomes. Therefore, a more extensive discussion of the concept of vocational education is needed.

The traditional approach to vocational education uses skills as a dichotomy to define – on the macro level of education systems – what vocational education is. Here, vocational education is all that takes place in institutions of a country's vocational education and training (VET) system as opposed to institutions that offer general educational programs (Shavit & Müller, 1998, 2000). It is assumed that general education institutions convey general skills and vocational education institutions convey specific skills: the first does not prepare for a specific occupation, whereas the second one is clearly linked to a well-defined set of occupation-specific skills. This dichotomy of general and vocational degrees is also reflected in international

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classifications of education such as CASMIN (Erikson & Goldthorpe, 1992; Müller et al., 1989) and ISCED (UNESCO Institute for Statistics, 2012).

Empirical research using this definition of vocational education usually contrasts enrollment in or degrees from VET institutions with those from general education institutions (see, for example, Blommaert et al. (2020) for a meta-analysis). Sometimes, vocational education is further distinguished based on whether it consists primarily of firm-based or school-based training, incorporating the theoretical distinction between firm-specific and broad vocational skills (see, for example, Bolli et al., 2021; Cedefop – European Center for the Development of Vocational Training, 2013; Choi et al., 2019; Middeldorp et al., 2019; Riphahn & Zibrowius, 2016).

It needs to be noted that this dichotomous (or three-category) distinction itself is purely based on the type of education and does not take the level of education into account. However, type and level of education are often conflated, as in many studies full levels of education are categorized as vocational (upper secondary) or general (tertiary). This means that in estimating the effect of vocational education, the counterfactual can be different things: it can be general education at the same level but sometimes also general education at a different level.

This traditional definition of vocational education is used to study individual-level effects of vocational education, but it is also used to characterize the education system of a country as the overall strength of the VET sector differs across education systems. In countries with a strong vocational orientation, many young people are enrolled in VET institutions at the upper secondary and tertiary levels. This is the case, for example in Austria, the Czech Republic, the Netherlands, and Slovakia, and to a somewhat lesser extent also in Belgium, Germany, Italy, Norway, Slovenia, and Switzerland (Bol & Van de Werfhorst, 2013). Similarly, countries can be characterized by which type of VET prevails: firm-based or school-based training. Dual apprenticeships with a focus on firm-based training prevail in Austria, the Czech Republic, Denmark, Germany, Slovakia, and Switzerland, while school-based VET is more common in Belgium, Italy, the Netherlands, Norway, and Slovenia (Bol & Van de Werfhorst, 2013; Forster et al., 2016). In other countries, VET institutions play a minor role and mostly serve as a safety net for a small group of low-achieving youth (Shavit & Müller, 1998). Measuring vocational education at the country level is often done in this categorical way, categorizing countries into apprenticeship systems, school-based VET systems, and general education systems. Some studies rely on more continuous classifications along the dimensions of vocational enrollment and dual-system participation (Bol & Van de Werfhorst, 2013).

While the dichotomous (or sometimes three-category) definition of vocational education is common and intuitive, it does not necessarily do justice to the actual types of skills that are taught in educational degree programs. The traditional dichotomy is based on arguments of skill specificity; however, skills are not directly measured when defining which programs are classified as vocational. Furthermore, dichotomizing vocational education artificially removes the variation in skill specificity within vocational and general education programs. As already mentioned above, not all vocational programs are equally specific, and not all general programs are equally

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general. Therefore, other approaches have tried to measure occupational specificity more directly and to capture the heterogeneity within vocational and general education categories.

One such approach tries to capture specific skills on a meso-level by focusing on the link between educational programs and certain occupational positions (DiPrete et al., 2017). It uses the concept of entropy as a basis for measuring the occupational specificity of educational programs. Entropy is here defined as the amount of information that is gained about the occupational position of an individual if their educational degree becomes known (Alonso-Villar & del Río, 2010; Frankel & Volij, 2011; Mora & Ruiz-Castillo, 2011; Reardon & Firebaugh, 2002). If someone's education is known, this will always result in some information about the occupation in which this person works. However, for more specific educational programs, this level of information will be higher than that of more general educational programs. This property can be used to gradually measure the occupational specificity of single educational fields and levels.

