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EDITORIAL

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The Role of Contexts in Educational and Employment Transitions and Pathways of Young People

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Abstract

Young people's educational and employment pathways are shaped by the social contexts in which they are embedded. While past research has often emphasized individual characteristics, this thematic issue highlights the decisive role of contextual factors—including regional disparities, institutional arrangements, and socio-economic structures—in influencing opportunities and transitions. Drawing on national and comparative perspectives, the contributions examine how educational systems, labour markets, and regional and local environments affect schooling outcomes, vocational training access, aspirations, and early career trajectories. Special attention is given to vulnerable groups such as refugee students, young women, and persons with disabilities, showing how contexts structure (dis)advantages and cumulative inequalities. Together, these studies offer valuable insights for research and policymaking. The findings stress the importance of targeted policy interventions addressing contextual disparities, curriculum reforms, and inclusive measures for disadvantaged groups.

Keywords

career entry; contexts; education system; labor market; pathways; transitions; youth

1. Introduction

Social contexts highly structure individual chances for favourable outcomes in education and employment. For young people, spatial, institutional, and socio-economic contexts can either facilitate or complicate their educational pathways and achievements, transitions from school to work, or early career outcomes. Because early (dis)continuities can yield cumulative (dis)advantages for employment trajectories, they are pertinent for individual social positioning across the life course and thus contribute to the reproduction of social inequalities.

While research has often emphasized personal characteristics, skills, and agency, this thematic issue highlights the decisive role of contexts. The articles presented here explore how various contextual characteristics influence young people's educational and employment transitions and pathways. Drawing on national and comparative perspectives, they address key dimensions such as regional disparities, institutional arrangements and policies in educational systems, labour market structures, and social inequalities, offering valuable insights to better understand and thus improve educational and employment outcomes.

2. Conceptualizing Social Contexts and Their Impact

Throughout sociology's history, contexts have been integral in analysing how individuals are embedded within collectives, environments, or social settings. Social contexts provide opportunities and constraints, shaping actions, choices, and outcomes (Coleman, 1990; Merton, 1995). They are defined in terms of space and time as temporally organized physical environments that surround or frame interactions. This means that actions and interactions occur in places (e.g., schools, companies, etc.) and, depending on the place and historical time, conditions for actions vary considerably (Giddens, 1984). A special case of such places is a territory with institutions that guarantee certain rights and restrict agency within a delimited space based on authority and objectified legal orders.

A key analytical tool here is the idea of contextual properties, which describe how aggregate-level characteristics (e.g., city-wide economic prosperity) affect individual outcomes independently of individual attributes (Lazarsfeld & Menzel, 1961; Raudenbush & Bryk, 2002). Social contexts can also catalyse the impact of individual resources and promote a cumulation of (dis)advantages, which may, therefore, unfold distinct mechanisms and effects on individuals' educational and career chances. They can be of particular importance for youngsters who often have fewer resources given their age and usually depend on their family's resources, which makes it potentially more difficult for them to change from a less to a more favourable social context. Especially in the case of education, young people (and their families) are often exposed to institutionalised contexts and policies that may restrict agency under threat of legal sanctions (Kohli, 1985).

School contexts have been widely shown to impact the educational achievements of students (Dreeben & Barr, 1988; Harker & Tymms, 2004). Regarding access to vocational education and training (VET) and employment, companies, markets, and national economies (and their regulations) serve as essential contexts affecting social closure and access to (aspired) training opportunities and occupations. For young people, school-to-work transitions and transitions into stable employment are particularly influenced by contextual properties such as insider-outsider market structures or the type of market economies (Brückner & Mayer, 2005; Brzinsky-Fay, 2007).

3. Overview of Contributions

3.1. Schooling and Educational Pathways

The foundations for successful placement in the labour market are laid during school years. School-leaving qualifications, shaped not only by personal or familial factors but also by contextual conditions, decisively influence access to the training market, as the contributions by Cantalini et al. (2025) and Will and Becker (2025) to this thematic issue show.

Cantalini et al. (2025) examine regional disparities, geographical marginality, and educational pathways in Italy, focusing on variations between central and marginal areas in high school enrolment, dropout rates, and academic track placement. Their findings challenge the assumption that geographical marginality always leads to adverse outcomes. In marginal areas of the North, non-enrolment in five-year secondary programs is often offset by a higher prevalence of enrolment in three-year vocational schools. In the South of Italy, though, geographical marginality appears to have a protective effect as students have lower dropout rates and higher chances of enrolling in the academic track than their peers in central areas. The authors' nuanced analysis underscores the complexity of regional influences on educational choices.

Will and Becker (2025) analyse municipal factors and the schooling of refugee students in Germany, focusing on a specific group of students. Their study shows that while the municipality's resources and experience with immigration influence school placement, the overall impact of local factors is relatively small. This finding raises important questions about how local contexts and municipal autonomy shape educational opportunities for newly arrived (young) refugees.

3.2. Educational and Occupational Aspirations

Understanding how young people develop aspirations is crucial for ensuring equitable school-to-work transitions, as the contributions of Sendzik et al. (2025) and Böhle et al. (2025) show.

Sendzik et al. (2025) explore the influence of educational policy on major choice in higher education through differences between school curricula across German federal states. Their findings suggest that increasing compulsory instruction in civic education and economics has a modest but positive effect on related major choices regarding the further educational path, specifically university majors. However, for computer science, the results are inconclusive, showing the need for further research on how policy interventions shape long-term educational trajectories.

Böhle et al. (2025), in contrast, focus on family, peers, and role model interventions. Their contribution examines how vocational role model effects unfold in different social contexts students are embedded in, potentially enabling or constraining intervention effects. According to their results, firstly, a unique encounter with vocational role models in class is, on average, related to increased occupational aspirations for the presented VET occupation, also against the backdrop of the long-term influence of peer and parental contexts. Secondly, vocational role model intervention also has an effect against the backdrop of the long-term influence of peer and parental contexts, even in contexts that convey strong parental and peer norms.

3.3. Accessing Training Opportunities

Once young people have finished school (successfully or unsuccessfully) and decided on their further educational moves, the next step is to secure a position in higher education or VET.

If the decision to aim, for example, for an apprenticeship has been made, the question is how personal preferences and given possibilities interact. Hoffmann's (2025) study on adaptations in VET seekers' mobility willingness shows how regional opportunity structures affect young people's willingness to relocate to find a company willing to award a VET training place. Using longitudinal data, the study finds that high-status aspirations for VET consistently drive greater mobility willingness, mostly independent of search duration or the regional availability of occupations aligned with their aspirations. In contrast, VET seekers with lower status aspirations are less willing to relocate, but adjust their mobility willingness, particularly with decreasing availability of matching occupations or increasing search duration.

Meyer (2025) explores whether young refugee women decide to enter vocational training. Her study on refugee women's transition to VET in Germany examines how gender norms and human capital endowments affect refugees' chances of entering vocational education. Surprisingly, the study finds that neither prior education nor gender role attitudes nor having children significantly predict participation in VET, while having a partner is associated with substantially lower chances. This suggests that broader social and structural factors, rather than individual characteristics, are key to understanding refugee women's educational transitions.

3.4. School-to-Work Transitions in a Comparative Perspective

Comparisons between countries offer valuable insights into the effects of the cultural, political, societal, and legal amalgam that countries or nations represent. Two contributions to this thematic issue addressing school-to-work transitions present cross-national comparisons.

Tomaszewski et al. (2025) provide a cross-national comparison of socio-economic and gender differences in post-secondary pathways in the UK, Germany, and Australia. Their analysis reveals that parental education significantly shapes post-secondary transitions, while the gender impact differs across countries. These findings underscore the need for targeted policies to support low-SES youth and promote gender equity in education and employment.

Blanck et al. (2025) investigate labor market entry trajectories of persons with disabilities in Europe, offering a comparative perspective on school-to-work transitions. According to their findings, young people with disabilities do not necessarily transition more slowly into employment, but they face higher instability and exclusion. Institutional support structures facilitate more inclusive transitions, emphasizing the importance of policy interventions to enhance sustainable labour market integration.

3.5. Unemployment Scarring and Early Career Outcomes

Rocky school-to-work transition processes, characterized by unemployment and education–job mismatch spells, can have long-lasting scarring effects on young people. However, the mechanisms that either foster

or prevent unemployment scarring are underinvestigated. Hänni and Kriesi (2025) examine unemployment scarring in early careers to fill this gap, focusing on the interplay between individual skills and labour demand on post-unemployment outcomes. Their study finds that general skills and strong, status-adequate labour demand reduce the risk of downward mobility. In contrast, occupation-specific skills help individuals exit unemployment quickly but increase the risk of status loss. These findings underline the long-term implications of skill specialization and job market structures.

4. Conclusion and Policy Implications

Collectively, these studies highlight the key role of social contexts in shaping young people's educational and employment transitions. They provide a multifaceted perspective of young people's challenges, spanning regional disparities, municipal policies, educational system structures, labor market conditions, and persistent social inequalities. By examining diverse populations, including young women, refugee students, and persons with disabilities, the contributions illuminate key mechanisms such as vocational role model interventions, mobility for training opportunities, and long-term consequences of unemployment scarring.

Several key implications emerge from this research. First, addressing regional context disparities requires targeted interventions to ensure equitable access to education and sustainable employment opportunities for young people and to promote their achievement and completion of targeted educational pathways. Second, curriculum reforms should be carefully designed and embedded to align with long-term educational objectives and outcomes. Third, policies aimed at supporting disadvantaged groups, such as refugee women and individuals with disabilities, should especially account for both structural barriers and individual agency.

Future research should continue to decode further the mechanisms and the complex interactions between individual aspirations and agency, institutional settings, and broader socio-economic contexts. By adopting a contextualized perspective, scholars and policymakers can develop more effective strategies to support young people's transitions and promote social inclusion in education and employment.

This thematic issue is valuable to the ongoing discourse on educational and employment pathways. It emphasizes the role of contexts in shaping young people's trajectories. We hope thus to inspire further research and informed policymaking in this critical area.

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Conflict of Interests

The authors declare no conflict of interest.

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ARTICLE

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Regional Disparities, Geographical Marginality, and Educational Pathways: A Study on Upper Secondary Education in Italy

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Abstract

This study examines the role of geographical location for educational outcomes in Italy, analysing variations between "central" and "marginal" areas in high school enrolment, dropout rates, and academic track placement. Drawing on data from the Italian Labour Force Survey (2005–2014) and INVALSI (2017–2018 and 2018–2019), the findings indicate that geographical marginality is only moderately associated with educational outcomes, especially in comparison to the more pronounced South–North divide. The analysis of non-enrolment reveals notable regional variations. In marginal areas of the North, non-enrolment in five-year secondary programmes is often offset by a higher prevalence of enrolment in three-year vocational schools. Conversely, the findings suggest a "protective effect" of marginality in southern regions, where students in marginal areas exhibit lower dropout rates and a higher likelihood of enrolling in the academic track compared to their peers in central areas. The results indicate that in the South, geographical marginality accentuates the dichotomy between non-enrolment and academic track enrolment, particularly favouring the choice of enrolling in a lyceum over other options.

Keywords

geographical inequalities; geographical marginality; inequality of educational opportunities; Italy; tracking; upper secondary education

1. Introduction

The geographical dimension of social stratification and educational inequalities has been central to sociological research (Blau & Duncan, 1967; Sorokin, 1927). However, over time, analyses of geographical

inequalities faded from the academic spotlight. Only recently, with the emergence of new forms of inequality due to globalisation and technological shifts (Moretti, 2004), as well as to the upgrading of the occupational structures in the most developed areas (Avola et al., 2024; Oesch, 2013), this issue re-emerged as a focal point in scholarly discourse, and several studies have examined whether individuals living in specific geographical areas experience divergent outcomes in the labour market, including subjective social status (Vigna, 2023), social mobility (Bell et al., 2023; Connor & Storper, 2020; Morris, 2023), school-to-work transitions (Scandurra et al., 2020), and returns to education (Panichella et al., 2024).

Despite progress in understanding how geographical marginality affects labour market outcomes, much less is known about how these geographical inequalities shape educational opportunities and reinforce educational disparities. However, exploring the intersection between geographical and educational inequalities is essential, as different areas exhibit distinct socio-economic characteristics that shape the composition of classrooms and peer groups (Wells et al., 2023), thereby influencing academic achievement (Willms, 2010). Furthermore, school quality varies significantly across geographical regions (Johnson, 2012), as does the availability of employment opportunities (Panichella & Triventi, 2014), both of which unevenly affect educational choices and opportunities. In this regard, marginalised regions are often characterised by lower proportions of highly educated and skilled individuals (Panichella et al., 2024), a limited availability of educational institutions—both in terms of quantity and quality (Lucatelli, 2015)—and weaker employment prospects (Panichella & Cantalini, 2023). These factors collectively hinder educational opportunities and outcomes for young people residing in such areas. Additionally, living in marginalised regions has been linked to an increased risk of youth disengagement from education (Rønningstad, 2025), exacerbating the likelihood of school dropout and negatively impacting well-being and behavioral outcomes (Henry et al., 2012).

This article seeks to contribute to this debate by examining the relationship between geographical marginality and educational opportunities in Italy, focusing on the transition from lower to upper secondary school—a critical stage for studying educational inequalities and, more broadly, the intergenerational reproduction of social inequalities (Triventi, 2014). Specifically, this study investigates how geographical location influences students' likelihood of enrolling in upper secondary school, their risk of dropping out, and their placement in academic or vocational tracks. Rather than directly analysing the mechanisms underlying this association, it represents a first step in understanding the extent to which geographical marginality shapes educational opportunities in Italy.

Italy presents a distinct case for studying the role of geographical disparities in educational outcomes and, more broadly, social inequality. Among economically advanced nations, Italy stands out for its severe and persistent regional economic disparities, especially along the North–South divide (Avola, 2017). Southern Italian regions consistently emerge as disadvantaged across multiple indicators (Cersosimo & Nisticò, 2013). For instance, while employment rates in Northern regions align with the EU27 average, many Southern regions—particularly Sicily, Calabria, and Campania—rank among the European regions with the lowest levels of employment. Furthermore, while the Centre-North region has experienced an expansion in occupations typical of industrial and post-industrial economies, processes of industrialisation and tertiarisation in the South have remained incomplete (Panichella, 2014). Moreover, the gap between the North and South has recently widened, with the South increasingly facing risks of economic and demographic decline (Associazione per lo sviluppo dell'industria nel Mezzogiorno, 2014).

Over time, these disparities have reshaped the territorial divides that have historically defined Italian society (Viesti, 2021). While previous research has explored educational differences across Northern, Central, and Southern Italy (Ballarino et al., 2014), this article offers a fresh perspective by focusing specifically on how educational opportunities vary between "marginal" and "central" areas, moving beyond the traditional North–South lens. Compared to central areas, marginal areas in Italy face greater challenges such as depopulation, limited economic opportunities, and declining social services. These issues are particularly pronounced in the South—where the majority of marginal areas are concentrated—compared to the North, which benefits from specific mechanisms and institutional assets that can help mitigate the disadvantages associated with geographical marginality (Panichella et al., 2024). Building on this, our study also examines how these two geographical dimensions—marginality and the North–South divide—interact to shape heterogeneous student educational trajectories.

The article is structured into eight sections, each addressing distinct aspects of this analysis. Following this introduction, Section 2 provides a theoretical framework, exploring the role of geographical disparities in educational inequality and grounding the discussion in existing literature. After a brief description of the Italian educational system, Section 3 outlines geographical distinctions within Italy, focusing on the North–South divide and the classification of areas as either central or marginal. Section 4 details the research strategy, while Sections 5 and 6 describe the methodology. Section 7 presents the results, and Section 8 concludes with a summary and discussion of the key findings.

2. The Geographical Dimension of Educational Inequality

Research on educational stratification has predominantly focused on the national level, often comparing different countries. This focus is justified, as educational systems are key components of the modern nation-state (Meyer, 1977), with the standardisation of schooling across a state's territory and population being a primary objective of contemporary education systems (van de Werfhorst & Mijs, 2010). However, examining variations within a country, particularly regarding the expansion of education and the associated inequalities, can provide important theoretical insights. For example, it is crucial to determine whether the goal of educational equalisation (Breen & Jonsson, 2007) is achieved evenly across the country or whether local social and economic heterogeneity significantly influences its realisation (Morris, 2023).

In a meritocratic society, schools are ideally expected to select individuals based on inclusive, non-discriminatory principles, meaning that academic success should not be influenced by ascriptive factors such as geographical origin (Bukodi & Goldthorpe, 2011; Goldthorpe, 2003). In reality, however, geography remains a crucial determinant of educational opportunities, shaping key institutional settings such as school availability and local labour market conditions. Where one is born or resides can influence educational opportunities and inequalities in multiple ways. First, the socio-economic composition of students across regions must be considered, as it shapes the socio-economic composition of classrooms and peer groups, as well as the immediate environment in which students interact daily (Wells et al., 2023; Willms, 2010). This composition is often influenced by the uneven development of occupational structures across regions, with highly skilled service-sector jobs typically concentrated in large cities (Avola et al., 2024; Oesch, 2013). As a result, highly educated individuals are more likely to relocate to areas with better employment prospects, which are frequently large urban centres (Panichella & Cantalini, 2023; Panichella & Impicciatore, 2024). Consequently, educational expansion and geographical mobility can deepen disparities between regions,

concentrating highly skilled individuals in specific areas (Scandurra et al., 2020). Moreover, geographical mobility linked to these inequalities leads to significant depopulation in certain areas (Rees et al., 2017), which in turn affects class sizes and the teacher-to-student ratio. Notably, depopulation processes can paradoxically have a protective effect on certain categories of students, particularly the most vulnerable. With smaller class sizes, these students may benefit from a lower teacher-to-student ratio, allowing for more individualised attention and support (Blatchford et al., 2003). Furthermore, in less populated areas, students are often in a more socially controlled environment, which can reduce instances of social deviance and create a setting that supports academic focus and personal development.

Beyond social composition, geography also influences educational opportunities through its effect on the quality of educational provision. Wealthier neighbourhoods or large cities generally provide better access to high-quality institutions, including primary and secondary schools, as well as higher education and vocational training centres (Cordes et al., 2016; Johnson, 2012). Conversely, socio-economically deprived areas often suffer from a scarcity of institutions, both in terms of quantity and quality, which negatively affects student outcomes. Furthermore, students in affluent areas typically benefit from better-funded schools, advanced educational resources, and a range of extracurricular activities, all of which enrich their academic experience (Burdick-Will & Logan, 2017; Gerber, 1996). In contrast, students in disadvantaged areas may face significant challenges, such as overcrowded classrooms, limited access to technology, and fewer educational resources, which can impede their academic progress (Lucatelli, 2015). Nonetheless, recent studies in the US suggest that while residing in geographically disadvantaged contexts negatively affects academic achievement, this is not necessarily due to lower school quality in these areas (Wodtke et al., 2023).

Additionally, the availability of employment opportunities in different areas influences educational choices, particularly in terms of students' selection of schools and educational tracks. A strong demand for skilled labour in both tertiary and industrial sectors may encourage students to enrol in technical and professional pathways aligned with local economic needs, in order to improve their employment chances. In contrast, in areas with less developed occupational structures, or where rural work predominates, general education is often favoured (Panichella, 2014). The higher concentration of technical and professional schools in economically advantaged areas is frequently supported by collaborations between schools, businesses, and professionals, facilitating internships and job placements—opportunities that are typically less accessible in marginalised regions.

3. Educational Inequality and Geographical Cleavages in Italy

3.1. The Italian Educational System and the Transition From Lower to Upper Secondary School

Before discussing how geographical disparities intersect with educational opportunities and inequalities, it is helpful to briefly outline the structure of the Italian educational system, focusing on the transition from lower secondary to upper secondary education. This is a critical educational transition where major inequalities emerge, both in terms of enrolment and access to more prestigious tracks (Panichella & Triventi, 2014), making it the primary focus of this study. In Italy, after completing lower secondary school at age 14, students face a decisive choice regarding upper secondary education, which typically spans ages 15 through 18–19. They can select from four main educational tracks, each lasting four or five years: academic (*liceo*), humanistic, technical, and vocational.

Unlike in some other systems where teachers recommend a suitable track based on academic performance, in Italy, students and their families independently select their educational path, allowing enrolment in any track regardless of prior academic achievement (Checchi & Flabbi, 2007; Contini & Scagni, 2011). As a result, this decision is strongly influenced by students' social background and individual characteristics (Panichella, 2022; Panichella & Triventi, 2014).

The academic track, or *liceo*, is generally considered the most prestigious, with options such as the classical lyceum—focused on humanities subjects such as Latin, Greek, and philosophy—and the scientific lyceum, which emphasises mathematics and sciences. Students from more advantaged backgrounds tend to favour these tracks (Panichella & Triventi, 2014). The technical and humanistic tracks occupy an intermediate position, offering a blend of practical and theoretical education to prepare students for either university or the labour market (Ballarino & Panichella, 2016; Contini & Scagni, 2013).

The vocational track, by contrast, is primarily designed for direct entry into the labour market and is frequently chosen by students with lower academic performance, often from disadvantaged backgrounds (Azzolini & Barone, 2013). Within this track, there are also shorter two- to three-year vocational pathways that allow for early workforce entry but do not grant university access, further limiting educational and professional opportunities and reinforcing the stratifying effects of track choice.

3.2. Education, the North–South Divide, and the Distinction Between Marginal and Central Areas

Geographical disparities have profoundly shaped educational opportunities in Italy, a country marked by some of the highest levels of territorial inequality in Western societies (Felice, 2013). Traditionally, these inequalities have been examined through the lens of the North–South divide (Panichella, 2022). Despite improvements in general well-being and a broader distribution of educational institutions, the *Mezzogiorno* (Southern Italy) continues to lag behind, characterised by lower educational attainment and more pronounced educational inequality, particularly evident in the transition from lower to upper secondary school (Ballarino et al., 2014).

Following lower secondary school, educational choices in the South are characterised by a de facto strong dichotomy between enrolling in academic high schools, which typically leads to university, or exiting the education system entirely (Panichella, 2014). This rigid structure of choice is linked to the historically lower rates of enrolment in technical and vocational schools, a long-standing issue tied to weak industrial development and a low demand for intermediate-skilled labour in the Southern labour market (Trigilia, 1992). Limited access to technical and vocational schools, combined with lower student achievement and higher dropout rates, creates a particularly challenging environment for disadvantaged students in Southern regions (Ballarino & Panichella, 2021; Bratti et al., 2007).

While the North–South divide is a well-documented source of educational inequality, other dimensions of geographical disparity within each macro-region have received less attention. In other words, beyond the North–South divide, educational inequality also aligns with other geographical cleavages that remain largely underexplored in sociological research on education. One significant cleavage is between central and marginal (or peripheral) areas, a broad distinction commonly employed in both Italian and international debates (Carrosio & Osti, 2017; Copus, 2001; Kühn, 2015; Viesti, 2021). Central areas attract skilled labour, offer greater employment opportunities, and support "inclusive institutions" (Acemoglu & Robinson, 2012)

that foster broad economic participation (Fielding, 1992; Moretti, 2004). In contrast, marginal areas suffer from depopulation, limited economic opportunities, and declining social services, leading some researchers to label them "places that don't matter" (Rodríguez-Pose, 2018) or "left behind" (Pike et al., 2023).

This central-marginal divide reflects recent shifts in geographical inequality, largely driven by globalisation and technological advancement (Chetty et al., 2014; Moretti, 2012), and differs from historical divides such as urban-rural disparities or the North–South cleavage in Italy. Unlike industrialisation, which geographically favoured certain regions—most notably the North-West—this newer form of marginalisation arises from population decline, demographic ageing, dwindling job prospects, low capital investment, and limited public services (Barca et al., 2014). From an educational perspective, marginal areas face disadvantages in both the quality of schooling and the availability of school services, including upper secondary education, extracurricular programmes, and childcare facilities (Lucatelli, 2015; Pietrolucci et al., 2024). Additionally, secondary school teachers in Italy exhibit high mobility rates and frequently seek transfers when assigned to schools in disadvantaged areas and smaller towns (Barbieri et al., 2011; Lezzi, 2018).

The central-marginal continuum thus highlights that individuals in peripheral areas may face systemic disadvantages, including access to valuable educational opportunities. This study seeks to investigate how these forms of geographical marginality contribute to educational inequality in Italy, an objective further elaborated on in the following section on research strategy.

4. Research Strategy

The study systematically compares results from two data sources, using geographical residence as the independent variable, defined according to the National Strategy for Inner Areas (SNAI) classification (see Section 5.3). This classification emphasises spatial peripherality in relation to access to essential services and its association with demographic and socio-economic vulnerability. Moving beyond the traditional urban-rural dichotomy, it aligns with recent international literature advocating for more granular spatial measures (Detemple & Wicht, 2024).

To capture geographical marginality, we employ two different approaches based on the level of detail available in the data (see Section 5.1). On the one hand, municipal-level data allow us to differentiate between central and marginal municipalities with varying degrees of peripherality. On the other hand, provincial-level data define marginality as the proportion of individuals residing in socio-economically disadvantaged municipalities within a province. This dual definition, which provides complementary perspectives on how geographical marginality influences educational outcomes, carries significant implications for how geographical residence is conceptualised. Geographical residence can be measured either based on the characteristics of the specific municipality of residence or understood more broadly as the general characteristics of the surrounding context beyond the municipality itself. This distinction is crucial, as a student may live in a municipality with characteristics of social and economic marginality, yet that municipality could be situated near other centres with better access to services and resources.

This study examines patterns of geographical marginality and centrality in relation to students' educational choices after lower secondary school in Italy, with a particular attention to the North–South divide. Rather than testing the mechanisms underlying this association, we take an initial step in describing how geographical marginality—and its interaction with the North–South divide—relates to educational opportunities.

Specifically, we analyse four educational outcomes: (a) enrolment in a 4–5 year upper secondary school programme; (b) enrolment in a 2–3 year vocational programme; (c) non-enrolment in any upper secondary education, including dropouts and students retained in lower secondary school due to grade repetition; and (d) enrolment in academic tracks. This approach provides a comprehensive perspective on the transition from lower to upper secondary education, a critical stage in the Italian educational system due to its lasting impact on subsequent educational and occupational inequalities and (re)production of social stratification. These outcomes encompass a range of scenarios, from pathways of particular advantage and prestige (e.g., selection of an academic track) to those marked by disadvantage and vulnerability (e.g., dropouts and repeated grades). Furthermore, while enrolment in a 4–5 year upper secondary education programme is the most common pathway for Italian youth (86.3% of the population aged 15–17, as per the Italian Labour Force Survey [IT-LFS]), both non-enrolment and track selection are socially stratified (Triventi, 2014). This study seeks to determine whether geographical factors—namely, geographical marginality and its interaction with the North–South divide—also play a significant role in influencing these educational choices.

We employ a three-step research strategy to address key research objectives, such as analysing differences in educational outcomes between marginal and central areas, examining geographical disparities beyond the North–South dimension, and observing how these two axes of inequality intersect. The first step explores differences in educational decisions between students in marginal versus central areas after completing lower secondary school, with attention to variations in access to higher-status tracks. The second step includes regional controls to assess whether geographical marginality exhibits distinct patterns nationwide or if broader macro-regional inequalities play a role. The third step examines intersections between geographical marginality and the North–South divide in shaping educational outcomes. This approach allows for a closer examination of variations in the association between geographical marginality and educational opportunities across different macro-regions, providing a nuanced view of how multiple geographical factors are associated with educational trajectories.

5. Data and Variables

5.1. Data

This study leverages two primary datasets: the IT-LFS and INVALSI, the National Institute for the Evaluation of the Italian School System. These datasets provide distinct yet complementary information that enables a comprehensive analysis of educational pathways and geographical marginality across Italy. The IT-LFS, conducted by the Italian Institute of Statistics (ISTAT), is a nationally representative household survey collecting data on all household members aged 15 and older. Our analysis draws on data from the years 2005 to 2014, focusing on a sample of 184,452 individuals aged 15 to 17. The large sample size, combined with detailed information on both enrolled and non-enrolled individuals in upper secondary education, allows for a comprehensive assessment of upper secondary school enrolment, dropout rates, and track placement, with rich detail on both educational and social background indicators. The survey includes 50 distinct categories for upper secondary tracks, offering nuanced insights into track placement.

However, IT-LFS data are limited to the provincial level and lacks municipality-specific information. As a result, we assess marginality at a broader scale, defining it as the percentage of individuals within each province residing in socioeconomically disadvantaged municipalities (see Section 5.3). This provincial-level

measure enables an analysis of how regional marginalisation correlates with enrolment, dropout rates, and track selection.

The INVALSI dataset originates from annual surveys conducted by INVALSI, covering the entire student population in Italy to monitor achievement in Italian reading (reading comprehension and grammatical knowledge) and mathematics. Our data is derived from assessments conducted in 2017–2018 and 2018–2019, capturing information on 504,123 students in grade 10, typically aged 15–17. Unlike the IT-LFS, INVALSI data is collected at the municipal level, offering finer spatial granularity for measuring territorial marginality. However, as it focuses solely on students, it does not allow for the study of upper secondary enrolment or dropout rates. Additionally, it provides less detail on track categories and social origin indicators. Despite these limitations, its high-resolution geographical data is particularly valuable for identifying marginal and central areas with precision.

5.2. Educational Outcomes

The analysis examines two groups of educational outcomes, which serve as the dependent variables in this study. The first group pertains to enrolment decisions following the completion of lower secondary education, measured using IT-LFS data. The primary outcome is the probability of enrolling in a 4–5 year upper secondary school programme, measured with a dummy variable coded as 1 for those enrolled in this programme and 0 for all others (including those enrolled in 2–3 year vocational programmes, those attending lower secondary school due to grade retention, and those not enrolled in any programme). This pathway is generally associated with academic and technical tracks, which prepare students for university or advanced career opportunities, as well as a lengthy vocational track leading directly into the labour market. In addition to this primary outcome, we assess an alternative enrolment choice, i.e., the likelihood of opting for shorter vocational programmes that span two to three years. This is measured with a dummy variable coded as 1 for those enrolled in these programmes and 0 for all others. These shorter programmes, typically organised at the regional level, facilitate earlier entry into the labour market but do not confer university eligibility. Lastly, we examine the probability of non-enrolment in any upper secondary education programme, representing the choice to exit the educational system after completing lower secondary school. This outcome is measured with a dummy variable coded as 1 for those attending lower secondary school due to grade retention or those not enrolled in any programme, and 0 for all others. As a robustness check, we also examine these two latter outcomes by excluding individuals enrolled in a 4–5 year upper secondary programme, thus estimating the probability of enrolling in a short vocational programme rather than not enrolling in upper secondary education. The results from this additional analysis confirm the pattern presented in the main text (see Supplementary File, Table A12).

The second group of outcomes focuses on track choice within upper secondary education and is measured using both the IT-LFS and INVALSI datasets. The detailed information on the track available in the IT-LFS allows us to examine enrolment in academic tracks, specifically the classical and scientific lyceums, which are generally regarded as the most prestigious pathways. In contrast, the INVALSI data combine classical and scientific lyceums with the linguistic lyceum (typically classified under the humanities track), requiring us to analyse the probability of students enrolling in either the academic tracks or the linguistic lyceum in this dataset. These probabilities are measured among students who have already opted to continue in upper secondary education, meaning they are conditional on enrolment. Therefore, we use a dummy variable coded

as 1 for those enrolled in academic tracks (or the linguistic lyceum, in the case of INVALSI) and 0 for those enrolled in humanities, technical, or vocational 4–5 year schools.

5.3. Geographical Marginality

The distinction between central and marginal areas is based on the classification provided by SNAI. SNAI is a place-based policy designed to address Italy's persistent geographical inequalities. This framework identifies central and marginal areas based on access to essential public services, specifically education, healthcare, and transportation. A municipality is classified as a central area (or city-hub) if it meets the following criteria (UVAL, 2014): (a) it has at least one academic and one vocational upper secondary school; (b) it contains a hospital with a catchment area of 150,000 to 300,000 inhabitants; and (c) it features a railway station with an average daily passenger count exceeding 2,500, providing short, medium, and long-distance transport services. Municipalities within a 20-minute road travel time from a city-hub are also classified as central or "belt" areas. In contrast, marginal areas are municipalities located more than 20 minutes away from a city-hub. These are further categorised into three subtypes based on distance: intermediate (20–40 minutes), peripheral (40–75 minutes), and ultra-peripheral (75 minutes or more).

Since areas are classified as central based, among other factors, on the presence of academic and vocational upper secondary schools, it follows that these schools are predominantly concentrated in central areas rather than in marginal ones (Pietrolucci et al., 2024). As a result, students residing in marginal areas, as defined by SNAI, may experience lower enrolment rates in upper secondary education due to the limited availability of schools in their vicinity. In other words, the reduced concentration of upper secondary schools in marginal areas may hinder educational opportunities for residents. This issue can be particularly pronounced in marginal areas of the South, which are more isolated and where public transport infrastructure is less developed, complicating school mobility towards central areas.

To quantify geographical marginality, we use both municipal-level and provincial-level measures. At the provincial level, two indicators were constructed using data from the IT-LFS. The first indicator represents the percentage of the population living in marginal municipalities within each province, providing an overview of provincial marginality by illustrating the proportion of residents in socioeconomically disadvantaged areas. The second indicator, used as a robustness check, measures the percentage of municipalities within each province classified as marginal, reflecting the geographical spread of marginality across the provincial landscape. For analytical purposes, we chose to present the results in terms of tertiles of marginality; however, the findings remain robust when using continuous measures as well (see Supplementary File, Table A10). This approach aligns with previous research (Avola et al., 2024; Panichella et al., 2024), which underscores the importance of distinguishing between areas with varying degrees of marginality, as particularly high levels of marginality may have distinct implications for educational outcomes. In contrast, the INVALSI data measure marginality at the municipal level, identifying the specific type of municipality in which each student's school is located at the time of data collection—whether central, intermediate, peripheral, or ultra-peripheral. To summarize, in the IT-LFS dataset, we utilise a variable divided into three categories, corresponding to tertiles of the distribution of our indicator: first tertile (reference category, corresponding to a low degree of marginality), second tertile (medium degree of marginality), and third tertile (high degree of marginality). For the INVALSI dataset, we employ a variable with five categories: city-hub (reference category), inter-municipal hub, belt, intermediate, and peripheral/ultra-peripheral.

Figure 1 illustrates the distribution of central and marginal areas in Italy, with the SNAI classification at the municipal level shown in the left panel and our provincial-level measure of marginality in the right panel. In both cases, redder colours indicate more central areas, while greener colours signify more marginal areas. The left panel, based on the SNAI classification, highlights a high concentration of marginal municipalities in rural and mountainous areas, particularly in Southern Italy and parts of the Centre. The right panel, which presents provincial-level marginality based on the population distribution within marginal municipalities, aligns closely with the SNAI classification at the municipal level (see also Supplementary File, Table A1).

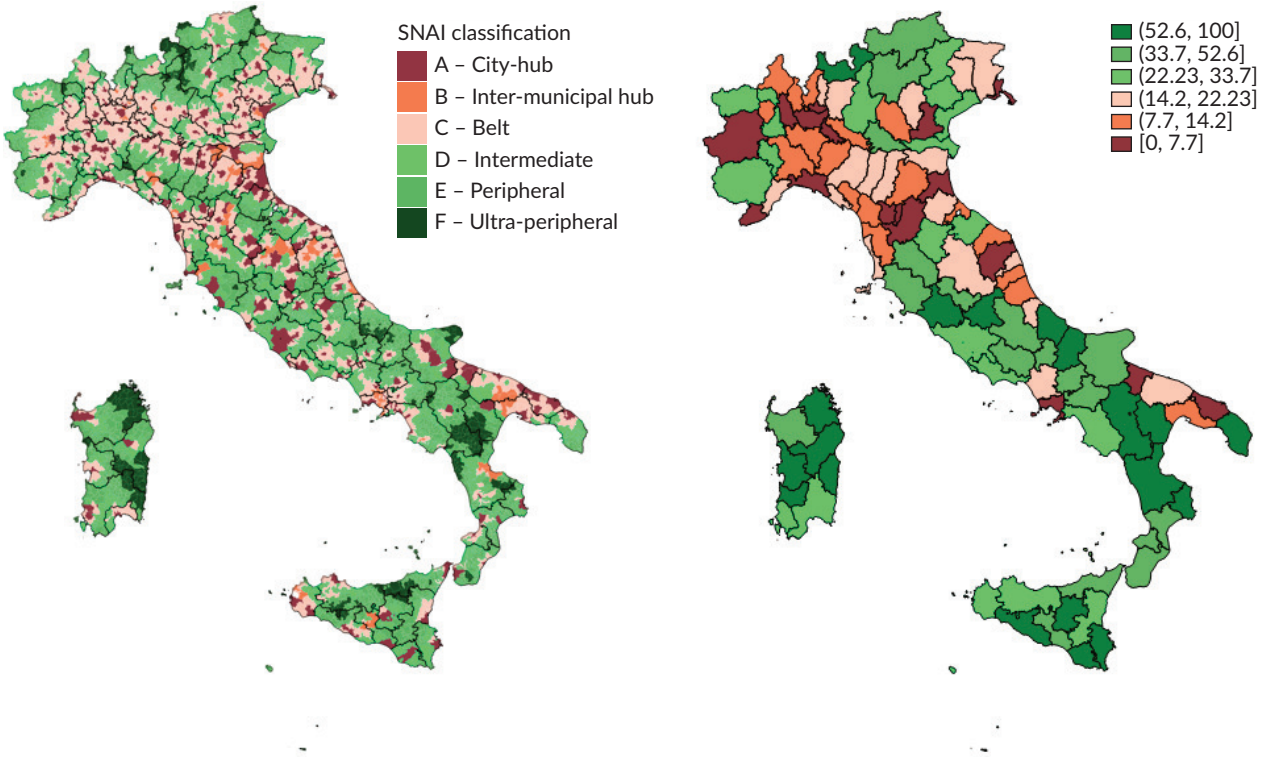

Figure 1. Marginal and central areas in Italy, according to the municipal-level (left panel) and provincial-level (right panel) measures of geographical marginality. Source: own elaboration based on INVALSI (2017–2018; 2018–2019) and IT-LFS data (2005–2014).

Both classifications reveal a pronounced North–South imbalance in Italy, with geographical marginality concentrated predominantly in the South. For example, in the North-West, only one-third of municipalities are classified as marginal, with just one-tenth of the population residing in these areas. The South, however, presents a starkly different scenario, where two-thirds of municipalities are considered marginal, and approximately one-third of the population lives in these disadvantaged regions. The North-East and Centre regions represent intermediate cases, with a more balanced distribution of central and marginal areas compared to the extremes observed in the North-West and South.

5.4. Controls

In the analysis, we include a set of control variables to account for individual and family characteristics that may influence educational outcomes beyond geographical marginality. Firstly, the macro-area of residence (North-West, North-East, Centre, South, and Islands) is included to control for the different distribution of

marginal and central areas across macro-regions and to estimate the association between geographical marginality and educational outcomes over and above the North–South divide. Moreover, the models include two indicators of social origin, both measured as the highest value held by either parent (dominance principle; Erikson, 1984). The first is parental education, which in the INVALSI dataset distinguishes between parents with lower secondary education or less, upper secondary education, and tertiary education. In the IT-LFS dataset, more detailed information is available, allowing for the differentiation of parents with the following educational qualifications: no formal qualification, primary education, lower secondary education, upper secondary education (two to three years), upper secondary education (four to five years), post-secondary non-tertiary education, and tertiary education. The second indicator is parental social class, which is operationalised using a simplified version of the EGP scheme, including the following categories: service class (EGP I+II), white collars (III), petit bourgeoisie (IV), working class (V+VI+VII), and unemployed or inactive. The models also control for sex, a dummy for country of birth (Italy vs abroad), age, and year of survey dummies. Descriptive statistics for all variables are presented in the Supplementary File, Tables A2–A3.

6. Statistical Analysis and Model Specification

The analysis employs linear probability models (LPMs) to estimate the effects of geographical marginality on educational outcomes, with robust standard errors applied to address potential heteroscedasticity. The LPM approach offers a straightforward interpretation of the probability of different educational choices across varying levels of marginality. As a robustness check, we also estimate logit models and multilevel models, which substantially confirm the results presented in the main text (see Supplementary File, Tables A8–A9). The models are structured to sequentially assess the net effect of marginality, the role of the macro-region of residence, and the interactions between marginality and Italy's North–South divide.

The model specification follows the steps of the empirical strategy outlined earlier. The first step quantifies the direct effect of marginality on educational outcomes by estimating two models:

$$\text{M1: } Y_i = \alpha + \beta_1 \text{Marg}_i + \beta_2 Z_i + \varepsilon_i$$

$$\text{M2: } Y_i = \alpha + \beta_1 \text{Marg}_i + \beta_2 Z_i + \beta_3 (\text{Par\_ edu}_i \times \text{Class}_i) + \varepsilon_i$$

where Y_i represents the probability of a particular educational outcome for individual i, β_1 is the coefficient estimating the effect of geographical marginality (Marg_i) on the outcome; Z_i represents the set of control variables, sex, immigrant status, age, and survey year; and ε_i denotes the error term. In the second model (M2), an interaction term between parental education and social class is included to examine the combined effect of these factors on the educational outcome. This interaction, facilitated by the large sample size, allows for a nuanced analysis of the relationship between geographical marginality and educational choices while controlling for various combinations of parental education and social class. This control is critical, as the penalising effect of geographical marginality may be influenced by the sorting effect across different contexts. Geographical mobility further accentuates this sorting by concentrating highly qualified individuals in specific urban areas (typically large cities) (Panichella & Cantalini, 2023), increasing the socio-spatial distance from marginal areas. In other words, this approach allows for the control of the socio-economic composition of different geographical areas, particularly the lower proportion of highly educated and skilled individuals in marginal regions, which can negatively influence the educational outcomes of young people (see Section 2). While alternative strategies could address these socio-economic

disparities—such as including macro-level controls for the proportion of tertiary-educated individuals or average income—our approach can be considered among the most effective when working with individual-level data.

The second step of the empirical analysis examines whether marginality is associated with educational outcomes independently of Italy's broader North–South divide, by means of the following model:

$$\text{M3: } Y_i = \alpha + \beta_1 \text{Marg}_i + \beta_2 Z_i + \beta_3(\text{Par\_ edu}_i \times \text{Class}_i) + \beta_4(\text{Reg}_i) + \varepsilon_i$$

where Reg_i indicates the macro-region of residence, to assess whether the effect of marginality persists over and above Italy's traditional North–South divide. Including this regional variable helps account for the fact that many marginal areas are concentrated in the South, clarifying whether geographical marginality independently impacts educational opportunities or if its effect primarily reflects its concentration in Southern regions.

The third step of the analysis assesses whether the association between marginality and educational outcomes varies across macro-regions, specifically within Italy's North–South divide. In this case, we estimate M3 separately for Northern, Central, and Southern regions, allowing for an exploration of whether the effects of marginality on educational outcomes differ by macro-area. This model provides insight into whether the association between marginality and educational trajectories is amplified or mitigated within specific macro-regions, offering a nuanced perspective on how regional contexts shape the consequences of geographical marginality on educational pathways. As a robustness check, we estimate an additional model including an interaction term between geographical marginality and the North–South divide. The findings align with those from models stratified by macro-region, as presented in the main text (see Supplementary File, Tables A10–A11).