This approach to defining occupation-specific education is not only different in measurement but also has different theoretical implications, especially when looking at the relationship to labor market outcomes. The question is whether the effects of occupation-specific education are theorized to be a consequence of different individual skill sets or whether the relationship is rather dependent on specific institutional structures that have to do with being enrolled in a VET institution. Moreover, this second definition can be used to measure occupational specificity either on the level of educational levels and fields (Bol et al., 2019; Forster & Bol, 2018; Geven & Spörlein, 2023; J. J. Rözer & Bol, 2019; Vogtenhuber, 2014) or to characterize the nature of national education systems by aggregating the properties of single educational level-fields (DiPrete et al., 2017; J. Rözer & van de Werfhorst, 2020).

Finally, vocational specificity can be determined on the micro-level by measuring occupational specificity directly for individual educational programs. This has been done either based on identifying skill sets in the curricula of training programs (Eggenberger et al., 2018; Grønning et al., 2020; Verhaest et al., 2018; Verhaest & Baert, 2015) or based on expert surveys with professionals working in VET institutions (Muja et al., 2019). This is a promising line of research as it also allows for within-level variation in the extent to which educational programs are defined as vocational or general. However, data, particularly cross-national data, on the vocationality of educational programs are still scarce, making it difficult to use this method on a larger scale.

An avenue for future research should be to explore interactions between the different levels (micro, meso, macro) where vocational education takes place. Some studies (Bol et al., 2019) have explicitly tried to study these interactions, but future research in vocational education could focus on this more explicitly.

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EFFECTS OF VOCATIONAL EDUCATION ON THE SCHOOL-TO-WORK TRANSITION

Equipped with these different approaches to conceptualizing vocational or occupation-specific education, we now turn to look at its relationship to labor market outcomes. One of the main findings concerning the effects of vocational education is its positive effect on a smooth transition from education to the labor market. Numerous studies have discussed and empirically confirmed this relationship.

The starting point of this line of research is an edited volume by Shavit and Müller (1998), in which different authors show numerous countries in the OECD that vocational education facilitates the transition from education to a skilled worker position. Van der Velden and Wolbers (2003) reach similar conclusions in their contribution to youth's integration into the EU labor market. Ryan (2001) shows that vocational education is a protective factor against unemployment at the beginning of a career, a finding that is confirmed by Breen (2005) in a study that includes 27 OECD countries. He finds that vocational education with a strong work-based component reduces youth unemployment and offsets negative effects of extensive worker protection. Further studies also find that a vocational education degree leads to a faster allocation process in the labor market (Wolbers, 2007; Wolter & Ryan, 2011).

Several possible mechanisms exist behind this positive effect of vocational education on the school-to-work transition. The most common explanation is that—in line with human capital theory—the specific skills taught in VET programs are directly beneficial for labor market integration. VET programs train students for a narrow set of occupations, making them immediately productive in these occupational contexts. Employers do not have to invest extensively in on-the-job training for these graduates, which gives vocational graduates a comparative advantage over general graduates, who do require more initial on-the-job training. A second explanation favors signaling as a mechanism: vocational degree titles signal productivity in certain tasks to employers irrespective of the actual skills acquired in the VET program. Third, close institutionalized links between graduates and future employers ensure a smooth school-to-work transition even before hiring. In VET programs, such links are established by apprenticeship training or during internships, which are part of the educational program.

Many of the comparative studies outlined above emphasize that the positive effect of vocational education on the school-to-work transition holds especially for countries with a strong VET sector (Breen, 2005; Müller & Gangl, 2003; Shavit & Müller, 1998; Wolbers, 2007). This is assumed to be the case as, in these systems, employers are more prepared for incoming vocational graduates. Degrees from vocational institutions are more widely recognized as signals of productivity, and links between employers and students are established on a more regular basis in systems in which vocational education is widespread. Firms are also more prepared for the specific skill sets of certain vocational degrees in systems where they often receive graduates with these degrees.

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Vocational education is found to be a beneficial and suitable safety net, especially in countries where it is also widespread. However, there has also been a discussion on whether the effects of vocational education are purely positive. An alternative explanation is that vocational education is a diversion from attaining higher levels of education. In addition to providing a safe school-to-work transition, especially for low-achieving youth, vocational education diverts students (particularly those of lower socioeconomic origin) from entering tertiary education. Shavit and Müller (2000) conclude that, especially in strong VET countries, safety net and diversion both operate simultaneously. Vocational education is successful in preventing youth unemployment, but at the same time, it keeps less privileged students from academic education.