7. Results

7.1. Enrolment in 4–5-Year Upper Secondary Schools

This section examines the association between geographical marginality and the probability of enrolment in a 4–5-year upper secondary school, using data from the IT-LFS. Table 1 presents the beta coefficients estimated through LPMs, analysing how different levels of geographical marginality—represented by the second and third tertiles compared to the first tertile (reference category)—affect the likelihood of enrolment.

The results from M1, which estimates the gross association between marginality and enrolment in a 4–5-year upper secondary school, indicate that the probability of enrolment for individuals residing in marginal areas does not substantially differ from that of individuals in less marginal contexts ($\beta_{2\text{ndtertile}} = 0.00$; $\beta_{3\text{rdtertile}} = 0.01$). This association becomes slightly more pronounced in M2, where an interaction term between parental education and social class is introduced to account for the combined effect of family background on educational outcomes. Net of sociodemographic and family background characteristics, students in provinces with a high degree of marginality exhibit a 2-percentage-point higher probability of enrolling in 4–5-year upper secondary schools.

In Model 3, the analysis incorporates the North–South divide by introducing a regional variable that categorises regions as North-West, North-East, Centre, or South. With the addition of regional controls, the

Table 1. Geographical marginality and probability of being enrolled in 4–5-year upper secondary schools, by macro-region.

	M1	M2	M3	North	Centre	South
Geographical marginality (ref. 1st tertile)						
2nd tertile	0.00	0.01***	0.00	0.01**	−0.01*	0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
3rd tertile	0.01***	0.02***	0.00	−0.06***	−0.00	0.04***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
N	184,452	184,452	184,452	76,210	26,930	81,312

Notes: LPMs; Beta coefficients and robust standard errors in parentheses; M1 controls for sex, immigrant status, age, year of survey; M2 includes also parental education and occupation; M3 includes also geographical macro-area of residence; models by macro-region are estimated with full controls; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. Source: Own elaboration based on IT-LFS data (2005–2014).

coefficients for marginality in both tertiles become statistically insignificant, implying that the (small) effect of marginality observed in the previous model is primarily driven by broader regional disparities rather than by marginality alone.

The intersection between geographical marginality and macro-region, presented in the second part of Table 1, offers further insight into these dynamics (see also Supplementary File, Figure A1). In the North, the coefficient for the second tertile is slightly positive but not substantially significant ($\beta_{2ndtertile} = 0.01$), while the coefficient for the third tertile is largely negative ($\beta_{3rdtertile} = -0.06$), indicating a much lower probability for young individuals living in marginal areas in the North to enrol in 4–5-year upper secondary schools compared to their counterparts living in Northern central areas. In the Centre, the effect of marginality is non-significant ($\beta_{2ndtertile} = -0.01$; $\beta_{3rdtertile} = -0.00$), suggesting that marginality does not play a substantial role in shaping enrolment in this region. In contrast, the South exhibits a distinct pattern, with a positive association in both the second ($\beta_{2ndtertile} = 0.01$) and, more notably, third tertile ($\beta_{3rdtertile} = 0.04$). This indicates that, particularly for individuals in the third tertile, marginality is associated with an increased likelihood of enrolment.

Therefore, analyses disaggregated by geographical macro-area indicate that the relationship between geographical marginality and the likelihood of enrolling in a 4–5-year upper secondary school programme varies across regions. In the North, individuals residing in provinces with the highest levels of marginality face a disadvantage in terms of upper secondary school enrolment. Conversely, in the South, individuals from similarly marginal areas appear to experience an advantage. In the following section, we delve deeper into this North–South disparity, focusing specifically on individuals who do not enrol in a 4–5 year upper secondary school programme.

7.2. The Risk of Non-Enrolment and Enrolment in 3-Year Vocational Schools

Table 2 explores regional differences in educational choices by examining two distinct outcomes that complement the choice of enrolling in 4–5-year upper secondary schools: the probability of enrolment in 3-year vocational schools and the risk of not being enrolled in any upper secondary education. The results, based solely on IT-LFS data, are reported separately for the North, Centre, and South, with tertiles of marginality representing varying degrees of geographical disadvantage.

Table 2. Geographical marginality, probability of being enrolled in 2–3-year vocational schools, and probability of not being enrolled in any upper secondary education programme, by macro-region.

	Enrolment in 2–3-year vocational schools		
	North	Centre	South
Geographical marginality (ref. 1st tertile)			
2nd tertile	–0.01***	0.01***	0.00**
	(0.00)	(0.00)	(0.00)
3rd tertile	0.04***	0.00	–0.00
	(0.01)	(0.00)	(0.00)
N	76,210	26,390	81,312
	Non-enrolment		
	North	Centre	South
Geographical marginality (ref. 1st tertile)			
2nd tertile	0.00	–0.00	–0.02***
	(0.00)	(0.00)	(0.00)
3rd tertile	0.01***	0.00	–0.04***
	(0.01)	(0.00)	(0.00)
N	76,210	26,390	81,312

Notes: LPMs; Beta coefficients and robust standard errors in parentheses; models control for sex, immigrant status, age, year of survey, parental education, and parental occupation; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. Source: Own elaboration based on IT-LFS data (2005–2014).

The first panel of the table shows that in northern regions, the coefficient for the second tertile of marginality is slightly negative ($\beta_{2ndtertile} = -0.01$), whereas that of the third tertile is positive ($\beta_{3rdtertile} = 0.04$). This pattern may indicate that in Northern regions, geographical marginality increases the likelihood of students being placed in vocational education rather than facing exclusion from upper secondary education entirely. This finding is further supported by the predicted probabilities (see Supplementary File, Figure A2) and models excluding students enrolled in 4–5-year upper secondary education programmes, which show that young people in marginal areas of the North are more likely to enrol in shorter vocational programmes rather than face dropout or grade retention compared to their counterparts in both northern central areas and southern marginal areas (see Supplementary File, Table A12).

In the Centre, the results show no substantial association between geographical marginality and the probability of enrolling in short vocational courses, suggesting that highly marginalised areas in the Centre do not experience the same vocational enrolment pressure observed in the North. In contrast, the South presents a different pattern compared to the North, also with regard to this educational outcome. Students in marginalised areas of the South do not exhibit the same increased likelihood of vocational enrolment as seen in northern regions.

To further understand this regional distinction, the second panel in Table 2 examines the risk of not being enrolled in any upper secondary school. For both the North and Centre, neither the second nor third tertiles show substantially significant coefficients, suggesting that geographical marginality does not significantly influence the risk of educational exclusion in these regions. In the South, the pattern shifts

considerably, with young individuals in the third tertile of marginality exhibiting a substantially lower risk of educational exclusion.

Overall, Table 2 highlights a key difference in how geographical marginality affects educational outcomes across regions. In the North, students residing in marginal areas are more often channelled into 3-year vocational schools, while in the South, students in marginal areas face a lower risk of experiencing school dropout or other situations of heightened educational disadvantage.

7.3. The Choice of the Academic Track

Table 3 explores how geographical marginality shapes students' likelihood of selecting an academic track in upper secondary education. It presents the results of M3, estimated using both the IT-LFS and INVALSI datasets. Geographical marginality is measured using two different approaches: One divides marginality into tertiles, while the other classifies municipalities as central, belt, intermediate, and peripheral or ultra-peripheral, as defined by the SNAI classification.

The IT-LFS data show limited differences in the probability of enrolling in academic tracks between students from areas with varying levels of marginality. Students in the second and third tertiles of marginality exhibit only a slight decrease in the likelihood of choosing an academic track, with coefficients of −0.01 and −0.03, respectively. Small differences are also observed in the INVALSI data, with coefficients ranging between −0.01 and 0.01.

Table 3. Geographical marginality and probability of being enrolled in the academic track.

	IT-LFS	INVALSI
Geographical marginality (ref. 1st tertile)		
2nd tertile	−0.01*** (0.00)	—
3rd tertile	−0.03*** (0.00)	—
Geographical marginality—SNAI (ref. city-hub)		
Inter-municipal hub	—	−0.01*** (0.00)
Belt	—	−0.01*** (0.01)
Intermediate	—	0.00 (0.00)
Peripheral and ultra-peripheral	—	0.01* (0.00)
N	159,258	504,123

Notes: LPMs; Beta coefficients and robust standard errors in parentheses; models control for sex, immigrant status, age, year of survey, parental education, and parental occupation; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. Source: Own elaboration based on IT-LFS data (2005–2014) and INVALSI data (2017–2018; 2018–2019).

As with previous analyses, however, models stratified by macro-regional location suggest that regional context plays a significant role in shaping the association between marginality and academic track enrolment (Table 4; see also Supplementary File, Figure A3). Both the IT-LFS and INVALSI data indicate that in Northern Italy, moderate and particularly high levels of marginality are associated with a considerable decrease in the likelihood of choosing academic tracks. Specifically, students in both the second and third tertiles of marginality exhibit significant negative coefficients ($\beta_{2ndtertile} = -0.04$; $\beta_{3rdtertile} = -0.08$), as do those in intermediate, peripheral, and ultraperipheral municipalities ($\beta_{intermediate} = -0.03$; $\beta_{peripheral} = -0.05$).

The Centre and South reveal different trends. In the Centre, it is particularly students from moderately marginalised areas (second tertile) who show a higher probability of choosing academic tracks ($\beta_{2ndtertile} = 0.04$). In the South, marginality does not appear to be significantly associated with academic track selection in the IT-LFS data. However, the INVALSI data provides a more nuanced perspective, showing a positive association with academic track enrolment for students in peripheral and ultra-peripheral areas only in Southern Italy ($\beta_{peripheral} = 0.03$).

In summary, these findings highlight how geographical marginality interacts with regional context to shape students' educational choices, revealing that the impact of marginality is not uniform across Italy. In the North, higher levels of marginality are closely linked to a reduced probability of choosing the academic track, reinforcing the challenges faced by students in more isolated areas. In contrast, Southern Italy exhibits a distinct pattern: Compared to students living in city-hubs or non-marginal areas, such as large cities, students in the marginal areas of the South are more likely to face the dual pressure of either not enrolling in

Table 4. Geographical marginality and probability of being enrolled in the academic track, by macro-region.

	IT-LFS			INVALSI		
	North	Centre	South	North	Centre	South
Geographical marginality (ref. 1st tertile)						
2nd tertile	−0.04*** (0.00)	0.04*** (0.01)	−0.01* (0.01)	–	–	–
3rd tertile	−0.08*** (0.00)	0.02*** (0.01)	−0.01 (0.01)	–	–	–
Geographical marginality—SNAI (ref. city-hub)						
Inter-municipal hub	–	–	–	−0.00 (0.00)	−0.03*** (0.01)	−0.01 (0.00)
Belt	–	–	–	−0.03*** (0.00)	−0.01* (0.01)	0.02*** (0.00)
Intermediate	–	–	–	−0.03*** (0.00)	0.01* (0.01)	0.01*** (0.00)
Peripheral and ultra-peripheral	–	–	–	−0.05*** (0.01)	0.01 (0.01)	0.03*** (0.00)
N	64,106	24,392	70,760	229,609	97,385	176,679

Notes: LPMs; Beta coefficients and robust standard errors in parentheses; models control for sex, immigrant status, age, year of survey, parental education, and parental occupation; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. Source: Own elaboration based on IT-LFS data (2005–2014) and INVALSI data (2017–2018; 2018–2019).

upper secondary school or, if they do enrol, choosing the academic track. In other words, the dichotomy between non-enrolment and academic track enrolment, characteristic of Southern regions (see Section 3.2), is amplified by geographical marginality, contributing to a complex educational landscape. Indeed, while students in marginal areas in the North are more likely to enter shorter vocational programmes compared to their peers in central areas of the North, those in the South, particularly from the most isolated communities, appear more inclined towards academic pathways if they remain in school.

8. Conclusion

This study investigates the relationship between geographical marginality and educational outcomes in Italy, focusing on how students from central and marginal areas in Northern and Southern regions differ in their enrolment decisions, dropout rates, and academic track selection in upper secondary education. The findings reveal that while the effects of geographical marginality are observable, they are generally modest compared to the more significant North–South divide. Specifically, the average effect of marginality on outcomes such as enrolment and track choice typically ranges from 1 to 3 percentage points in magnitude. The role of marginality becomes more pronounced when considered within the broader context of the North–South divide, accentuating the characteristics of regional dualism in educational choices (Ballarino et al., 2014; Panichella, 2014). In the North, marginal areas are associated with a lower likelihood of enrolling in 4–5 year upper secondary programmes. However, students in these areas exhibit a higher propensity for enrolment in 3-year vocational schools compared to their peers in central areas of the North. This suggests that the primary factor behind lower enrolment in the most typical five-year programmes in Northern marginal areas is the greater prevalence of vocational school enrolment, directing students toward shorter, less academically focused pathways.

In the South, the relationship between marginality and educational choices differs. Students in marginal areas of the South, when compared to their peers in central Southern areas, display higher rates of enrolment in 4–5-year upper secondary programmes and a lower risk of non-enrolment. Thus, unlike the Centre-North, marginality in the South seems to serve as a "protective" factor, reducing the risk of school dropout and other forms of educational disadvantage.

Regarding academic track enrolment, both the IT-LFS and INVALSI data indicate that, on average, students in marginal areas do not differ substantially from those in central areas. However, even when considering this educational outcome, the effect of marginality varies significantly by region, with a negative association in the North and a positive association in the South. In the North, students from marginal areas who remain in upper secondary school are less likely to enrol in academic tracks than their peers in central Northern areas. Conversely, in the South, students in marginal areas are more likely to enrol in academic tracks than those in central Southern areas.

This result contrasts with recent findings on labour market marginality and social mobility (Avola et al., 2024; Panichella et al., 2024), which highlight a clear double disadvantage in Southern marginal areas. When considering educational outcomes, however, marginality in the South seems to exert a protective effect, reducing dropout risk and increasing the likelihood of enrolling in academic schools. This protective effect may be attributed to various factors, such as smaller school classes, denser social capital, greater community social control, and lower levels of social deviance in marginal areas of the South.

However, while these factors may represent mechanisms of advantage for students living in Southern marginal areas, further clarification is needed. First, the reference category used in the analyses plays a role: While in the North, marginal areas are compared with economically and socially dynamic central areas like Milan or Turin, in the South, marginal areas are compared with central areas that have different socio-economic characteristics. Southern cities such as Naples, Bari, and Palermo tend to have limited modern educational infrastructure, fewer educational resources, and higher dropout rates. Therefore, rather than reflecting a protective effect of marginal areas, this result may partly be due to the comparison with particularly disadvantaged Southern urban areas, where high dropout rates and social deviance are more common.

Second, the protective effect may only appear to be protective. It could actually reflect the effects of the relatively unskilled occupational structure in Southern marginal areas, where the agricultural sector remains significant and commuting opportunities to more dynamic centres are limited. In these areas, the likelihood of securing employment that matches one's educational qualifications is generally lower (Panichella et al., 2024), which reduces the expected returns on technical and vocational education and can encourage families to view upper secondary and university education as more viable long-term strategies for social mobility. This perspective aligns with the observed dichotomy between non-enrolment and academic track enrolment in Southern regions—particularly in marginal areas—where technical and vocational education is less widespread than general and academic education, also due to historical and cultural factors (Felice, 2013). Moreover, the decision to enrol in university is often linked to plans to study at universities in the Centre-North region. Consequently, economically disadvantaged contexts, with a strong agricultural presence, may motivate students in Southern marginal areas to invest in education and pursue academic pathways with an eye toward university enrolment, which often involves geographical mobility toward the Centre-North, given limited transport access. From this perspective, the "protective" effect of marginality in the South on educational attainment may actually contribute to the issue of depopulation, reinforcing the brain drain toward more central and innovative areas in the Centre-North.

This study contributes to the ongoing debate on the relationship between geographical and educational inequalities, focusing on a context uniquely suited to examining these issues. Italy is characterized by unparalleled geographical disparities, marked by a pronounced North–South divide. All Southern regions lag economically behind their Northern counterparts, creating a stark regional imbalance. Moreover, marginalised areas are predominantly concentrated in the South, making these regions a context of "pure" marginality. In other words, Italy provides a unique opportunity to study the effects of marginality, as most marginal areas are not only geographically isolated but also situated in regions where even central areas face substantial economic deprivation. Future research should explore how the findings from Italy compare to those from other countries, where the effects of marginality may be obscured or offset by differing institutional or socioeconomic factors.

Building on this, however, our study yields findings that are, in part, counterintuitive. While existing literature suggests that disadvantaged contexts—in our case, marginal areas—tend to undermine educational opportunities through a network of interrelated socioeconomic and infrastructural factors (e.g., lower school quality, limited employment opportunities, and reduced human capital), our analysis reveals a potential "protective" effect associated with these contexts. This protective effect is particularly evident in contexts typically considered at high risk of disadvantage, such as Southern regions. In other words, the "pure" marginality described above may, in some cases, have positive implications for educational opportunities.

However, we cannot entirely dismiss the possibility that this protective effect may be misleading. Future research should delve into the mechanisms underlying this phenomenon to determine whether it conceals other forms of disadvantage.

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Conflict of Interests

The authors declare no conflict of interests.

Data Availability

Data from the IT-LFS are provided by the Italian National Institute of Statistics (ISTAT) and are available on its website. Data from INVALSI are provided by permission of INVALSI-SNV. Data will be made available on request to the corresponding author with the permission of INVALSI-SNV.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

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ARTICLE

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Do Municipal Factors Influence the Type of Schooling Newly Arrived Refugees Receive?

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Abstract

In the context of refugee immigration in the mid-2010s, a considerable number of adolescents of compulsory school age came to Germany. This group of lateral entrants to the German school system is more frequently enrolled in less demanding school types and often taught in separate classes. Previous research suggests that, in addition to individual and family-related factors, educational policy regulations at the federal-state level impact the schooling of refugees. However, these regulations are relatively abstract, leaving the individual municipalities considerable room for implementation. Furthermore, the associated administrative regulations can vary greatly between districts and might affect school integration differently. Yet, the influence that such municipal-level factors have on refugees' educational participation has hardly been quantitatively researched. We analyse whether conditions at the municipal level correlate with the school type and class type attended by refugees. We expect education-related municipal resources, but also local experience with immigrants, to be important. Applying multivariate multilevel models, we test these assumptions with data from the ReGES study regarding 1,879 adolescent refugees. The results show that the more refugee pupils there are in the municipality, the more likely it is that pupils will be educated in a separate class for newcomers. In most cases, examining the further hypotheses shows the assumed direction of the relationships, but they are not statistically significant. Overall, municipal factors only contribute to a very small extent to explaining the schooling of lateral entrants in our analyses. Possible explanations for this are discussed in the conclusion.

Keywords

educational participation; lateral entrants; municipal context; newcomer classes; refugees; secondary schools

1. Introduction

In the mid-2010s, many refugees sought protection in other countries, including in Europe. In the years 2013–2017 alone, Germany took in 1.8 million refugees, about a third of whom were minors (Bundesamt für Migration und Flüchtlinge, 2018). For children and adolescents, participation in the education system is crucial for settling into the host society; it is essential for acquiring knowledge and skills, structuring everyday life, and making social contacts. In addition, in Germany, the acquisition of school-leaving qualifications is closely linked to subsequent labour market success (Bol & van der Werfhorst, 2011). However, integrating large numbers of newcomers into educational institutions is challenging for both schools of the host society and immigrants. The situation is particularly demanding for so-called lateral entrants: young people who have fled during their educational trajectory and are now trying to catch up in the host country. This makes it vital to investigate which factors influence educational participation and which aspects hinder or promote the educational success of young newcomers.

Previous research has shown that both individual and family resources, but also educational policy regulations, are related to the educational participation of young lateral entrants to the German education system (Will et al., 2022; Will & Homuth, 2020). This applies to various indicators of educational participation, such as duration until enrolment at school, the classes and school types attended, and whether new immigrants are enrolled age-appropriately. However, these studies can only explain the schooling of newcomers to a certain extent. One explanation for this could be that educational policy regulations for the schooling of new immigrants at the federal-state level are usually relatively abstract. This leaves the municipalities, which are responsible for implementing the federal state regulations, considerable room for interpretation. The administrative implementation of regulations at the municipal level can therefore vary greatly between municipalities, even within a federal state, as they possibly also depend on other structural characteristics in the district (Tjaden & Spörlein, 2023). Therefore, we suspect—in line with previous research (e.g., El-Mafaalani & Kemper, 2017; Emmerich, Hormel, & Kemper, 2020)—that factors at the municipal level also influence the schooling of newly immigrated adolescents. We analyse whether conditions at the municipal level correlate with the school type and class type attended by refugees. In doing so, we take into account the number of newly arrived pupils at the municipal level who need to be integrated into education and the experience of the respective municipality in educating immigrant pupils. We also consider the number of existing schools and free capacity in these schools in the respective municipality. Our analyses are based on data from the study ReGES—Refugees in the German Educational System that allows us to consider relevant individual and family-related aspects as well as variables at the federal state and regional levels. Furthermore, we import regional characteristics from various databases. We test our hypotheses using multivariate multilevel models based on data from 1,879 young refugees.

We first describe the situation of lateral entrants in the German education system regarding their assignment to school and class type (2.1 and 2.2), before presenting studies on the influence of municipal characteristics on educational participation (2.3). We then present our theoretical assumptions and the research hypotheses derived from them (3), describe our data basis, and outline the analysis strategy (4), before presenting our results (5). In the conclusion, we discuss the results in the context of the limitations of the available data (6).

2. The Situation of Lateral Entrants in the German Education System

Two aspects seem central to the schooling of newly immigrated adolescents in Germany. First, the assignment to a specific type of school or a specific educational track; second, the question of how young pupils are to be educated if they have not yet acquired sufficient knowledge of the language of instruction, i.e., German. Here, we will briefly describe the educational regulations in Germany and report empirical results on the schooling of newly arrived refugees regarding these two aspects. Note that there are usually no explicit regulations for refugees; mostly there are regulations for pupils without a sufficient command of the language of instruction. These are primarily newly immigrated pupils, among whom refugees comprise the largest group. Also, in Germany, as a rule, there are no nationwide legal regulations for schooling; instead, education falls under the jurisdiction of the 16 federal states.

2.1. Assignment of Newly Immigrated Pupils to a School Type or School Track

The German school system is characterised by a relatively early division into different school types or educational tracks. In most federal states, the transition from primary school, which all children attend together, to the secondary level takes place after the fourth grade, i.e., at the age of around ten. Traditionally, there are three school types: *Hauptschule* (lower secondary school) and *Realschule* (intermediate secondary school), which prepare pupils for vocational training and usually end after 9–10 years with an intermediate secondary school leaving certificate at most. The *Gymnasium* (grammar school) prepares pupils for university and ends after 12 or 13 years with the *Abitur*, the general higher education entrance qualification. *Hauptschulen* and *Realschulen* are now often combined into one school type (von Maurice & Roßbach, 2017), so that in some federal states, *Hauptschulen* no longer exist as a separate type. In the meantime, there are also school types that combine all three tracks (e.g., comprehensive schools), but the quantitative significance of these school types varies greatly between federal states. Nevertheless, the assignment to a particular type of secondary school is of great importance, as the German school system is not very permeable and a subsequent transition from a *Hauptschule* or *Realschule* to a *Gymnasium* is not easily possible. When transitioning to secondary school, children's performance plays a dominant role, although other factors, such as motivation and a supportive family environment, can also matter. Teachers recommend a school type, which is more or less binding for parents, depending on the federal state in which the school is located.

In Germany, there are generally no guidelines as to which school types or educational paths newly arrived refugees should be assigned to if they immigrate at an age at which the other children have already officially moved on to secondary school. In principle, the same rules should apply to them as to pupils who have lived in Germany for longer. However, several factors make it much more difficult to assess the performance of recent arrivals: the curricula in their countries of origin often differ from the curricula in Germany and previous school reports of refugee pupils are often unavailable. Many refugees have had their schooling interrupted for a significant time due to the situation in their country of origin and their flight. A lack of German language skills also makes it difficult to assess their school knowledge (on the problem of allocation to specific school types see Emmerich et al., 2017). Due to these problems and the absence of standardised measurement procedures (Jäger et al., 2021; Massumi et al., 2023), it is therefore likely that young immigrants with little or no knowledge of the language of instruction tend to be assigned to less demanding school types. This trend could be reinforced by the decades-long practice of primarily educating new

immigrants in *Hauptschulen* (Emmerich et al., 2017; Emmerich, Hormel, Jording, & Massumi, 2020). This applies even more to federal states that initially educate immigrants in separate newcomer classes (see 2.2) and locate these classes primarily in less demanding school types (for instance, in Bavaria and Saxony; see Will et al., 2022). It can be assumed that the change of school type (especially to a more demanding one) represents an additional hurdle when moving from a newcomer class to a regular class (Jäger et al., 2021; Will & Homuth, 2020). Moreover, refugee pupils and their parents are often unfamiliar with the education system in the country of arrival. This is particularly relevant when there is a big gap between the school systems of the country of arrival and the country of origin. The structuring of the German school system into different educational tracks and the early division into these different educational programmes is not common in many of the refugees' countries of origin, such as Iraq or Syria (see Welker et al., 2021; Will et al., 2024). As such, refugee pupils are often unable to assess the consequences of being assigned to a particular school type or educational track. Indeed, previous research has demonstrated that newly arrived refugees are less likely to attend demanding school types (de Paiva Lareiro, 2019; Emmerich, Hormel, Jording, & Massumi, 2020; Homuth et al., 2020). While newly arrived refugees are overrepresented at lower secondary schools and schools with several educational tracks, they are underrepresented at *Realschulen* and *Gymnasien* (Homuth et al., 2020).

2.2. Strategies for Educating Adolescents With Insufficient Knowledge of the Language of Instruction

For educational institutions, integrating newcomers without sufficient knowledge of the language of instruction at a late and learning-intensive point in their education is challenging. Many states (including most federal states in Germany) therefore provide (temporary) separate schooling of newcomers so that they can first learn the language of instruction (see, e.g., Crul et al., 2017; Hilt, 2016; Tajic & Bunar, 2020; Vogel & Stock, 2017). However, there is no nationwide regulation in Germany for how immigrants without sufficient knowledge of the language of instruction are taught at lower secondary levels. The regulations range from integrative schooling in regular classes (e.g., in Rhineland-Palatinate) to schooling in separate classes for new immigrants, in which young pupils can be educated separately until they have obtained a school-leaving qualification (e.g., in Hamburg). There are also countless hybrid forms that combine integrated (e.g., in some subjects) and separate schooling (see Massumi et al., 2015). Whether schooling in separate classes is better than direct schooling in regular classes has not been conclusively clarified. Arguments in favour of separate schooling emphasise the importance of initial separate language acquisition, as a lack of language skills could lead to children not being able to keep up in regular classes and being afraid to participate (Nilsson & Axelsson, 2013; Schmiedebach & Wegner, 2019). Arguments against separate schooling are that faster language acquisition through separate teaching is doubtful (Höckel & Schilling, 2022; Simopoulos & Alexandridis, 2019) and that contact with native pupils is also reduced, which limits opportunities to learn the language of arrival outside the classroom (Lang, 2019; Miller et al., 2005). Existing research on young refugees' participation in the German general school system shows that many refugees initially attend classes for newcomers (about 50%; see Homuth et al., 2020), and that about a third of them still attend separate classes after some time (e.g., de Paiva Lareiro, 2019; Homuth et al., 2020). However, it also shows that there is a significant number of refugees who have been attending regular classes from the outset (see Homuth et al., 2020).

2.3. Research on the Connection Between Municipal Aspects and the Schooling of Newly Arrived Immigrants

Previous research has observed that education policy guidelines at the federal-state level, e.g., whether separate newcomer classes are set up and to which school types newcomer classes are assigned, have a strong influence on the schooling of young immigrants (see Will et al., 2022). This influence remains even when individual resources (such as school performance in the country of origin) or family resources (such as educational background) are controlled for (Will et al., 2022). However, these studies could only partially explain the schooling of new immigrants. This could be because the education policy regulations for the schooling of newcomers at the federal-state level are usually formulated in a relatively abstract way and often as guidelines, thus giving the individual municipalities major scope for interpretation. We therefore suspect that there are also factors at the municipal level that influence the schooling of newly immigrated adolescents.

Prior work on regional aspects and the educational participation of immigrants in Germany has primarily focused on the socio-economic or ethnic composition of the neighbourhood or school and has mainly considered their influence on pupils' competencies or the acquisition of educational qualifications (see, e.g., Helbig, 2010; Olczyk, 2018). It is, however, difficult to disentangle the effects of neighbourhoods and schools on pupils' educational success (Horr, 2016). In addition, certain groups specifically chose schools that differ in their composition from that of the neighbourhood. Some studies therefore analyse the relationship between the social and ethnic background of families and their school choice while controlling for selected characteristics of schools or residential areas (Jurczok & Lauterbach, 2014; Kristen, 2008; Riedel et al., 2010; Schneider et al., 2012; for an overview see also Horr, 2016). Studies that specifically address the schooling of newly immigrated adolescents and examine which classes and school types these newcomers attend, depending on regional or municipal characteristics, are still the exception.

Several studies suggest that there are strong regional differences in the schooling of lateral entrants (El-Mafaalani & Kemper, 2017; Emmerich et al., 2017; Emmerich, Hormel, & Kemper, 2020; Jäger et al., 2021). The variance here is related not only to the type of school attended but also to whether a separate class is attended (see Emmerich, Hormel, Jording, & Massumi, 2020). Yet, despite these regional differences, there are limited hypotheses about the potential influence of municipal characteristics on attending a newcomer class. It is assumed that new immigrants in municipalities with fewer newcomers are more likely to attend a regular class, because the establishment of newcomer classes may not be worthwhile due to low numbers of newcomers. Or, as in North Rhine-Westphalia, for example, additional personnel resources for the establishment of classes for newcomers are only provided if there is a minimum number of pupils (see Emmerich, Hormel, Jording, & Massumi, 2020). There are many more explanations in the literature for regional differences regarding the type of school attended. It is thought that the number of different school types in a municipality and the free capacity in these schools are linked to the chance of attending certain school types (El-Mafaalani & Kemper, 2017; Emmerich, Hormel, & Kemper, 2020). In particular, it is assumed that the long-standing practice of educating new immigrants at *Hauptschulen* will decline to the extent that the number of *Hauptschulen* in some municipalities gradually reduces (see Emmerich et al., 2017; Emmerich, Hormel, & Kemper, 2020). However, the absolute number of lateral entrants within a municipality is also deemed important: the more newcomers in a municipality require schooling, the greater the need to include all school types in the education of lateral entrants (see Emmerich et al., 2017). More generally, it is assumed

that the educational participation of immigrant pupils tends to be better in municipalities where the share of foreign pupils among all pupils is high—and vice versa (El-Mafaalani & Kemper, 2017). Reasons for this are teachers' expertise in teaching immigrants and established support services in and outside of school. Additionally, it is assumed that in areas with fewer immigrants, there is more prejudice towards immigrants and that decision-makers overestimate the demands of the German language competencies. Immigrant pupils are also not distributed equally among schools within a city but are often found primarily in schools in segregated urban areas (El-Mafaalani & Kemper, 2017).

3. Theoretical Background

When analysing educational participation, theoretical models are often used that see educational decisions as the result of rational cost-benefit calculations. In these models, individuals choose the option that best suits their long-term interests (Boudon, 1974; Breen & Goldthorpe, 1997; Erikson & Jonsson, 1996). However, the weighing up of costs and benefits does not take place independently of a given opportunity structure. This is also noted by Roberts (2009), who assumes that focusing solely on the decisions of individuals does not sufficiently acknowledge the contexts that shape individual decisions and the constraints within which different groups of adolescents make decisions. Opportunity structures include macro-level factors (e.g., national laws and state-level education policies) and community-level factors (e.g., institutions, gatekeepers). For example, the availability of certain schools in a neighbourhood can strongly influence educational choices, as can the number of competing pupils. Here, we therefore use a model that views investments in education as the result of rational cost-benefit considerations and integrates municipal aspects into the theoretical model via the opportunity structure. Crucially, the different levels (especially the individual and municipal levels) are not isolated but interact (Walther, 2020). On the one hand, we assume that municipal characteristics influence the educational alternatives available to refugee families and those that are perceived by them as alternatives. The educational alternatives proposed to young refugees by those responsible in the education system in these municipalities can decisively influence new immigrants' perception of alternatives. On the other hand, we also assume that the influence of individual and family resources on educational decisions varies depending on characteristics at the municipal level: The more municipal aspects restrict the opportunity structure, the less influence personal and family characteristics should have, and vice versa. The influence of parents' education (signalling effect for municipal decision-makers, parents' interest in their children's higher education) should be particularly relevant in municipalities that impose fewer restrictions on the type of schooling for newcomers. Previous school performance should play a role, too, particularly in municipalities that do not automatically assign newcomers to certain classes and school types but rather take individual characteristics into account when deciding on their education. Considering possible interactions between individual and family resources and municipal conditions is even more important, given that previous research on the schooling of lateral entrants suggests that certain regional aspects may severely restrict the educational choices of refugee families.

We will first specify our theoretical assumptions regarding attending a separate class for new immigrants before formulating hypotheses about the relationship between municipal characteristics and attending a *Gymnasium*.

3.1. Education in a Class for Newcomers Depending on Municipal Characteristics

3.1.1. Number of New Immigrants in the Municipality

First, we assume that whether newly immigrated adolescents are educated in separate classes for newcomers is linked to the number of newly immigrated pupils in the municipality. There are various reasons for this: setting up a separate class for newcomers is only worthwhile if there are enough pupils in the relevant catchment area (see, e.g., Massumi et al., 2015). This is supported by the fact that additional personnel resources for the establishment of separate newcomer classes are only provided if there is a minimum number of newly arrived pupils (see Emmerich, Hormel, & Kemper, 2020). We therefore assume that the more newcomers there are in a municipality, the more likely they will be educated in newcomer classes (H1a). However, we assume that this is not a linear relationship, but rather that, above a certain threshold, the influx of further lateral entrants into the municipality does not additionally increase the probability of attending a newcomer class (H1b). Furthermore, the more newcomer pupils a municipality has, the less capacity municipal actors have to examine individual cases, especially if there are established newcomer classes. Consequently, families have less freedom to choose which class their child should attend. We therefore assume that in municipalities with many newcomers, the influence of family (H1c1) and individual (H1c2) resources on the type of class attended is less pronounced than in municipalities with few lateral entrants.

3.1.2. Experiences in Teaching Pupils Whose Mother Tongue is Not the Language of Instruction

Due to the greater experience of teachers with non-native speaking pupils and established support structures, the integration of lateral entrants into regular classes may appear easier to implement in communities with longer migration histories. A realistic assessment of the required German language skills could support this trend. Thus, we assume that the more experience municipalities have in educating pupils whose native language is not the language of instruction, the less likely they are to educate newly arrived adolescents in newcomer classes (H2a). Furthermore, we assume that in communities with experience in schooling immigrants, newly immigrated pupils are perceived less as a homogeneous group and that, consequently, family (H2b1) and individual (H2b2) characteristics may have a greater influence on the form of schooling.

3.1.3. Number of Schools in the Municipality

In municipalities with many schools, it could be easier to distribute newcomers to different schools and integrate newcomers into regular classes. We therefore assume that the probability of attending a newcomer class decreases with the number of schools in the municipality (H3a). However, this correlation should only be observable if the newly arrived pupils are also distributed across the entire community and do not live and attend schools in segregated residential areas. We therefore suspect that the influence of the number of schools decreases with increasing segregation in the community (H3b).

3.1.4. Free Capacity in Schools in the Municipality

Free capacity in schools could make it more attractive for the schools to educate newcomers in regular classes. Yet, it could also make it easier for teachers at these schools to additionally master the integration of

newcomers. We therefore assume that the probability of newcomers being educated in newcomer classes decreases with the amount of free capacity at the municipal schools (H4a). Furthermore, we suspect that in municipalities with more free capacity, the influence of family (H4b1) and individual (H4b2) characteristics on the education of young newcomers should be greater than in municipalities with less capacity.

3.2. Attending a Gymnasium *Dependent on Characteristics at the Municipal Level*

3.2.1. Number of *Hauptschulen* in the Municipality

The connection between municipal aspects and the schooling of newly arrived immigrants most frequently mentioned in the literature is that between school provision and the type of school attended (e.g., El-Mafaalani & Kemper, 2017; Emmerich, Hormel, & Kemper, 2020). In particular, it is assumed that schooling newcomers (especially the establishment of newcomer classes) traditionally takes place primarily at *Hauptschulen*. If there are a sufficient number of *Hauptschulen* offered in the municipality, it is to be expected that the possibility of attending a different school, such as a *Gymnasium*, will be communicated less frequently as an option by those responsible for enrolment of lateral entrants in the municipality and will therefore be less likely to be perceived as an alternative by refugees. If there are not enough *Hauptschulen*, however, lateral entrants will be taught at other school types, too (Emmerich et al., 2017; Emmerich, Hormel, & Kemper, 2020), and information about these additional options is presumably also more frequently conveyed to refugees. Our hypothesis is therefore: The higher the number of *Hauptschulen* in a municipality, the less likely it is that newcomers will be educated in a *Gymnasium* (H5a). Furthermore, we assume that refugee families are less likely to influence which type of school their children attend if the number of *Hauptschulen* in the municipality is high and newcomer classes are, thus, more likely not located at alternative school types: The higher the number of *Hauptschulen* in a municipality, the smaller the influence of family (H5b1) and individual (H5b2) resources on the school attendance of newcomers. Since these hypotheses relate also to the establishment of newcomer classes at different types of schools and, thus, affect newly immigrated pupils from the beginning of their school career, we consider all pupils, regardless of whether they attend a newcomer or a regular class.

3.2.2. Number of New Immigrants in the Municipality

If there are many new immigrants living in a municipality who need to be integrated into education, the capacities of individual schools (usually *Hauptschulen*) might not be sufficient to accommodate them. Thus, it could be assumed that all schools have to take responsibility to enrol newcomers, regardless of the type of school. Therefore, we assume that the greater the number of newcomers in the municipality, the more likely it is that they will be educated in a *Gymnasium* (H6a). As we assume that the probability of being taught in a class for newcomers increases with the number of newcomers (see H1a), we take all pupils at a *Gymnasium* into account, regardless of whether they attend a regular class. It is assumed that the correlation between the number of newly immigrated pupils and the probability of attending a *Gymnasium* is not linear, but that the strength of the correlation decreases beyond a certain threshold of newcomers in the municipality (H6b). If the hypothesis is correct that in municipalities with many newcomers, newcomer classes are also offered at *Gymnasien*, it can be assumed that *Gymnasien* are not only increasingly being perceived as a realistic educational alternative by refugees but also being proposed as a possible alternative by those responsible at the local level. We therefore assume that family (H6c1) and individual (H6c2) resources should have a greater influence on schooling decisions in these communities.

3.2.3. Experiences in Teaching Pupils Whose Mother Tongue is Not the Language of Instruction

In the literature, it is assumed that the educational success of non-German pupils (e.g., better performance through better support structures) tends to be higher in municipalities with a high share of immigrant pupils (El-Mafaalani & Kemper, 2017). Indeed, we also believe that in communities with more experience with immigrants, educational institutions and teachers are better prepared for the integration of new immigrants and a better infrastructure for schooling immigrants exists. This could also mean that refugee pupils in municipalities with a longer history of immigration might be more likely to be taught in regular classes (see also H2a). However, we assume that this infrastructure for supporting immigrants mainly exists at school types with a disproportionately high number of immigrants. As a rule, these are rarely *Gymnasien* (see, e.g., Siegert & Olszenka, 2016). If immigrants are to be enrolled at schools where support structures already exist, then these will generally be *Hauptschulen* and *Realschulen* rather than *Gymnasien*. Our hypothesis is, therefore, that the more experienced the municipality is with educating immigrants, the less likely lateral entrants are to attend a *Gymnasium* (H7). Since this argument refers more to support measures in everyday school life in regular classes and not to newly established newcomer classes, we only consider pupils who already attend a regular class when examining this hypothesis.

3.2.4. Free Capacity in Schools in the Municipality

We believe that free capacity in schools makes it easier for teachers at these schools to additionally master the integration of newcomers (see 3.1.4). We therefore assume that with greater free capacity at specific school types in the municipality, the probability increases that newly arrived refugees will also be educated at these school types. This is particularly true for *Gymnasien*, as the integration of lateral entrants at this demanding school type is particularly ambitious. We therefore assume that with free capacity at *Gymnasien* in the municipality, the probability increases that newcomers will also be educated at *Gymnasien* (H8a). In these communities, attending a *Gymnasium* should be perceived as a realistic educational alternative, and thus, the influence of family (H8b1) and individual (H8b2) resources should play a greater role than in communities with less free capacity. The analyses again consider all pupils who already attend a regular class. Figure 1 summarises the research hypotheses.

4. Data and Methods

4.1. Data

Our analyses are based on data from the first wave of the panel study ReGES—Refugees in the German Educational System (Artelt & ReGES, 2024; Will et al., 2021), which was collected in the spring of 2018. The study was conducted in five German federal states (Bavaria, Hamburg, North Rhine-Westphalia, Rhineland-Palatinate, and Saxony) which were chosen to achieve a variation according to selected macro factors, including the number of people seeking protection or the schooling strategies for newly immigrated pupils. The sample was drawn in a multi-stage process, with municipalities with a higher number of refugees being disproportionately represented (Steinhauer et al., 2019). We use the data from the adolescent cohort (Refugee Cohort 2), which includes refugee adolescents who arrived in Germany between 2014 and 2018, live in Germany with at least one parent or legal guardian, have been assigned to a municipality, and are enrolled at lower secondary school in the school year 2017–2018. The data was collected using surveys

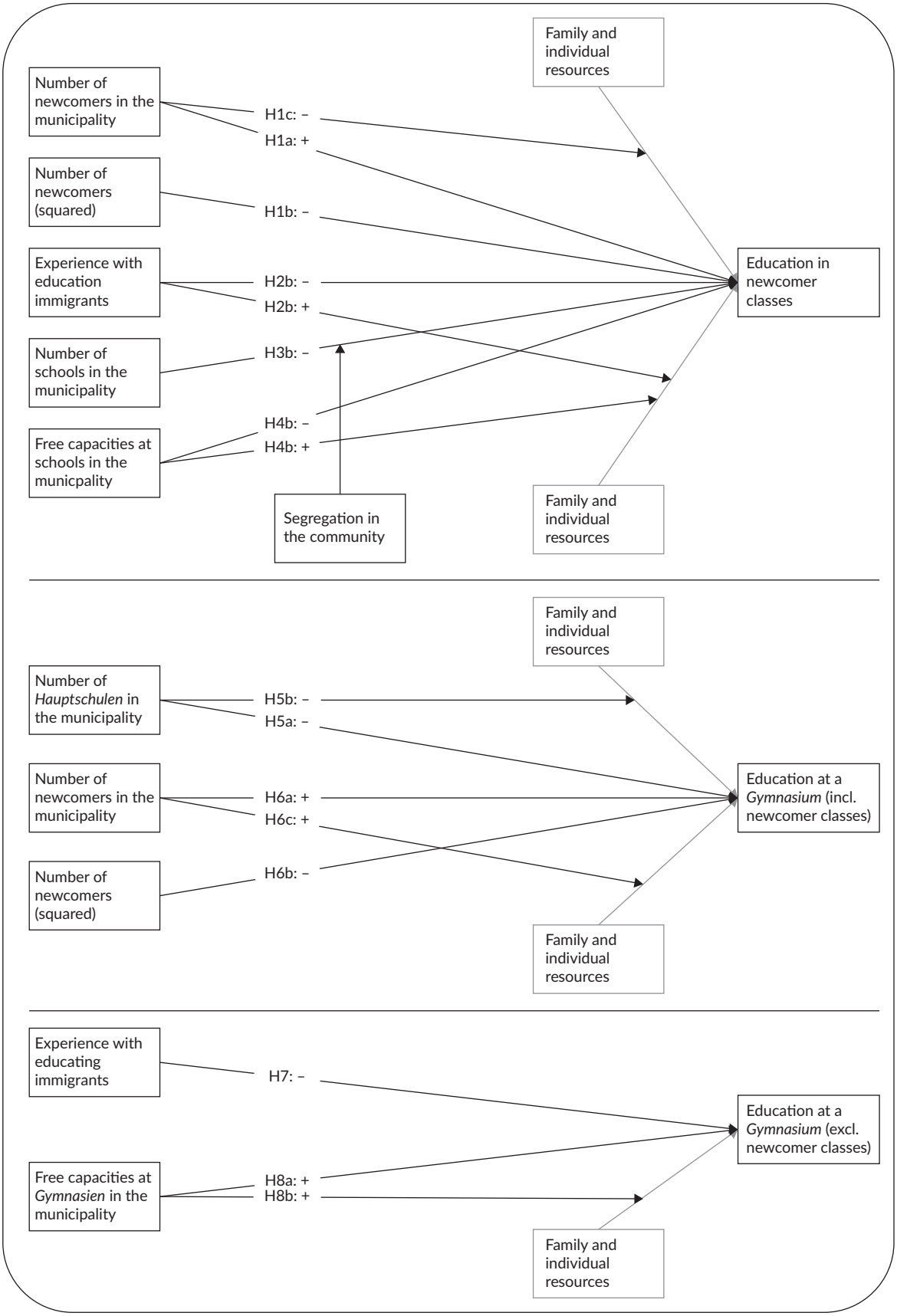

Figure 1. Overview of hypotheses.

with both adolescents and parents (for further information, see Will et al., 2021). The regional variables originate from the microcensus (Statistische Ämter des Bundes und der Länder, 2024b) and the databases INKAR (Bundesinstitut für Bau-, Stadt- und Raumforschung, 2024), regional school statistics (Statistische Ämter des Bundes und der Länder, 2024a), and the Federal Employment Agency (Bundesagentur für Arbeit, 2023). We only included adolescents for whom we knew in which municipality they lived and only those who lived in regions with at least 100,000 inhabitants.