While most of the research on the school-to-work transition has used the dichotomous definition of vocational education, these findings are confirmed using alternative approaches to conceptualizing occupation-specific education. Forster and Bol (2018) use Dutch Labor Force Survey data to show that higher linkages between educational categories and certain occupations are associated with higher employment rates for young and middle-aged workers. Further studies find positive effects on income if individuals work in matched occupations (Bol et al., 2019) and on the occupational status of the first job (Vogtenhuber, 2014). Also, when occupational specificity is directly measured at the program level, positive effects on employment (Muja et al., 2019) and allocation to matched occupations (Verhaest et al., 2018) have been found.

To our knowledge, no studies using a more fine-grained measure of vocational education have examined for whom the positive effects of vocational education on the school-to-work transition are strongest, which is an avenue for future research: Is vocational education a safety net or a diversion, and who benefits most from having a vocational degree?

LIFE COURSE EFFECTS OF VOCATIONAL EDUCATION

This could, of course raise the question: if all approaches find positive effects, why do we care about the way it is measured or defined? Vocational education smooths the transition from school to work, irrespective of how it is defined. The main reason is that in more recent literature, vocational education is not just associated with positive effects on labor market outcomes.

This literature has been investigating the effects of vocational education beyond the transition from school to work. What are the effects of vocational and general education over work careers? Particularly influential here was the paper by Hanushek and colleagues (2017) who studied the effects of vocational and general education over the life course across different countries. Their study revealed a late-career penalty to vocational education when it concerns employment and earnings. While vocational education gave students a head start when entering the labor market, this premium decreased over the life course and even became a small penalty for older

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workers: those with vocational degrees were less likely to be employed in their later career, and their earnings were lower than those of graduates from general education. Hanushek et al. argued that this effect could be explained by skill depreciation: the highly specific skills that vocational graduates have acquired during their training would become obsolete at the end of their careers.

This effect would be particularly strong in times of technological change: several studies have found that occupational tasks have changed rapidly in the past 40 years (Acemoglu & Autor, 2011; Goos et al., 2014), leading to rapid changes in skill demand. An example here could be someone schooled as a car mechanic: occupational tasks have changed rapidly, making the skills of older car mechanics more outdated. Relocating to a different position in the labor market is more difficult for vocational than for general graduates, and this lack of occupational mobility—so it is argued—limits the late-career returns to vocational education. Similarly, with the changing occupational structure, some occupations are decreasing in size or even disappearing, which is argued to affect vocational graduates more.

Hanushek et al. (2017) take a cross-national perspective. A key they identify for the life course effects of vocational education lies in the organization of vocational education at the country level. Effects are powerful when vocational education is organized in dual systems, where the skills are more occupation-specific. It is specifically these particular skills that are argued to become a burden in the late career. Occupational mobility in the late career is a function of the specificity of the skill set. Therefore, it would be expected that in a country with a particular vocational system, the late-career penalty for vocational education would be larger. Hanushek et al. (2017) indeed find evidence for this country-comparative claim that the late-career penalty associated with vocational education is stronger in countries with robust apprenticeship systems (e.g., Germany, Denmark, Switzerland). They conclude that the "declining age-employment pattern for those with vocational education relative to those with general education is found in all vocational education countries, [but] it is most acute in the three apprenticeship countries" (Hanushek et al., 2017).

In the trail of Hanushek et al. (2017), a growing body of literature has investigated these hypotheses, and these studies only partially replicated the detrimental late-career effects reported by that study. The findings regarding the life course effects of vocational education are not uniform, and there are two critical points on which studies have resulted in different findings. First, does vocational education indeed lead to a penalty in later life, or is the early-career benefit just disappearing? Put differently, is there a reversal of the effect, or does the vocational premium diminish but remain positive? Second, is it indeed the case that life course effects of vocational education are powerful in countries where vocational education is more specific, as Hanushek et al. (2017) found? In the following, we will discuss cross-national and single-country studies that address these two questions.