4.2. Operationalisation

4.2.1. Dependent Variables

The type of class includes information on whether the first class a pupil attended in Germany was a newcomer class (yes vs. no). The type of school is the first school a pupil attended in Germany and was coded as *Gymnasium* vs. other school types. Attending a *Gymnasium* implies being on the direct track to pursuing higher education while other school types primarily lead to vocational training. Comprehensive schools were categorised as other school types, even though these might also include academic tracks. We include those who are placed into a newcomer class at a *Gymnasium* if we are interested in looking at the first allocation, even though the school type is not necessarily the same after transferring to a regular class (Emmerich, Hormel, Jording, & Massumi, 2020). However, if we are only interested in pupils who have already been relatively firmly assigned to a school type, we exclude pupils in newcomer classes. Thus, we use two different variables for *Gymnasium*, depending on the hypothesis.

4.2.2. Independent and Control Variables

4.2.2.1. Municipal Factors

Where possible, we used the regional indicator in the year before adolescents' enrolment as this best presents the initial local situation for enrolling newcomers. Deviations from this procedure are indicated. The adolescents were enrolled between 2014 and 2018. Most regional indicators are available at the district level, not the municipal level. The administrative unit of the district encompasses both rural districts with several municipalities and urban districts, which correspond to a municipality. As we have limited the analyses to refugees in large cities (excluding those living in areas with fewer than 100,000 inhabitants), the regions included should mostly correspond to an urban district and only one municipality. The number of newly arrived pupils in the district is calculated by the total number of refugees in the district. We divided the number by 1,000 to better illustrate the correlation. Additionally, a squared term was included to account for a non-linear correlation. The municipalities' experiences in educating immigrant pupils are measured via the share of immigrants and people with a migration background among all inhabitants in the district (for the year 2011). The indicator for the number of secondary schools includes the orientation level regardless of the school type, *Hauptschulen*, schools with combined tracks, *Realschulen*, *Gymnasien*, and integrated comprehensive schools. The number of *Hauptschulen* only includes these school types and is, thus, missing if no *Hauptschulen* exist in a federal state or municipality. These missing values were set to 0 for the analysis. The segregation index indicates the extent to which foreigners live segregated in the respective municipality. There are three indicators to measure free capacities in schools: the pupil–teacher ratio of all secondary school types listed above, the pupil–teacher ratio of *Gymnasien*, and the pupil–teacher

ratio of all secondary school types, except *Gymnasien*. A higher pupil–teacher ratio means that one teacher is responsible for more pupils and therefore has less spare capacity. See Table 1 for the distribution of regional variables in the districts under consideration.

4.2.2.2. Parental Education, School Performance, and Control Variables

Educational background is assessed via the highest parental educational qualification, measured by the International Standard Classification of Education (ISCED-1997). Cases with no education were also included. The categories were regrouped to obtain enough observations per category: "no/less than primary education," "primary education," "secondary I + II education," and "postsecondary/tertiary education." The parental socio-economic background is measured via the highest parental occupational status in the origin country according to the International Socio-Economic Index of Occupational Status (ISEI-08; see Ganzeboom, 2010; Schimpl-Neimanns, 2004). The scale ranges from 11.01 to 88.96. If no parents were employed prior to moving to Germany, the ISEI was coded as 0. Previous educational experiences in the origin country are a self-assessed measurement of their average school performance, based on a scale from 0 to 100. We added interaction terms to test, as stated in the hypotheses, whether educational background and previous educational experiences may have a stronger influence under certain regional conditions. The degree of urbanity entails two categories: regions with "more than 500,000 inhabitants" and regions "between 100,000 and 500,000 inhabitants."

Federal states' educational policies vary. Following Will et al. (2022), we make the following distinctions: For newcomer classes, there are federal states in our sample which school newly arrived pupils primarily directly in regular classes (Rhineland-Palatinate), some which school them primarily separately (Hamburg), and some which assign them more flexibly to either a regular or newcomer class (Bavaria, North Rhine-Westphalia, and Saxony). For attending a *Gymnasium*, there are the following distinctions: There are some federal states (Bavaria and Saxony) whose guidelines stipulate that classes for newly arrived pupils should be set up primarily at lower school types. In other federal states (Hamburg, North Rhine-Westphalia, and Rhineland-Palatinate), the guidelines are less tied to specific school types, so refugee pupils are also enrolled at *Gymnasien*. We generated two variables to capture the educational regulations. Gender was coded as female vs. male. Age was measured as age at arrival in months. The origin country lists the three most frequent countries of origin separately: Afghanistan, Iraq, and Syria. Origin countries with <3% were subsumed under "other." Current residence status distinguishes between insecure and secure. Insecure residence status encompasses those whose application has been rejected (including those with a short-term tolerated stay status, i.e., *Duldung*), whose application has not yet been decided, or for whom an asylum application has not yet been submitted. Secure residence status includes being recognised as a refugee or as a person entitled to asylum or if another protection status was granted. For an overview of all the variables used in the analyses and their statistical characteristics, see Table 1 in the Supplementary File.

4.3. Analytical Strategy

We calculated multilevel linear models with random intercepts to account for the fact that multiple adolescents live in the same municipality. The Intraclass Correlation Coefficients (ICC) are low, which indicated that only a small percentage of the overall variance is explained at the group level (ICC: refugee class: 0.101, *Gymnasium*: 0.054, *Gymnasium* without refugee class: 0.054). We used iterated chained equations to estimate all missing

values (White et al., 2011) but deleted imputed values for the dependent variable after imputation (von Hippel, 2007). We used a quadratic rule to determine the required number of imputations ($M = 70$) based on the fraction of missing information in our fully specified models (von Hippel, 2020).

For each dependent variable, we first provide a model without regional variables and then test the individual hypotheses to assess the effect of each regional variable separately. We present a coefficient plot for the effects of the central independent variables in the text and a corresponding comprehensive table with all effects in the Supplementary File. For each dependent variable, we also calculate an overall model that contains all variables at the regional level to test whether the correlations are also stable when other regional factors are controlled for. We map the key results of these models using a coefficient plot in cases in which the overall results differ from the analyses by hypothesis.

5. Results

5.1. Descriptive Results

The descriptive results show that about half of the pupils indicated that the first class they attended in Germany was a newcomer class (50%; see also Table 1 in the Supplementary File). 24% of the sample indicated that the first school which they attended was a *Gymnasium*. This percentage is slightly lower when considering only those who already attend a regular class (19%).

We observe a large diversity regarding our central independent variables in the different municipalities (see Table 1). We display the results for the year 2015, which characterises the situation in the year before enrolment for almost half of the adolescents in our sample. The number of people seeking protection varies

Table 1. Overview of regional characteristics in 2015.

	N	Missing values	%/M	SD	Min.	Max.
Number of people seeking protection	66	0	5,299.95	5,936.01	381.04	37,356.83
Share of refugees as a proportion of all residents	66	0	1.45	0.97	0.44	8.01
Share of immigrants (2011)	66	0	22.88	8.91	2.79	37.34
Segregation index (2018)	58	8	26.90	10.84	12.30	74.34
Number of secondary schools	66	0	40.09	29.53	5	162
Number of inhabitants per secondary school	66	0	8,678.55	2,107.14	3,504.98	14,062.27
Number of *Hauptschulen*	66	0	8.74	8.76	0	59
Pupil–teacher ratio (secondary schools)	66	0	19.70	1.35	16.66	22.88
Pupil–teacher ratio (secondary schools without *Gymnasien*)	66	0	18.88	1.41	14.65	22.12
Pupil–teacher ratio (*Gymnasien*)	66	0	20.80	1.90	17.36	28.21

from about 380 to more than 37,000, depending at least partly on the size of the municipality. However, in some municipalities the share of refugees as a proportion of all residents is 0.44, while in others it is 8.01. Whereas some municipalities have a high share of population with familial migration experiences (37.34%), in other areas there are only a few (2.79%). The segregation index ranges from 12.30 to 74.34. Additionally, the number of secondary schools varies from 5 to 162 and the number of *Hauptschulen* ranges from 0 to 59. The number of schools also correlates with the number of inhabitants in the respective district. However, if we compare the number of schools with the number of inhabitants, there are still huge differences (number of inhabitants per secondary school ranging from 3,505 to 14,062). This could indicate a difference in the availability of secondary schools. At the same time, it cannot be ruled out that there are fewer secondary schools overall in some municipalities but the available schools have larger capacities. There are some areas in which teachers at secondary schools need to tend to only about 17 pupils, while in others, one teacher is, on average, responsible for 23 pupils. The pupil–teacher ratio for different school types also varies greatly between districts.

5.2. Attending a Newcomer Class

First, the model without regional variables shows a significant negative effect for adolescents living in federal states which enrol mainly directly in regular classes (compared to those who live in federal states, who enrol more flexibly), meaning that they are less likely to attend newcomer classes (see Supplementary File, Table 2). The same holds true for adolescents with parents who obtained postsecondary or tertiary education (compared to those with secondary education), but also for newcomers from families with less than primary education. Additionally, the older pupils were at the time of arrival, the more likely they are to attend a newcomer class. These effects remain stable if we control for regional variables (an exception being the models with interactions).

Our first two assumptions were that the more newcomers there are in a municipality, the more likely it is that they will be educated in a newcomer class (H1a). A non-linear effect is expected, which implies that above a certain threshold, additional newly immigrated pupils have a decreasing additional influence (H1b). The results show a significant positive effect of the number of newcomers in a municipality, confirming H1a (see Figure 2). If we additionally account for the squared number of newcomers, we see the expected negative direction of the squared term (H1b), but both indicators are not significant. The interaction term measures whether the effect of educational background varies for adolescents in municipalities with different numbers of newcomers. The main effects, in this case, the educational background and the number of newcomers, then indicate the effect for the baseline or reference category, e.g., no newcomers or adolescents with parents with secondary education. We could not confirm that educational factors at the family level (H1c1) or individual level (H1c2) play a significant role in deciding whether to school newly arrived refugee adolescents in a newcomer class, dependent on the number of newcomers in a municipality (see Figure 2).

We further assumed that the experiences a municipality has with immigrant pupils and the potentially established support structures facilitate schooling newcomers directly in regular classes, making it less likely that refugee adolescents will attend newcomer classes (H2a). While our analysis points in this direction, the effects are not significant (Figure 3). Additionally, we cannot confirm from our data that municipal experiences with schooling immigrant pupils increase the opportunities of immigrant families to influence the type of class attended (H2b1 and H2b2, Figure 3).

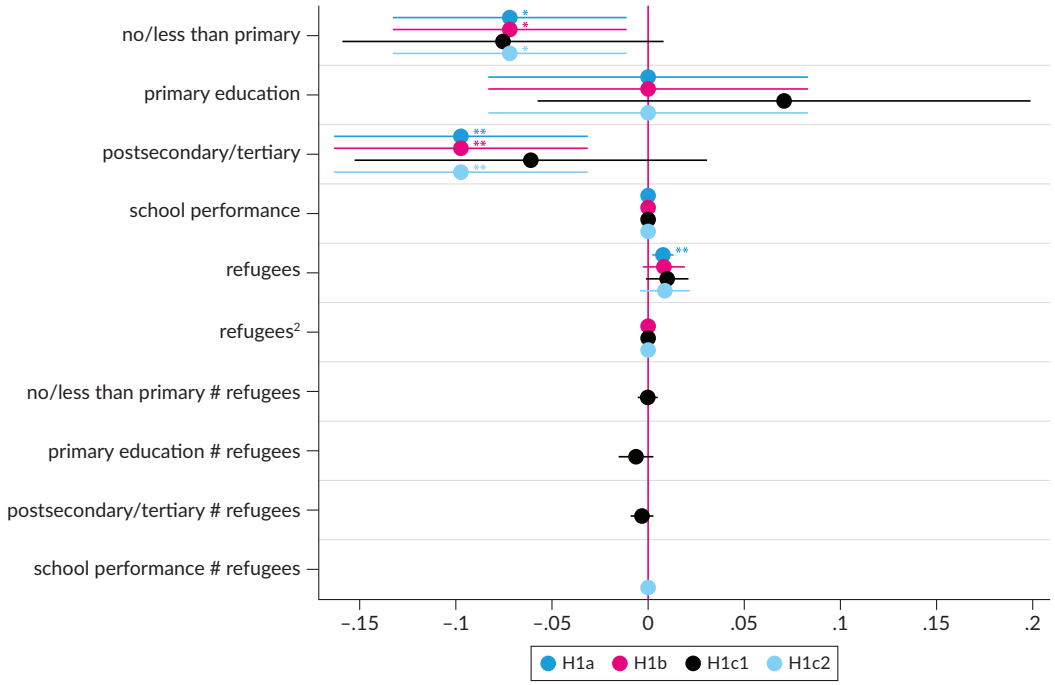

Figure 2. Multi-level models on newcomer class as dependent variable (only regional variables and interaction effects displayed). Notes: Results present regression coefficients and confidence intervals; significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; reference category: HISCED = secondary I+II education; control variables = educational policies, degree of urbanity, HISEI, gender, age at arrival, origin country, residence status.

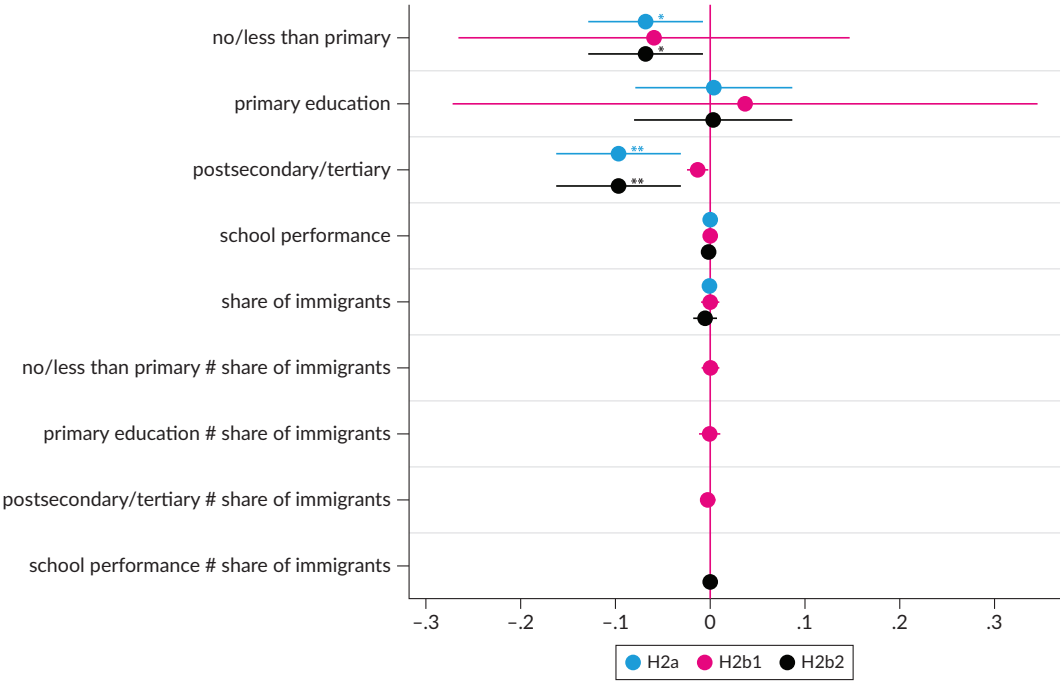

Figure 3. Multi-level models on newcomer class as dependent variable (only regional variables and interaction effects displayed). Notes: Results present regression coefficients and confidence intervals; significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; reference category: HISCED = secondary I+II education; control variables = educational policies, degree of urbanity, HISEI, gender, age at arrival, origin country, residence status.

The negative effect for the number of schools indicates that the refugee adolescents in our sample are less likely to attend a newcomer class if there are more schools in the municipality they live in (H3a, Figure 4). However, this correlation is also not significant. Additionally, we cannot confirm the assumption that the influence of the number of schools decreases with increasing segregation in the municipality (H3b).

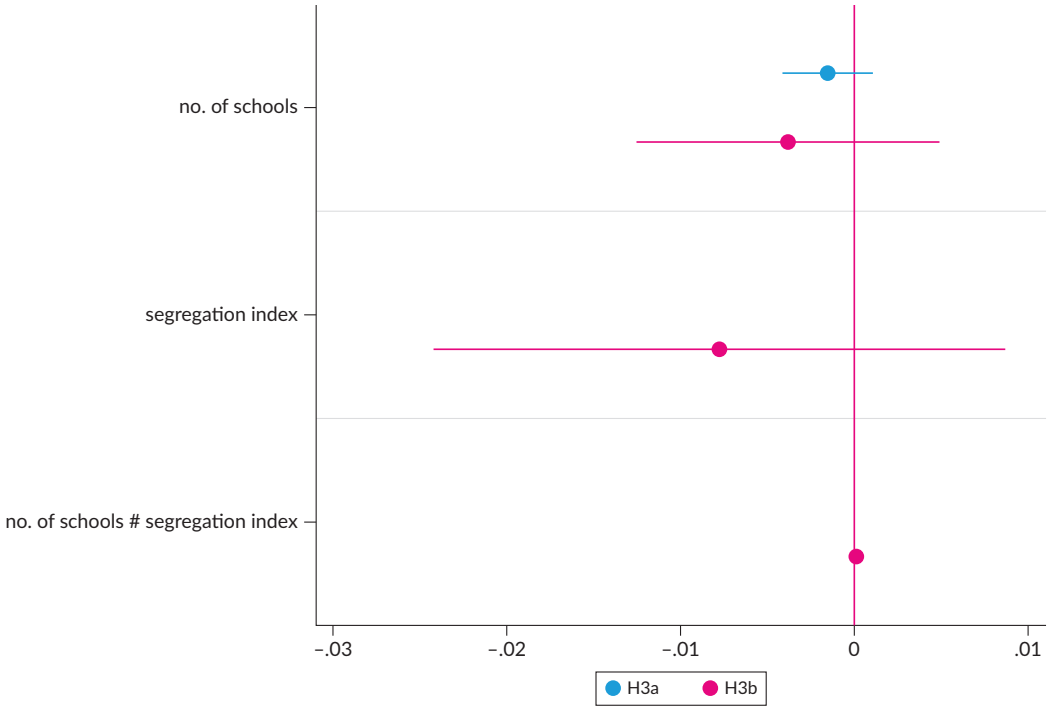

Figure 4. Multi-level models on newcomer class as dependent variable (only regional variables and interaction effect displayed). Notes: Results present regression coefficients and confidence intervals; significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; reference category: HISCED = secondary I+II education; control variables = educational policies, degree of urbanity, HISEI, gender, age at arrival, origin country, residence status.

The same holds true for the level of free capacity, measured via the pupil–teacher ratio (Figure 5). While the results point towards a lower likelihood of being educated in newcomer classes if more capacity is available across schools in this municipality (H4a), this effect, as well as the assumed correlations of family and individual resources in combination with free capacity, is not significant (H4b1 and H4b2, Figure 5).

When we account for all regional variables that we deem relevant for schooling in newcomer classes in a model without interactions, we first see that the number of people seeking protection (as a proxy for the number of new immigrant pupils) remains positive and significant. Furthermore, we now see that the probability of attending a newcomer class decreases with the number of schools. This correlation is generally as expected in hypothesis 3a but only appears to become relevant when controlling for other regional factors (see Figure 6).