Forster et al. (2016) studied data on a large set of countries, using data from the *Program for the International Assessment of Adult Competencies* (PIAAC; see also Lavrijsen and Nicaise, 2017). While they found support for an average late-career penalty, they found no systematic differences across countries, thereby questioning

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the extent to which the "skill specificity" argument holds. Using similar data, Hampf and Woessmann (2017) do find the effect to be strongest in countries with apprenticeship systems, indicating that the definition of when vocational education is highly specific plays a role here, too. Whereas Forster et al. rely on a continuous measure of the vocational specificity of the education system (Bol & Van de Werfhorst, 2013; Bol & van Werfhorst, 2011), Hampf and Woessmann use the dichotomy between apprenticeship/non-apprenticeship systems also used by Hanushek et al. (2017). While we do not argue that one of the two (dichotomous or continuous) is necessarily better than the other, we do believe that the connection between theoretical concepts and measurement is more clearly defined in studies relying on continuous measures. A different study did not focus on the content of vocational systems but on whether countries were collectivist or not, finding a slightly stronger vocational penalty in collectivist systems (Chuan & Ibsen, 2022).

Single-country studies also show a more scattered pattern depending on the country that they study and the outcome. For example, studying Switzerland, Korber and Oesch (2019) find that vocational training offers an advantage in employment compared to general education at the beginning of the career, and while this advantage decreases over the life course, it remains an advantage. For income, their finding is different: vocational graduates are better off at the start of their careers but worse off in their later careers. However, they argue that life course earnings remain higher for vocational graduates, nuancing the more alarming findings by Hanushek et al. (2017). Similarly, Forster and Bol (2018) find convergence in employment probabilities for the Netherlands and find no indication that vocational education becomes a penalty in late career. Forster and Bol also rely on a different definition of vocational education, using the gradual entropy-based measure—which indicates that here the way vocational education is measured might affect the findings. A similar pattern of diminishing benefits (but no clear penalty) is found in Israel (Gabay-Egozi & Yaish, 2018), the UK (Brunello & Rocco, 2017), and Germany (Kratz et al., 2019).

While there is a discussion on whether vocational education becomes a penalty, virtually all studies find that the wage and employment premia associated with vocational education in their early career diminish over the life course. Why is this the case? The key argument of Hanushek et al. (2017) is skill depreciation: skill demands are changing, and workers with vocational education do not keep up with changing demands. The lack of mobility of graduates with highly specific education hinders their labor market prospects. Empirical studies show some evidence for this argument, finding, for example, that participation in lifelong learning is much lower for vocational graduates compared to general graduates, especially for vocational graduates in their later careers (Lavrijsen & Nicaise, 2017). At the same time, empirical studies do not corroborate some elements of this argument. In a recent article on Germany, Decker et al. (2023) do not find lower rates of occupational mobility for vocational graduates in their later careers. Moreover, they also find no significant difference in what they call "forced" mobility: involuntary job changes. Another study found no differences in life course effects across cohorts (Rözer & Bol, 2019), questioning the explanation that technological innovation and rapidly changing skill

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demands are driving the reversal in the impact of vocational education. It is clear that skill demands are changing now more rapidly than before (Acemoglu, 1998), but apparently, this does not have an influence on the effects of vocational education on life courses.

These findings question some of the critical arguments regarding the drivers of life course effects of vocational education. Interestingly, another study points to a theoretical mechanism that is largely overlooked: health. Again, studying Germany, Kratz and colleagues (2019) decompose the life course effect and find that health declines more rapidly for workers with vocational education. The reason why vocational graduates are less likely to be employed in their late careers lies not so much in the depreciation of their skills but in self-selection out of the labor market. While it is unclear where this health difference comes from, a likely explanation is the types of work and occupations into which vocational versus general graduates are sorted.

We conclude that over the past decade, sociologists and economists have "established a phenomenon" (Merton, 1987): vocational graduates have an advantage in their early careers, but this advantage diminishes or, according to some studies, even becomes a disadvantage in their later careers. There is a life course trend in the payoff to vocational education. However, we still know very little about the mechanisms that drive this phenomenon, and as we will argue below, we believe this to be an essential avenue for future research.