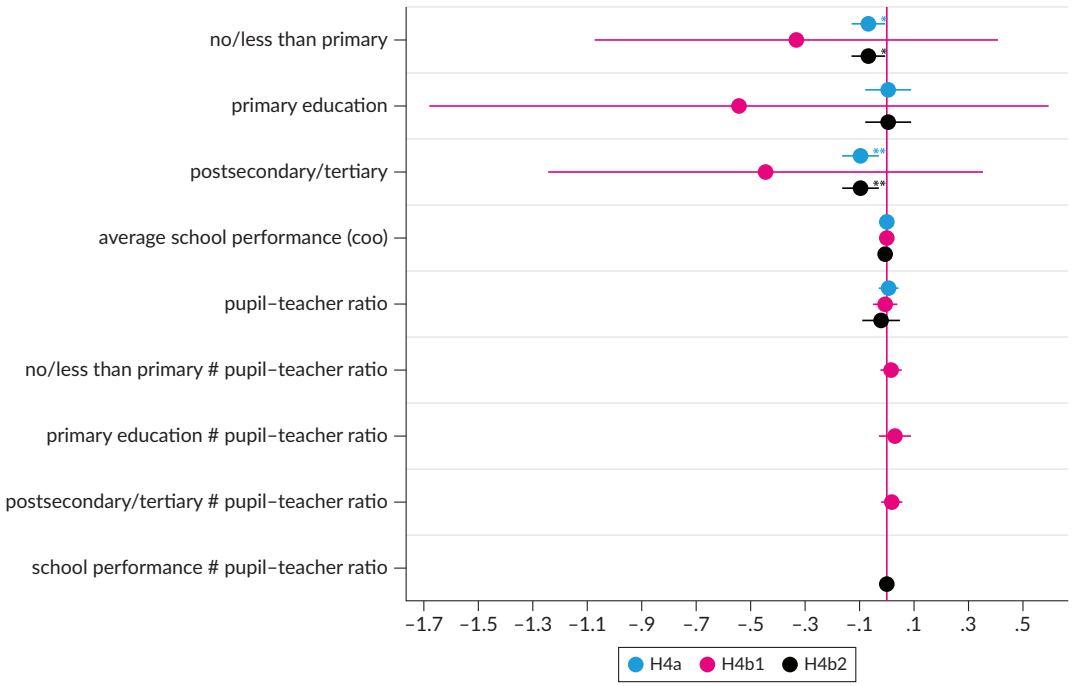

Figure 5. Multi-level models on newcomer class as dependent variable (only regional variables and interaction effects displayed). Notes: Results present regression coefficients and confidence intervals; significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; reference category: HISCED = secondary I+II education; control variables = educational policies, degree of urbanity, HISEI, gender, age at arrival, origin country, residence status.

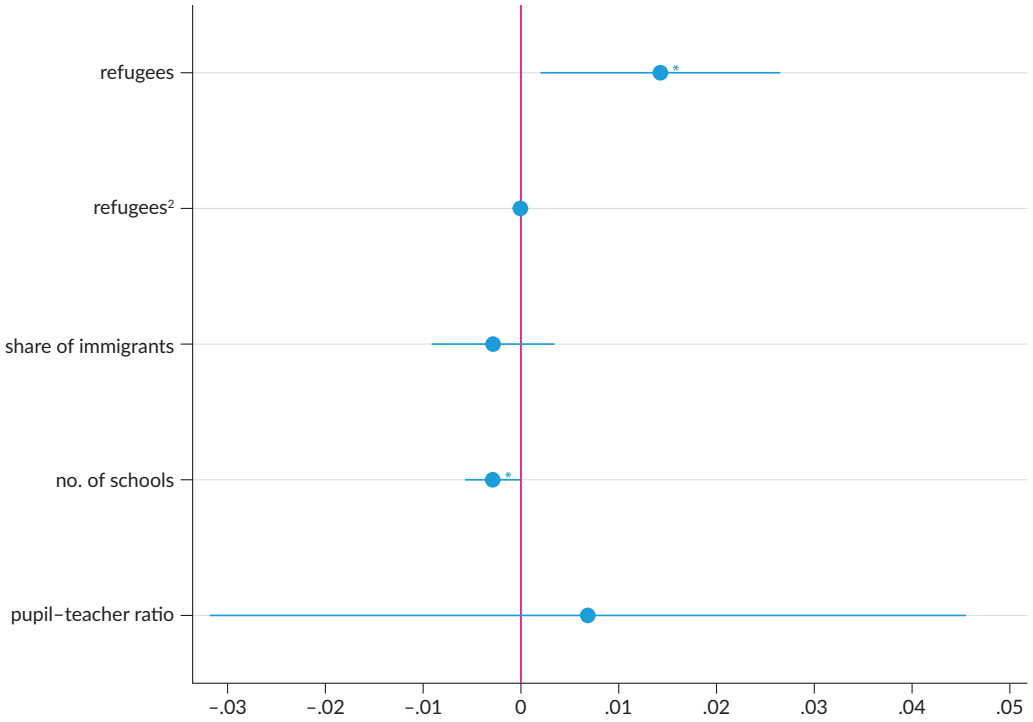

Figure 6. Multi-level models on newcomer class as dependent variable (only regional variables displayed). Notes: Results present regression coefficients and confidence intervals; significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; reference category: HISCED = secondary I+II education; control variables = educational policies, degree of urbanity, HISEI, gender, age at arrival, origin country, residence status.

5.3. *Attending a* Gymnasium

Recall that some of our hypotheses concerning attendance at the *Gymnasium* apply to all pupils, independent of whether they attend a newcomer class (H5a to H6c), while others only concern those who attend a regular class (H7 to H8b). Thus, we show these results separately.

The baseline model without regional variables indicates that pupils who live in federal states which preferably enrol pupils at lower school types are less likely to attend a *Gymnasium*, while pupils with parents who obtained postsecondary or tertiary education (compared to those with secondary education), and with better self-assessed school performance in the country of origin, are more likely to attend a *Gymnasium* (see Supplementary File, Table 3). These effects remain largely stable if we control for regional variables (an exception being the models with interactions). The picture looks similar if we only include those who attend a regular class (see Supplementary File, Table 4).

5.3.1. Attending a *Gymnasium* (Newcomer and Regular Classes)

Testing our assumptions on the effects of regional factors on the attendance of a *Gymnasium*, we cannot observe any significant results of the regional factors (Figures 7 and 8; see also Supplementary File, Table 3).

While the effects show in the expected direction, meaning the higher the number of *Hauptschulen* in a municipality, the less likely newcomers are to attend a *Gymnasium* (H5a, Figure 7), and the more newcomers

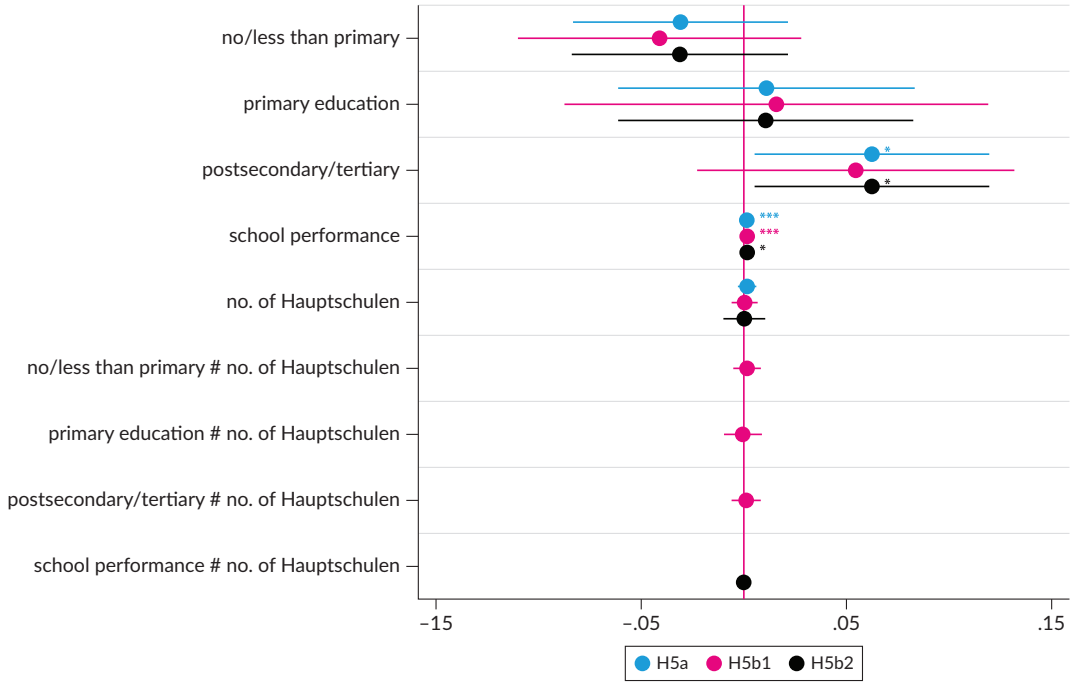

Figure 7. Multi-level models on *Gymnasium* as dependent variable (including those in newcomer classes, only regional variables and interaction effects displayed). Notes: Results present regression coefficients and confidence intervals; significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; reference category: HISCED = secondary I+II education; control variables = educational policies, degree of urbanity, HISEI, gender, age at arrival, origin country, residence status.

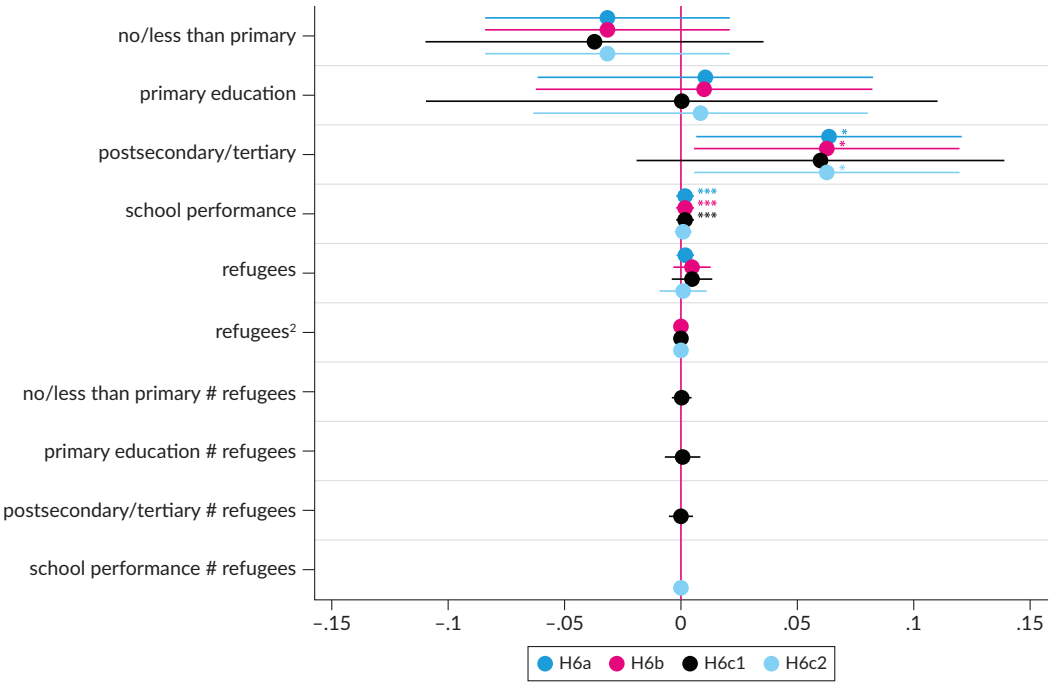

Figure 8. Multi-level models on *Gymnasium* as dependent variable (including those in newcomer classes, only regional variables and interaction effects displayed). Notes: Results present regression coefficients and confidence intervals; significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; reference category: HISCED = secondary I+II education; control variables = educational policies, degree of urbanity, HISEI, gender, age at arrival, origin country, residence status.

there are in a municipality, the more likely the adolescents in our sample attend a *Gymnasium* (H6a, Figure 8), these effects are not significant. No evidence was found for the assumption that the number of *Hauptschulen* (H5b1 and H5b2, Figure 7) and the number of newly arrived pupils (H6c1 and H6c2, Figure 8) in the municipality affect the influence of family and individual resources on educational decisions.

Considering the relevant regional aspects together in a model without interaction terms, a similar picture emerges. The effects of the regional variables point in the expected direction but show no significant correlations with attending a *Gymnasium* (see Supplementary File, Table 3).

5.3.2. Attending a *Gymnasium* (Only Regular Classes)

The results regarding previous experiences with schooling immigrants indicate in the expected direction (Figure 9). If the adolescents in our sample live in a municipality with more previous experiences with teaching immigrants, they are less likely to attend a *Gymnasium* (H7). The correlation is not significant, however. Contrary to our assumptions, the higher the pupil–teacher ratio at *Gymnasien*, meaning the less capacity there is at *Gymnasien* in a municipality, the more likely they attend a *Gymnasium* (H8a, Figure 9). This significant correlation contradicts hypothesis 8a. It is possible that other regional aspects influence both the workload of teachers at *Gymnasien* and the schooling of newcomers. An alternative explanation is that more teachers have been assigned to schools that have faced particular challenges in the past (e.g., a high proportion of children from socially disadvantaged backgrounds or children whose family language is not German), so that the pupil–teacher ratio has diminished. A high pupil–teacher ratio could therefore indicate

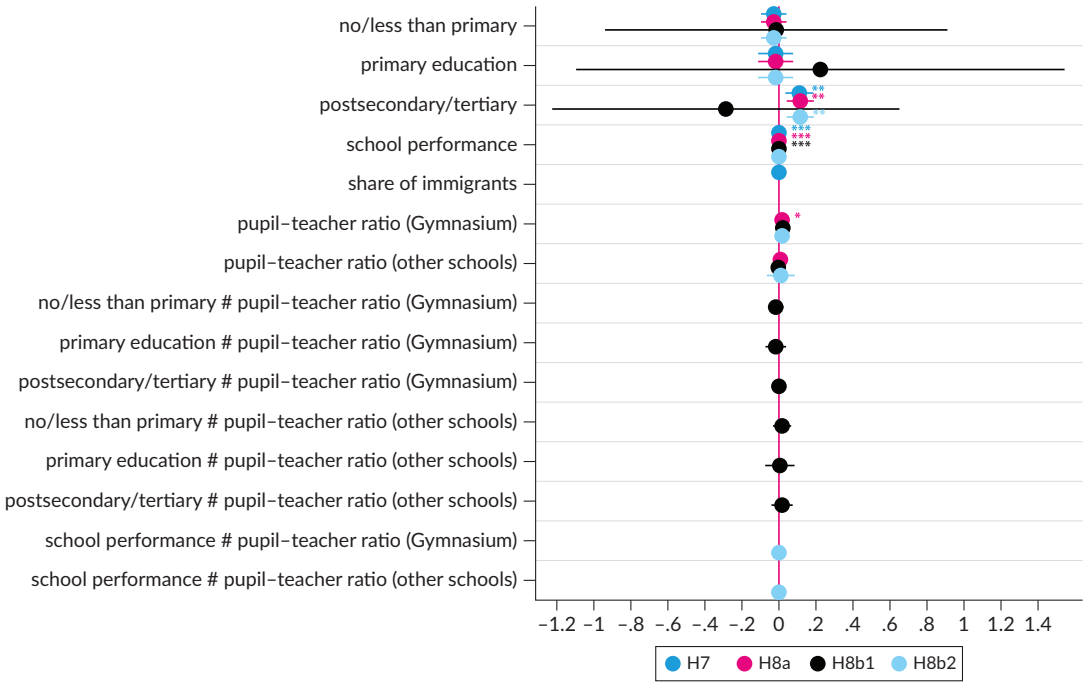

Figure 9. Multi-level models on *Gymnasium* as dependent variable (excluding those in newcomer classes, only regional variables and interaction effects displayed). Notes: Results present regression coefficients and confidence intervals; significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; reference category: HISCED = secondary I+II education; control variables = educational policies, degree of urbanity, HISEI, gender, age at arrival, origin country, residence status.

that the school has not been particularly challenged so far and is therefore considered capable of including newly arrived refugees. The assumed interactions between free capacities and family and individual resources (H8b1, H8b2) are not significant.

In a model without interactions that considers all relevant regional aspects, we see similar results to those obtained when the hypotheses are tested individually. The unexpected significant correlation between less free capacity at *Gymnasien* and a higher probability of attending a *Gymnasium* remains (see Supplementary File, Table 4).

6. Conclusion

In the literature on the schooling of newly arrived refugees, factors at the municipal level are assigned great importance. Analyses with the data from the ReGES study show that a small part of the variance when explaining differences in the schooling of newly arrived refugees can indeed be attributed to municipal aspects (5.4–10.1%). This is in line with other studies, which conclude that regulations at the district level contribute to a limited extent to explaining the integration processes of refugees (Tjaden & Spörlein, 2023). We can only explain the regional variance to a very limited extent based on our models, and there are hardly any significant correlations between municipal aspects and the education of newly immigrated pupils. The number of newly immigrated pupils in the municipality operationalised by the number of those seeking protection in the district is, as expected, associated with a higher probability of being educated in a separate newcomer class. Furthermore, as expected, in municipalities with more schools, instruction in newcomer

classes seems to be less likely. However, this finding only emerges when other regional characteristics are controlled for. In municipalities where teachers at *Gymnasien* are responsible for many pupils and should therefore have little free capacity, we see a positive correlation with the education of new immigrants at *Gymnasien*. This correlation contradicts our expectation and requires further investigation. The assumption that the freedom of choice of pupils and their families varies depending on municipal aspects and that individual and family resources should have a stronger influence in some municipalities could not be confirmed.

Overall, we could not find any evidence for most of our hypotheses, although the results often showed the expected direction of the relationships. Several reasons for this can be discussed. First, the explanatory factors can often only be measured indirectly. The experience of the municipality with the education of immigrant children, which might increase teachers' expertise or imply established support structures, is only operationalised by the share of immigrants in the total population, to give one example. The pupil–teacher ratio may also not be the best (sole) indicator of teachers' workload due to the complexity of this topic. Other factors that might be important (El-Mafaalani & Kemper, 2017; Emmerich et al., 2017; Jäger et al., 2021; Massumi et al., 2015) cannot be incorporated into the analysis due to a lack of suitable indicators. This applies, for example, to the presence of a welcoming culture, (official) guidelines for assigning newly arrived pupils within the municipality, or the commitment and personal initiative of teachers or gatekeepers who assign newly arrived pupils to classes and schools. Furthermore, many characteristics are only available at the municipal level and not in a more detailed subdivision, such as at the neighbourhood level. Differences within municipalities, which are sometimes significant, cannot be sufficiently considered. Moreover, there are arguments that the schools themselves exert a strong influence on the allocation of young refugees to classes and school types (Emmerich et al., 2017; Massumi et al., 2015), which could not be accounted for in the present analyses either. Future work should therefore try to consider smaller-scale contexts. It further seems worthwhile to consider distance measures, which could test the hypothesis that newly immigrated pupils are primarily enrolled in the nearest school (with a class for newly immigrated pupils), regardless of whether this matches their skills or previous educational experiences (Emmerich et al., 2017). Finally, in the ReGES study, large municipalities and those with many refugees were disproportionately included for sampling reasons. Rural districts with small municipalities and with relatively few refugees could not be included. This makes it more difficult to test some hypotheses that relate, for example, to the number of refugees or the number of secondary schools.

Previous research has shown that regional aspects influence the schooling of new immigrants. However, due to the design of these studies, the suspected mechanisms could not be tested by quantitative analyses. The present study is a first step towards a quantitative examination of these relationships. We showed that the number of newly immigrated pupils, as already assumed in the literature, and the number of schools influence whether lateral entrants are educated in separate newcomer classes. We also acknowledged the difficulties in analysing regional factors that influence the educational participation of newly immigrated pupils and discussed approaches for further research.

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Conflict of Interests

The authors declare no conflict of interests.

Data Availability

The data is available as scientific use files via the Leibniz Institute for Educational Trajectories, Bamberg, Germany. Further information about data access can be found here: https://www.reges-data.de/en-us/Data-and-Documentation/Data-Access

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

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Can Educational Policy Influence Major Choices in Higher Education Through Changes in School Curriculum?

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Abstract

The impact of high school curriculum reforms on students' major choices in higher education remains an underexplored field, despite their potential role in shaping workforce composition, economic development, and social mobility. This study addresses this gap by examining the varying emphasis on compulsory school subjects across German states. We focus on non-core subjects that vary significantly in importance across states (civic education) or that are part of the curriculum in some states but not in others (economics and computer science). These subjects are increasingly recognized as essential for fostering democratic values, economic understanding, and digital literacy, which also shape students' career aspirations and educational trajectories, ultimately contributing to a skilled workforce and potentially reducing the shortage of skilled labor. Using a novel dataset documenting state-specific introduction of compulsory courses and instructional time from 1995 to 2018, we analyze their influence on major choice. This dataset is linked with German higher education register data to assess whether increased compulsory instruction time and the introduction of compulsory courses affect students' subsequent major choices. For our analyses, we employed two-way fixed effects models to examine whether changes in the curriculum led to changes in major choices. Our results indicate small but positive effects of additional compulsory hours in civic education and economics on related major choices. However, our findings for computer science courses remain inconclusive. These results, along with the methodological limitations identified, highlight the need for further research on the long-term educational implications of school curriculum reforms.

Keywords

civic education; computer science; curriculum reform; economics; educational context; educational policy; major choice

1. Introduction

Curriculum reforms in high schools can play a crucial role in shaping students' educational pathways, including their choice of majors in higher education. These reforms, often implemented to align education with evolving pedagogical trends, technological advancements, and societal needs, aim to enhance both specific academic outcomes and broader societal goals, such as labor market integration and civic engagement. However, the extent to which these changes impact students' long-term educational trajectories and major choices in higher education remains insufficiently explored.

Research indicates that changes in high school curricula can shape students' interest in particular subjects, influencing their future educational decisions, including their choice of majors in higher education. By providing varying levels of exposure to different subjects, school curricula create opportunities for students to assess their interests and competencies (Legewie & DiPrete, 2014). However, most research on curriculum reforms has concentrated on core subjects or sought to explain gender disparities in major choices (see also Jacob et al., 2020; McNally, 2020). Consequently, there remains a notable gap in research regarding the effects of reforms in non-core subjects such as civic education, economics, and computer science. These subjects are increasingly recognized as essential for fostering democratic values (e.g., Sendzik et al., 2024), economic understanding (e.g., Kaiser & Menkhoff, 2016), and digital literacy (Liu et al., 2024). Furthermore, exposure to these subjects may shape students' career aspirations and educational trajectories, which, in turn, have broader implications for society, politics, and the economy. For instance, a well-educated and digitally literate workforce can drive economic development by enhancing productivity and innovation. Additionally, fostering democratic values through education can promote social mobility and political engagement, ensuring that citizens are equipped to participate actively in democratic processes. Moreover, addressing the shortage of skilled labor through targeted educational initiatives can strengthen the overall workforce, contributing to economic stability and growth.

Against this background, we pose the broader question: To what extent can education policy shape students' future choice of major in higher education through changes in the compulsory high school curriculum in certain non-core subjects?

To answer our research question, we employed a quasi-experimental research design to examine the impact of curricular changes in the non-core subjects of civic education, economics, and computer science. The study takes advantage of Germany's system of educational federalism, which gives the 16 federal states (*Länder*—hereinafter states) primary decision-making authority in school-related matters. This system has engendered a diversity of curricula in the 16 states over time, particularly in terms of the introduction and the number of hours devoted to the non-core subjects that are the focus of this study. Conversely, the school systems share important similarities, such as the allocation of students to different school tracks after primary school and the acquisition of the *Abitur* as a prerequisite for university admission. In addition, unlike in other countries, all German students pursuing the academic track (*Gymnasium*) in lower secondary school must enroll in all core and non-core subjects at the same level, and there are very few opportunities to take additional subjects voluntarily. Specifically, this study exploits state-level curriculum changes over a 24-year period. We use a novel dataset derived from high school curricula in lower secondary education across Germany's 16 states, covering graduate cohorts from 1995 to 2018, combined with register data on all students in higher education in Germany.

This article contributes to the literature on the impact of curriculum reforms on major choices in higher education in three ways. First, it examines how curriculum reforms during compulsory education influence major choices in higher education. While previous research has primarily focused on the choice of curricular tracks in secondary education or subjects in upper secondary education and their subsequent impact on major choices (e.g., Barone & Assirelli, 2020; de Philippis, 2021; Jacob et al., 2020), our study investigates the earlier period when students have very limited choice, and individual selection into subjects is not yet prominent. Second, it highlights changes to the curriculum regarding non-core subjects, an area often overlooked in research that predominantly focuses on core subjects or STEM fields (science, technology, engineering, and mathematics; see, e.g., Darolia et al., 2020; Goodman, 2019; Görlitz & Gravert, 2018). Finally, our research expands the sociological literature on educational choices by emphasizing institutional-level factors. While a substantial body of research examines individual-level or societal influences on major choice, fewer studies consider the role of institutional changes. Our article contributes to this body of knowledge by examining the impact of educational policies, particularly those related to non-core subjects, on educational trajectories.

2. Theoretical Considerations and State of Research

Existing research has already explored several factors influencing both university admissions and the choice of specific fields, particularly in STEM areas (e.g., Altonji et al., 2012; McNally, 2020). These factors operate at various levels: micro (individual), meso (institutional), and macro (societal; see, e.g., Hadjar & Becker, 2009). At the micro level, decisions are shaped by personal abilities, personality traits, decision-making processes (e.g., expected income), and socio-demographic factors like gender and social background (e.g., Card & Payne, 2021; Erdmann et al., 2023; Mentges & Spangenberg, 2021). At the macro level, influences include gender roles associated with specific occupations, labor market trends, and sector-specific unemployment rates (e.g., Makarova et al., 2019; Peter et al., 2024). Studies that focus on the meso level examine the role of institutions—particularly educational institutions—in shaping educational choices, viewing them as modifiable through policy. These studies investigate how institutional factors, such as tuition fees, admission requirements, mentoring programs, and the local university landscape, correlate with educational inequality and the alignment between individual preferences and societal needs (e.g., Aucejo & James, 2021; Declercq & Verboven, 2018; Engelhardt & Lörz, 2021; Erdmann et al., 2023; Neugebauer et al., 2016; Shin & Milton, 2008; Suhonen, 2014).

To our knowledge, the influence of the regulation of school curricula on students' major choices in higher education has received rather little attention compared to the other factors mentioned above. And if so, then particularly concerning gender differences in STEM (see also Jacob et al., 2020; McNally, 2020). The underlying theoretical assumption is that school subjects can influence interest in certain content (positively and negatively) and thus later educational pathways, such as a major choice in higher education. Thus, by varying levels of exposure to different subjects, school curricula create opportunities for students to assess their interests and competencies (Legewie & DiPrete, 2014) and enhance subject-related performance and self-efficacy (Görlitz & Gravert, 2018). In this context, the degree of standardization within school systems, particularly concerning the freedom of subject choice, plays a crucial role. According to Jacob et al. (2020), a "paradox of choice" (Jacob et al., 2020, p. 63, as cited in Abbiss, 2009, p. 345) may emerge due to the increasing influence of individual and social factors, such as social norms, on subject choice when these courses can be taken voluntarily. This, in turn, can reinforce the educational trajectory

already being pursued (Humphries et al., 2023). Conversely, compulsory school subjects are expected to expose groups of students to certain content they might otherwise miss due to selection based on their interests, family socialization, or other contextual factors. In light of this theoretical consideration, school subjects and their political-administrative design can be considered as an important institutional factor in the analysis of major choices in higher education.

The validity of this assumption is examined by a few studies that utilize longitudinal individual-level data analyzing the *general effect* that changes in high school curricula may have on major choices in higher education (on the effects of high school subjects on later stations in the educational and life course see, e.g., Biewen & Schwerter, 2021; Goodman, 2019; Jia, 2021). Since curriculum reforms are typically not designed to favor specific groups, this article focuses on the general effect. Accordingly, we report only the results from studies that directly address this issue. While studies that focus solely on gender differences, such as Görlitz and Gravert (2018), Joensen and Nielsen (2014), and Bertocchi et al. (2021), are mentioned here, they are not discussed in detail, despite their significant importance, particularly when examining differences between subgroups. The studies that focus on the general effect mostly focus on educational policy reforms leading to changes in high school curricula in upper secondary education, which are occasionally accompanied by new requirements for teaching content and quality. These studies mainly examine the variation in instructional time across schools and states using quasi-experimental research designs (for variation in teaching content while teaching time remains constant see Morando, 2024). The findings of Broecke (2013) and de Philippis (2021) suggest, for example, that England's reform to increase instructional time in science (physics, chemistry, biology) for high-ability students had a (small) positive impact, particularly on their subsequent decision to study STEM subjects. In the context of the introduction of advanced computer science courses in schools in the US state of Maryland, Liu et al. (2024) find that students who have taken these courses are more likely to go on to study computer science in higher education. In a cross-national study (Germany, Ireland, Scotland), albeit without a quasi-experimental research design, Jacob et al. (2020) show that pursuing more STEM subjects in upper secondary school is associated with a higher enrollment rate in a STEM degree program. In contrast, Darolia et al. (2020) find no effect of taking more math and science courses in the US state of Missouri on subsequent enrollment in a STEM degree program.

Despite the existing research, uncertainty remains about the general effect of school subjects on major choices in higher education, as selection processes are structurally embedded in the school contexts analyzed in current studies, such as through the free choice of courses. To our knowledge, only the study by Hübner et al. (2017) provides more evidence on compulsory subjects. They utilized the curriculum reform implemented for the final two years of academic high school in the German state of Baden-Wuerttemberg, which students commence at an average age of 17. For all students, advanced courses in German, mathematics, and a foreign language, as well as attendance in at least two science courses, became mandatory, although the total number of hours for advanced courses was reduced by one hour per week. The results of Hübner et al. (2017) suggest that the reform did not lead to an increased number of students taking a STEM subject (for gender-specific effects see Görlitz & Gravert, 2018).

Existing research has provided valuable insights into how school subject choices impact major selection in higher education. Studies have primarily focused on the later stages of schooling, where students actively select curricular tracks in secondary education or place greater emphasis on particular subjects in upper secondary school, both of which influence their eventual major choices (e.g., Barone & Assirelli, 2020; Jacob et al., 2020).

Despite these contributions, significant gaps remain. First, there is limited research examining how curriculum reforms during compulsory education—when students typically have minimal choice— impact future major decisions. This early educational phase is critical, as students' exposure to different subjects may shape their interests before individual selection becomes prominent. Additionally, while much of the existing literature prioritizes core academic subjects and STEM fields (e.g., Görlitz & Gravert, 2018), studies rarely address the influence of non-core subjects. This gap may oversee the potential impact of a broader curriculum on students' academic trajectories. Finally, fewer studies explore how institutional-level factors, particularly educational policies setting high school curricula, shape major choices. Much of the existing research emphasizes individual or societal influences, but understanding how policies on non-core subjects affect students' choices could provide a clearer picture of the pathways leading to higher education majors.

Overall, we investigate whether educational policy measures mandating attendance in certain school subjects will lead to changes in enrollment rates in similar subjects at the university level. However, this approach is exploratory without using directional hypotheses, given the limited and, at times, mixed evidence currently available.

3. Institutional Background

3.1. The German High School and Higher Education System

Although Germany has a standardized educational system, each of its 16 states maintains autonomy in shaping its specific features through its own educational policies (Helbig & Nikolai, 2015). A key feature of the German school system is its early tracking structure. Compulsory education begins at the age of six, when children enter elementary school, which typically lasts four or six years, depending on the state. At an early age (10 or 12), students are assigned to one of three hierarchically structured tracks based on the recommendations of their primary school teachers and the decisions of their parents. Selection is formally based on students' abilities and achievements. Thus, students' choices are limited and depend on external factors. The academic track (*Gymnasium*), which is the focus of this study, leads directly to the higher education qualification (*Abitur*). The number and nature of these tracks have shifted over the past few decades and vary between states (Becker et al., 2016). An increasing number of states offer the possibility of taking the *Abitur* examination at a school track other than a *Gymnasium*. However, the majority of students at university graduate from a *Gymnasium* (Spangenberg & Quast, 2023).

The *Gymnasium* is divided into two successive stages: lower secondary education (up to the age of 15 or 16) and upper secondary education (up to the age of 18 or 19; see also Görlitz & Gravert, 2018; Jacob et al., 2020).

The degree of standardization at the *lower* secondary level, which is the focus of our study, has undergone minimal changes across states during the period under investigation (graduation cohorts from 1995 to 2018). Apart from a few optional courses and electives, all students are obliged to take all subjects at the same level and for the same number of hours within states and school tracks. Despite the similarity of the lower secondary education of the *Gymnasium* between the states in terms of compulsory education, disparities emerge in the educational policy priorities of the states, manifesting in the composition of the curriculum (i.e., different subjects) and the number of hours devoted to them. Differences primarily pertain to non-core subjects, including computer science, economics, and civic education.

The degree of standardization at the *upper* secondary level was characterized by a certain degree of freedom in many states until the 2000s. Since the beginning of the 2000s, however, more and more states have increased the degree of standardization by expanding the compulsory lessons in the core subjects (Trautwein et al., 2010). Furthermore, the duration of upper secondary education was reduced from three to two years in most states at different times since the 2000s (though many states later returned to three years). These alterations led to overall changes in enrollment in higher education but did not significantly affect the choice of majors among high school graduates of our interest, namely political and social science, economics, and computer science (Marcus & Zambre, 2017, 2019).

Access to the higher education system in Germany and admission to certain subjects is characterized by the following general conditions (see also Jacob et al., 2020). Unlike in other countries, the *Abitur* in Germany entitles students to choose any subject at university. Proof of successful completion of certain advanced courses at the school is not required. The choice of a specific subject is made with the application to a university. However, highly sought-after subjects (e.g., medicine, pharmacy, psychology) and study locations (e.g., Berlin) impose admissions restrictions based on the overall *Abitur* grade, known as the *numerus clausus*, which sets the threshold for admission to a specific subject. To our knowledge, the subjects of our interest were not or only slightly affected by (strict) *numerus clausus* admission restrictions (see also Reimer & Pollak, 2010). In addition, between 2005 and 2013, certain German states introduced tuition fees of approximately €500 per semester, irrespective of the subject. However, these did not appear to have a negative impact on the general propensity to study (Helbig et al., 2012). The so-called Bologna Process also falls within our study period. This reform process, which began in 1999, led German universities and faculties to gradually convert the previously common diploma and master's degree programs, as well as teacher training programs that culminated in a state examination, into bachelor's and master's degree programs. However, the reform does not appear to have changed the choice of a particular field of study (Horstschräer & Sprietsma, 2013) and has affected all states equally.

3.2. The Curriculum Reforms

To examine the influence of civic education, economics, and computer science on the choice of major, we exploit the variation in these subjects in the lower secondary curriculum across time and states. Specifically, we focus on educational policy reforms that have led to (a) changes in compulsory school hours and (b) the introduction of compulsory courses at the lower secondary level, which, during our observation period, occurred only for economics and computer science. Drawing from existing historical work, the objectives and history of these subjects can be categorized as follows. However, given the limited extent to which the reform process is described, we refer here to examples from our own data collection on the reforms (see also Section 4 for more details).

Since the beginning of the Federal Republic of Germany, the school subject of civic education has been assigned an important function in the democratization of the population (Sendzik et al., 2024). Course goals include the development of an understanding of democratic and constitutional principles and critical engagement with political and social issues. Since the late 1960s, civic education has been a compulsory subject in all states. However, the implementation of reforms within the states has resulted in fluctuations in the number of hours allocated to this subject over time. For example, due to the 1991 reform in Lower

Saxony, the graduating cohort of 2000 received three more hours of civics per week compared to the graduating cohort of 1996.

Since the turn of the millennium, discussions and calls for economics as a compulsory subject have intensified (Retzmann & Seeber, 2022). The objective is to empower young people to develop into responsible economic citizens and consumers by engaging with economic issues in the classroom setting. Consequently, at least economics became an official component of so-called integration subjects (e.g., politics/economics in North Rhine-Westphalia, since the school year 2007/08). However, even prior to this development, economic content was part of subjects such as work studies (e.g., in Hesse, since the school year 1976/77). During the period under review, 13 out of 16 states introduced economic education as part of a compulsory (integrated) subject at various times.

Since the mid-2010s, there has been increasing discussion about the introduction of computer science as a compulsory subject (SWK, 2022). One of the aims of computer science is to help students better meet the challenges of an increasingly digital (working) environment. During the reporting period, seven out of 16 states introduced computer science as a separate subject (e.g., Saxony) or as part of a (integrated) subject (e.g., Mecklenburg-Western Pomerania in the 1990s).

4. Data and Analytical Strategy

4.1. Data and Variables

Our dataset includes data from the Federal Statistical Office, which provides information on higher education and school statistics. This data has been supplemented with a specially compiled dataset drawn from the timetables of the 16 states (Sendzik et al., 2024). All information collected pertains to the cohort of high school graduates (only of *Gymnasium*) in Germany from 1995 to 2018.

The dependent variable—the enrollment in certain majors in higher education—was identified using register data of all students enrolled in higher education in Germany (Research Data Centres of the Federal Statistical Office and Statistical Offices of the Federal States of Germany, 2022). All German higher education institutions are required to report information on their students to the Federal Statistical Office and the Statistical Offices of the Federal States, which provide the data in anonymized form for research purposes. The dataset includes students' demographic information (e.g., gender and age), study choices (e.g., the year and university of first enrollment, the choice of major in higher education), and high school background (e.g., the year and state of high school graduation, and the type of high school). For our analysis, we utilized data from high school graduation cohorts spanning from 1995 to 2018.

Using this dataset, we calculated our dependent variable as the share of first-semester students who enrolled in fields of interest, for each graduation cohort and by state. For civic education, we included majors in political and social sciences. For economics, we included majors in economics and business management, encompassing specializations such as tourism management, sports management, or health management. For computer science, we included majors in computer science with specializations such as health informatics, bioinformatics, or information systems.

Our two main independent variables are: (a) the changes in compulsory instruction hours and (b) the implementation of compulsory courses in lower secondary education. They were analyzed using both a new dataset for civic education (Sendzik et al., 2024) and new data for economics and computer science collected for this article. Specifically, we utilized information from the so-called secondary school timetables. These timetables are used by education policymakers to set the instruction time for school subjects. The datasets provide information for each state and each cohort on the number of compulsory hours per week for subjects ranging from grades five to ten (ages 10 to 16).

4.2. Analytical Strategy

Due to differences in the implementation of the three subjects during our observation period, we first examine how changes in the number of school hours affected all three subjects. Secondly, we analyze how the introduction of economics and computer science courses, irrespective of instructional hours, influenced students' major choices in higher education.

To address our research question—to what extent do changes in high school curricula in specific non-core subjects influence students' future major choices in higher education—we employ two-way fixed effects (TWFE) models (e.g., Callaway et al., 2024; Imai & Kim, 2021) using two different codings of the independent variable.

First, we apply analyses using a continuous independent variable to account for longitudinal variations in treatment intensity. This approach allows us to examine the influence of changes in instructional hours within a state over time. By leveraging within-state variations across multiple years, we gain insight into how changes in instructional policies impact higher education enrollment trends within each state when the subject is already implemented.

Second, we employ the same two-way fixed effects approach but with a binary-coded independent variable, disregarding treatment intensity. This allows us to estimate the difference in the dependent variable between two groups (e.g., with and without instruction time) while controlling for fixed effects. By examining the average effect (binary coding) of instructional time, we exploit the fact that economics and computer science were newly introduced during our observation period. Here, our primary interest lies in assessing whether the introduction of these subjects, regardless of instructional hours, influenced students' major choices. This analysis may provide valuable insights for policymakers when discussing the general implementation of new subjects in high school curricula.

For all models, we include year-fixed effects by incorporating year dummies to account for national trends. Furthermore, we conduct several robustness checks, which are described in more detail in Section 6.

Our chosen research design, which includes both entity and time-fixed effects, strengthens our ability to infer causality by addressing key challenges related to unobserved heterogeneity, omitted variable bias, and endogeneity (Brüderl & Ludwig, 2015). Nevertheless, there is a broad critical discussion about the use of TWFE for causal inference, underscoring its potential pitfalls in the context of longitudinal data (see, for instance, Callaway et al., 2024; Imai & Kim, 2021). Together, these approaches allow us to examine the relationship between secondary school instructional time in specific fields and higher education enrollment in related

majors, accounting for both the intensity of exposure to a subject and the timing of its introduction across different regional and temporal contexts.

5. Results

As the collected data is novel, we begin by presenting descriptive figures and statistics for both the independent and dependent variables before turning to our main results in the second part of this section.

Figures 1 to 3 illustrate the evolution of instructional hours (independent variable) for all three subjects across states. Analyzing these patterns reveals four key characteristics: First, there was considerable variation in the timing of implementation across states, meaning that the periods defining pre- and post-treatment conditions differed by region. Second, the intensity of the treatment—defined by the number of instructional hours allocated to each subject at the time of its implementation—also varied between states, reflecting policy decisions that adjusted instructional time based on regional educational priorities and resources. Third, treatment intensity was not static within several states, with instructional hours undergoing modifications over time, and some states increasing or decreasing instructional time in certain subjects after the initial implementation period. Fourth, our study period (covering graduates from 1995 to 2018) coincides with a phase in which civic education was consistently part of the high school curriculum in almost all states (with exceptions being Schleswig-Holstein and Bavaria, see also Table A1 in the Supplementary File).

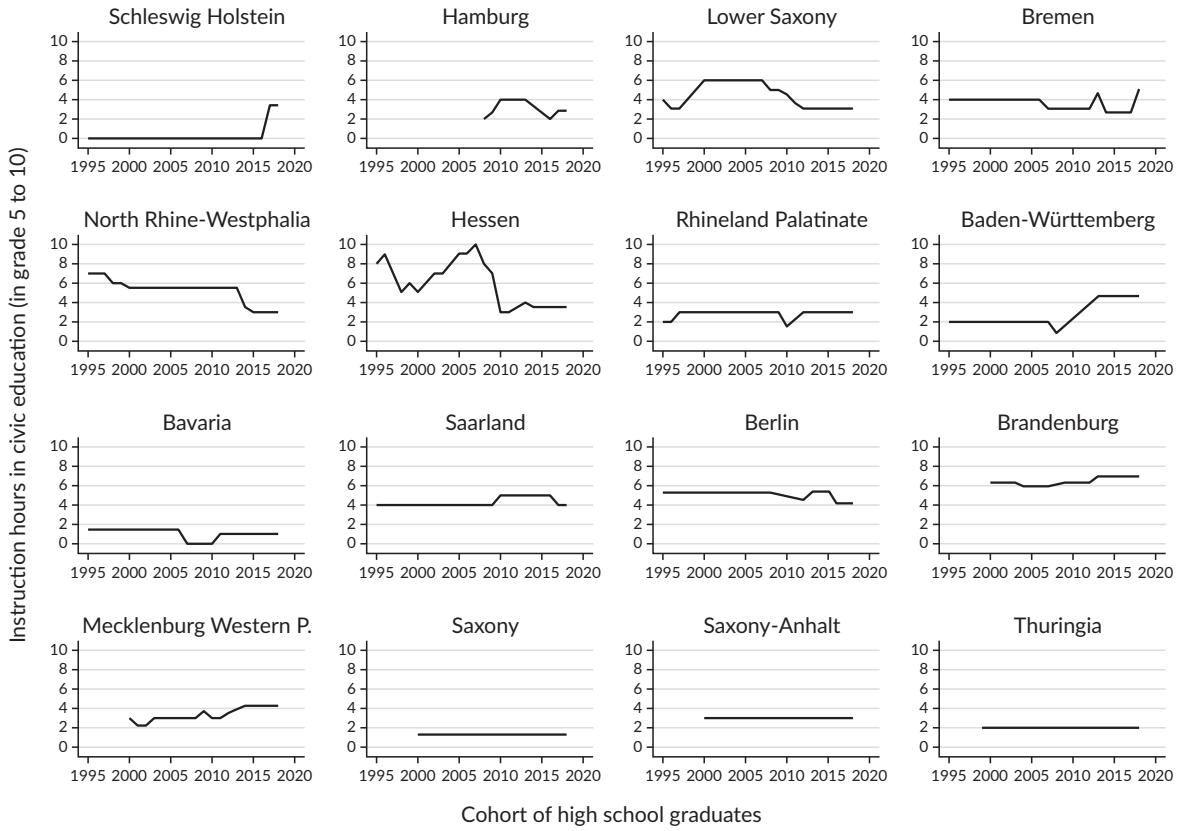

Figure 1. Number of hours in civic education over time by state.