AGENDA FOR THE FUTURE

In this chapter, we provided an overview of research on vocational education and the labor market consequences of having occupation-specific education. We discussed how the literature in the past decade has moved from investigating the labor market effects of vocational education in the transition from school to work to a more long-term perspective. In recent work, vocational education's effects are both studied and theorized as changing over the course of life. While we believe that scholars have made substantial progress, we also see some directions for future research into vocational education. We make most of the suggestions directly with some of the lacunas we have discussed above.

First, we believe that there are not enough conceptual discussions concerning vocational education. This is partially a measurement discussion. How do we measure vocational education? Do we use all levels of education? And, how do we deal with variation within the often-used two broad categories (general versus vocational)? Future research should take a step back and investigate to what extent some key findings in the field are explained by how vocational education is measured or conceptualized. While it is easy to reduce this to a measurement issue, the underlying discussion is theoretical: what do we mean by vocational education, and to what extent does our measurement capture this theoretical meaning?

Most of the studies that we have reviewed here define vocational education by (a) the nature of what is learned in school and (b) how students acquire their skills.

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When the skills that are taught are narrower, or more occupation-specific, the educational program is defined as more vocational. Similarly, when the learning is organized in a combination of school and work, the educational program is defined as more vocational. We believe that most theoretical conceptualizations of vocational education are continuous: something can be more or less specific—no one would argue that sociology and medicine are equally "general", or that both an upper secondary degree in plumbing and commercial business are equally "vocational".

In line with earlier publications (Forster & Bol, 2018), we advocate for theorizing the way we measure vocational education. What is vocational education, and how should it be measured? Engaging in this discussion is crucial because of the counterfactual that is (often implicitly) assumed in studies. Often, the counterfactual is general education, but what educational programs are truly general? In most countries, this would only refer to general secondary education, but nowadays, only a minority of students enter the labor market without pursuing upper secondary or tertiary education. This means that the counterfactual against which we estimate—those with only lower secondary general education—increasingly becomes selective on things that we often cannot observe in our models: motivation, cognitive ability, ambition, and so on.

This issue brings us to our second main direction for future research into vocational education: estimating its effect. An issue with estimating the effect of vocational education is that individuals differently sort into educational programs, making it difficult to assess whether observed outcomes are caused by the education program or (unobserved) individual characteristics. Most studies are not able to measure cognitive skills or skills at all (Forster & Bol, 2018), and when they can, the measurements are imperfect (Bol et al., 2019). For a long time, scholars have been interested in estimating the "causal" effect of vocational education. Oosterbeek and Webbink (2007), for example, used an educational reform as treatment and found no evidence that a year of extra vocational education added extra earnings. Other studies relied on measures of skills to cancel out potential confounders (Forster et al., 2016; Hampf & Woessmann, 2017). Again, we do not believe that this is simply a methodological discussion that can be solved by exploiting new econometric methods. We argue that we need to explicitly study the choice process of who enters vocational education and who does not and how this has varied over time. Whether or not vocational education functions as a safety net or a diversion from higher education (Arum & Shavit, 1995; Saar & Martma, 2021) also depends on the people who are participating in it. It is already clear that public opinion towards vocational education is different across social strata (Di Stasio, 2017; van Daalen, 2010), which might affect the extent to which parents let their children enter vocational education.

A final recommendation refers to the countries that we study. Vocational education is almost exclusively studied in countries that are part of the OECD (Tian et al., 2023), with the strongest emphasis on countries in Western Europe (e.g., Germany, the Netherlands, Switzerland). Partly, this is explained by data availability: large cross-national datasets like the PIAAC, EU-LFS, or ESS are only available for a limited set of countries. Similarly, high-quality panel data (Turek et al., 2021) are

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only available for a few rich countries within the OECD. Right now, only a minority of studies that investigate the labor market effects of vocational education are performed outside of this "traditional" set of countries. There are recent studies on the labor market effects of vocational education in India (Ahmed, 2016; Bahl et al., 2021) or Brazil (de Souza Leão et al., 2023), but these remain a small minority. A key reason for educational sociologists and sociologists of stratification to focus on countries outside of the set of regular countries is to expand our ideas on how countries' systems of skill formation affect the association between vocational education and the labor market. So far, we mostly focus on countries that are, in many aspects, very similar. We argue that broadening our scope will also help us to understand more about how countries' national contexts affect the labor market effects of vocational education.

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