Figure 2. Number of hours in economics over time by state.

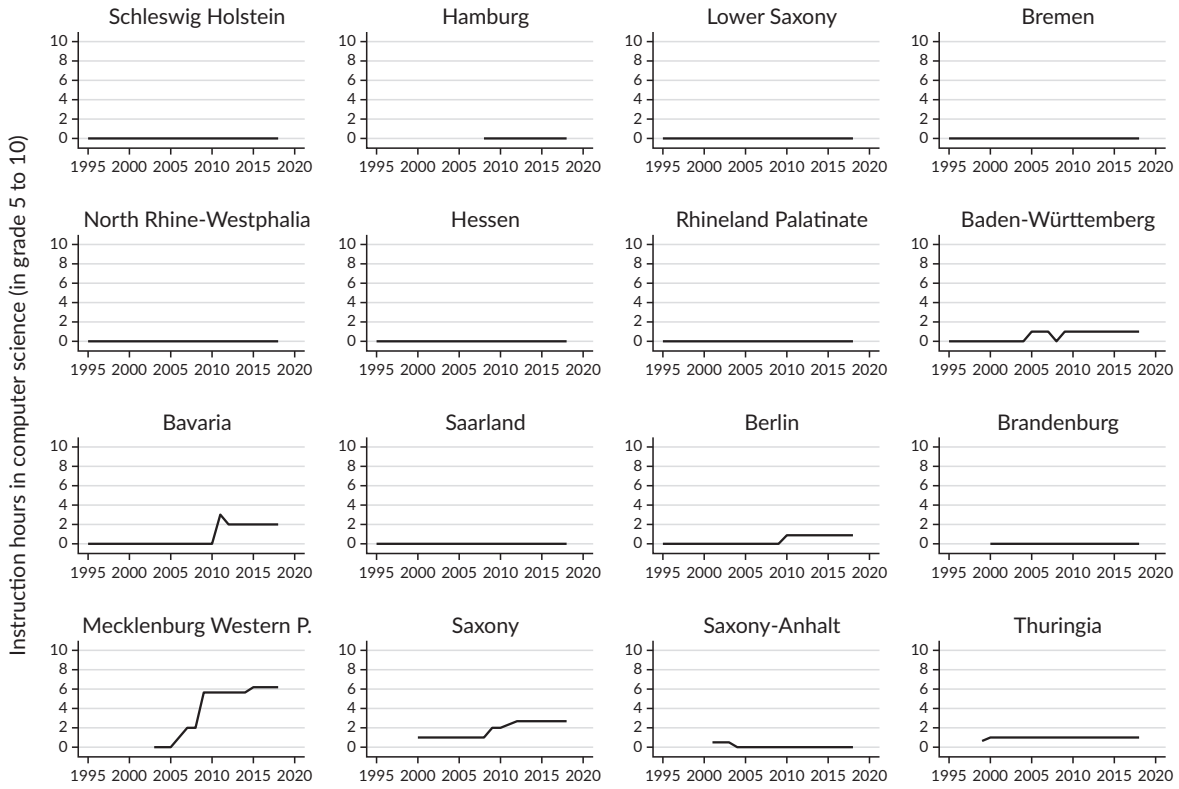

Figure 3. Number of hours in computer science over time by state.

Table 1 presents the mean share of first-semester students enrolling in specific majors in higher education (dependent variable), disaggregated by state and instruction in the respective subjects, for descriptive purposes. Since civic education was implemented in nearly all states throughout the observation period, values for cohorts without instruction are displayed only for the two states where implementation varied. A comparison of the mean values by state for economics reveals that, in almost every state where a change in implementation status occurred, the cohorts with instruction time in economics exhibited a lower share of first-semester students in this major than the cohorts without instruction time. This pattern indicates that the introduction of economics instruction is associated with a decline in the share of students choosing this major. However, it is important to note that we observe an overall decline in economics enrollments over time, independent of implementation status (not shown here). This trend coincides with the introduction of economics instruction, suggesting that broader national patterns in economics enrollment may be influencing this outcome. For computer science, by contrast, we observe the opposite pattern, with the share of first-semester students being generally higher in cohorts that received instruction in this subject.

Table 1. Distribution of share of first-semester students in a specific major in higher education.

State	Civic Education				Economics				Computer Science			
	Without mean (n)		With mean (n)		Without mean (n)		With mean (n)		Without mean (n)		With mean (n)	
Schleswig-Holstein	0.050	(22)	0.038	(2)	0.191	(17)	0.188	(7)	0.062	(24)	n/a	(0)
Hamburg	n/a	(0)	0.044	(11)	n/a	(0)	0.207	(12)	0.062	(11)	0.052	(0)
Lower Saxony	n/a	(0)	0.062	(24)	0.171	(13)	0.161	(11)	0.050	(24)	n/a	(0)
Bremen	n/a	(0)	0.066	(24)	0.205	(11)	0.169	(13)	0.065	(24)	n/a	(0)
North Rhine-Westphalia	n/a	(0)	0.046	(24)	0.180	(7)	0.151	(17)	0.047	(24)	n/a	(0)
Hessen	n/a	(0)	0.066	(24)	0.205	(1)	0.171	(23)	0.050	(24)	n/a	(0)
Rhineland Palatinate	n/a	(0)	0.063	(24)	0.164	(24)	n/a	(0)	0.059	(24)	n/a	(0)
Baden-Württemberg	n/a	(0)	0.041	(24)	0.172	(13)	0.186	(11)	0.054	(11)	0.064	(13)
Bavaria	0.044	(4)	0.060	(20)	n/a	(0)	0.162	(24)	0.048	(16)	0.069	(8)
Saarland	n/a	(0)	0.044	(24)	0.161	(24)	n/a	(0)	0.056	(24)	n/a	(0)
Berlin	n/a	(0)	0.043	(24)	0.160	(24)	n/a	(0)	0.058	(15)	0.069	(9)
Brandenburg	n/a	(0)	0.042	(19)	n/a	(0)	0.157	(19)	0.067	(19)	0.076	(0)
Mecklenburg Western P.	n/a	(0)	0.054	(19)	n/a	(0)	0.162	(16)	0.054	(3)	0.063	(13)
Saxony	n/a	(0)	0.043	(19)	n/a	(0)	0.141	(19)	n/a	(0)	0.060	(19)
Saxony-Anhalt	n/a	(0)	0.056	(19)	0.145	(15)	0.196	(3)	0.057	(15)	0.072	(3)
Thuringia	n/a	(0)	0.058	(20)	n/a	(0)	0.144	(20)	n/a	(0)	0.061	(20)

In Table 2, we present the results for the effect of instruction time on major choice in higher education across all three subjects. Models 1 to 3 include estimates based on the metric independent variable (instruction time), while Models 4 and 5 display results for economics and computer science using a binary coding of instruction time.

For civic education, the results indicate a small but significant increase of 0.1 percentage points in the proportion of students who choose political or social science as their major in higher education (see Model 1). Given that the baseline enrollment rate in these majors within our model is 5.3%, this 0.1 percentage point rise corresponds to a 1.9% relative increase in political or social science enrollment per additional hour of civic education. The mean instruction time for civic education across all observations is 3.45 hours (see Table A1 in the Supplementary File). Thus, if civic education were implemented with an average of 3.45 hours, this would lead to an estimated 6.5% relative increase in the proportion of students choosing these fields compared to a scenario where no instructional time in civic education is offered. This finding highlights the potential impact of increased civic education on students' career pathways in political and social sciences.

For economics, we observe a significant increase of 0.2 percentage points in the proportion of students who choose economics as their major in higher education (see Model 2). Although this effect appears to be twice as large as the effect for civic education, its relative impact is smaller in relation to the baseline enrollment in economics of 15.5%. Specifically, this 0.2 percentage point increase represents only a 1.3% relative rise in economics enrollment.

Conversely, for computer science, our results indicate a decrease of 0.2 percentage points in the proportion of students who choose computer science as their major in higher education (see Model 3). While the absolute effect size is similar to that observed for economics, its relative impact is notably larger when considered in relation to the baseline enrollment rate. Given that the baseline enrollment rate for computer science in our model is 3.6%, this 0.2 percentage point decline corresponds to a 5.6% relative decrease, making it a more substantial proportional effect compared to the relative changes observed for civic education (1.9%) and economics (1.3%).

Table 2. Results for the instructional time effect on the share of students within these fields in higher education.

	Model 1	Model 2	Model 3	Model 4	Model 5
	Civic Education	Economics	Computer Science	Economics	Computer Science
hours in civic education	0.001***				
hours in economics		0.002***			
hours in computer science			−0.002***		
economics provided (0/1)				0.010***	
computer science provided (0/1)					0.003**
Constant	0.053***	0.155***	0.036***	0.153***	0.035***
Observations	347	344	343	344	343
Number of States	16	16	16	16	16
R^2 within	0.566	0.554	0.816	0.553	0.814
R^2 between	0.025	0.020	0.102	0.045	0.063
R^2 overall	0.312	0.270	0.722	0.237	0.721

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; all models with time-fixed effects while coefficients for the time dummies are not displayed here.

In addition to the analyses utilizing the detailed amount of instruction time as an explanatory variable, we also present the results for economics and computer science with binary coding (Models 4 and 5). These coefficients describe the average effect of whether economics or computer science was offered in school. Since civic education was implemented across most states throughout the entire observation period (with exceptions being Schleswig-Holstein and Bavaria, see Table A1 in the Supplementary File), we were unable to apply this approach to civic education.

For economics, our results indicate a significant average effect of 1 percentage point for instruction in economics. On average, the implementation of instruction time in economics resulted in a 6.5% relative increase in the baseline enrollment rate in economics in higher education.

Notably, for computer science, we found an opposite average effect compared to the model with instruction time as a continuous variable (Model 3 vs. Model 5). In the model estimating the average effect across all variations of instruction time, the results indicate that the implementation of computer science increased the proportion of students who choose computer science as their major in higher education (Model 5). Thus, our results regarding the effect of instruction time in computer science are not robust across different model specifications.

To test whether this inconsistency is driven by specific amounts of instruction time, we also estimated a model with instruction time dummies, which capture the effect of varying amounts of instruction time. The results suggest that the negative effect observed in Model 3 is primarily attributable to high levels of instruction time in computer science (specifically, 5 to 6 hours of instruction; see Figure A1 in the Supplementary File). These high levels of instruction time were only provided in one state, namely Mecklenburg-Western Pomerania (see Figure 3 above). Therefore, we hypothesize that the negative effect could also be a state-specific issue and test for differences by excluding Mecklenburg-Western Pomerania from our sample (Table A2 in the Supplementary File). The changes in results indicate a state-specific phenomenon that is potentially driven by other factors, such as a teacher shortage in computer science. For example, during the implementation of computer science in Mecklenburg-Western Pomerania, the demand for specially trained teachers may have increased rapidly due to the sharp rise in instructional hours. It might be possible that this increased demand was not fully met by specially trained teachers over time.

The results presented in this section suggest that instruction time may have an impact on major choices in higher education, with different effects observed across the subjects of civic education, economics, and computer science. For civic education, the results indicate a small but significant increase in the proportion of students choosing political or social science as their major. In economics, a positive effect of instruction time on major choice is observed, but its impact is relatively modest when compared to the baseline enrollment rate, suggesting that the influence of economics instruction on students' decisions may be less pronounced. However, the results for computer science show inconsistencies, with a negative effect on enrollment in the model based on continuous instruction time, but a positive effect when using binary coding.

6. Robustness

As some of our results exhibit limited robustness (e.g., varying findings for computer science), we conducted additional analyses and employed alternative TWFE regression specifications. First, as indicated by our

previous analyses and Figure A1 in the Supplementary File, the assumption of a linear additive effect appears to be violated for computer science. To assess whether this also holds for economics, we tested for non-linearity in this field and found a steadily increasing effect with a higher number of instructional hours (see Figure A2 in the Supplementary File). Second, for both economics and computer science, certain states never introduced these subjects during the observation period and were consequently excluded from the TWFE regression. To address this, we re-estimated all models using random effects, incorporating these states into the analysis (see Table A3 in the Supplementary File). Third, while our primary models include year-fixed effects through year dummies, we further refined our estimates by adding control variables that additionally account for the evolution of the number of high school graduates and first-semester students by state and year (Federal Statistical Office, 1997, 1998, 2022). This adjustment allows us to control for variations in both the supply of and demand for higher education (see Table A4 in the Supplementary File). Specifically, by including both the growth rate and the absolute number of high school graduates, we capture substantial shifts in graduate numbers resulting from educational reforms that altered the duration of secondary education during our observation period. For example, one major reform was the transition from the nine-year *Gymnasium* system (G9) to an eight-year system (G8), which was implemented in most states between the early 2000s and the mid-2010s, reducing the duration of secondary education while maintaining the total instructional hours (see also Section 3.1.). As a result, students in affected cohorts graduated one year earlier, leading to a temporary "double cohort" of high school graduates in the respective years. The exact timing varied by state, but in general, these double cohorts occurred between 2007 and 2013. In subsequent years, as some states reverted to the G9 model or allowed schools to choose between G8 and G9, the distribution of graduates stabilized. Since our main dependent variable is the share of first-semester students in a given major, we also account for fluctuations in the total number of first-semester students, which reflect changes in the level of competition for university places. These dynamics are of particular pertinence, as the subjects analyzed—being less restricted in admissions—may serve as alternative options for students unable to secure entry into highly competitive programs, such as medicine. Despite these adjustments, our main results remain consistent across different model specifications and the inclusion of additional control variables, reinforcing the robustness of our findings.

7. Conclusion

This study was motivated by a central question: To what extent can education policy shape students' future major choices in higher education through changes in the compulsory high school curriculum in certain non-core subjects? Within this scope, we focused particularly on the meso-level—the role of institutions—in shaping educational choices. We assumed that (a) the increase in the number of hours of civics, economics, and computer science at the lower secondary level, as well as (b) the introduction of economics and computer science as compulsory subjects, would lead to changes in enrollment rates in certain fields of study. Our analyses of major choices in higher education and of high school curricula (timetables) in the 16 German states over a 24-year period for the subjects civic education, economics, and computer science show that mandatory instruction in non-core subjects can influence the choice of major, although the effects vary across subjects.

Analyzing civic education using TWFE models, we found that increasing instruction hours in this subject led to a small but significant increase in enrollment in political and social science majors in higher education. This finding aligns with the expectation that greater exposure to a subject can enhance interest in it. Prior

research has suggested that students' engagement with certain topics during school fosters increased interest, which may subsequently influence their choice of study at the higher education level. These results are also consistent with those observed in science education, which indicate that an increase in instruction time can lead to higher enrollment in STEM fields in higher education (Broecke, 2013; de Philippis, 2021).

Our analyses of the effects of both increased compulsory economics instruction and the introduction of economics as a compulsory subject show a positive, albeit small, effect. The results suggest that students' later choice of major is only slightly influenced by the subject of economics in lower secondary school. This relatively small observed effect is somewhat surprising in terms of further research but can be explained by several factors. For example, referring to the 2019 PISA results, Piepenburg and Fervers (2022) highlight that "manager" is among the most desired occupations among the students surveyed. In their study, they examine whether a lack of information contributes to the pronounced emphasis on management careers and the limited range of commonly considered options—the so-called "beaten paths"—in terms of major choices. In our context, the subject of economics may, on the one hand, reinforce some students' aspirations for a managerial career by confirming their belief that studying economics is a necessary step toward that goal. On the other hand, the introduction of compulsory courses in economics has the potential to make some students reconsider their previous preference for economics as a "default major". That is, the opportunity to engage more deeply with the subject through mandatory coursework may lead students to adjust their expectations regarding the study of economics and related career paths, resulting in more informed decisions—and, for some, a decision to opt out of economics. Although our analytical design does not allow us to identify these countervailing mechanisms, they may help explain the relatively small effect of school subjects on major choices. In addition, or as an alternative explanation, the quality of economics teaching may also play a role. In many schools, teachers without an economics specialization are assigned to teach economics, often from the social studies department, at least until appropriately trained new teachers begin teaching in about seven years after the curriculum reforms (Frohn, 2020).

The results concerning compulsory computer science courses are contradictory. On the one hand, our analysis shows a decreasing rate of major choices when the teaching time allocated to computer science is considered. On the other hand, our analysis suggests that the introduction of compulsory courses in computer science has led to an increase in the number of students choosing to major in this subject. Additional analysis indicates that these inconsistent results are due to a violation of the modeling assumptions (assumption of linear additive effect). Further, more detailed analyses indicate that the high number of planned computer science lessons in one state (Mecklenburg-Western Pomerania) suggests the presence of context-specific influencing factors that may have distorted the overall effect. The schools in this state may not have been adequately equipped with the technology needed for effective computer science teaching. In addition, qualified computer science educators were in short supply, and many teachers lacked the specialized training needed to fully engage students in the subject (Schröder et al., 2022; SWK, 2022). We assume that these factors become more important as the number of planned computer science courses increases, resulting in a decline in the quality of instruction and, consequently, in fewer students being interested in pursuing computer science as a major. Alternatively, computer science courses, similar to economics, can provide an opportunity to address students' misconceptions about the field as the number of hours increases, which can lead to a decline in interest as students come to realize that their expectations do not align with the reality of the subject. Thus, the curriculum serves not only as a point of exploration but also as a mechanism for perceptual correction and self-selection among high school students.

Several limitations to our study should be considered when interpreting the findings. First, while we controlled for unobserved heterogeneity and overall trends by design, we could not exclude the potential influence of third variables, such as concurrent reforms or changes in subject composition, which may have affected the results. Previous studies on other reforms (see section 3.1.) generally indicate no effect on major choices; however, we could not rule out the possibility of moderation effects. Additionally, implementing or adding extra hours in the subjects under investigation could lead to a reduction in hours for other subjects, potentially altering the composition of the curriculum. These changes are complex and could not be fully captured across all states over the entire study period.

Given the limited scope of existing research and the methodological constraints of our study, further research is essential to draw definitive conclusions about the impact of high school curriculum changes on students' major choices in higher education. In addition, the findings of our study (especially in the case of computer science) and the current state of research provide mixed results, which currently cast doubt on the ability to make reliable statements about the overall effects of curriculum changes. These uncertainties highlight the need for caution when drawing policy implications from the available evidence, as it may be based on an incomplete understanding of the underlying causal relationships. Consequently, more research on the effects and underlying mechanisms is needed before policy recommendations can be formulated for the concrete implementation of effective curriculum reforms. Future studies should adopt more comprehensive analytical approaches, explore the role of other reforms, the influence of specific teaching content and approaches, and investigate potential regional effects.

Additionally, our study focuses on the general effect on major choices in higher education, as most reforms did not target specific groups and were not designed to be more effective for particular subpopulations. However, research has already identified gender differences concerning major choices, highlighting the importance of analyzing effect heterogeneity across subgroups, such as gender. Prior studies have demonstrated that high school subjects can have a gender-specific influence on students' educational and career trajectories (e.g., Joensen & Nielsen, 2014; Liu et al., 2024). As stated above, exposure to certain subjects may also function as a mechanism for perceptual adjustment in various aspects, such as self-confidence in specific fields or awareness of occupational opportunities in these fields. Research has also shown gender differences in responses to career education, further emphasizing the need to consider gender-specific effects (e.g., Beckmann & Fervers, 2024). Therefore, we emphasize that our results capture only the overall effect of curriculum reforms on the investigated subjects and do not account for group-specific effects. However, based on recent research, we would expect gender differences, particularly concerning STEM subjects, as previous studies have found indications of such relationships. Since the mechanisms underlying gender-specific responses to exposure to these three subjects may vary considerably, a detailed analysis of gender-specific effects falls beyond the scope of this article and remains an important question for future research.

Overall, more robust and detailed data are needed to draw conclusions that can inform the development of educational policies aimed at more effectively shaping students' academic and career trajectories. This could include registry data that allows individual and institutional characteristics in the educational biography to be linked from at least the lower secondary level. The data sets available for Germany, such as the National Educational Panel Study (NEPS) and the Student Life Cycle Panel (SLC), only offer limited potential for analysis.

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Conflict of Interests

The authors declare no conflict of interest.

Data Availability

The data on hours of instruction in economics and computer science are available upon request from the authors. The data on civic education hours are available free of charge at: https://www.lifbi.de/de-de/Start/Daten-Services/Daten-und-Dokumentation/HISPOL. Microdata from the student statistics from 1995 to 2018 can be obtained from the Research Data Centres of the Federal Statistical Office and Statistical Offices of the Federal States of Germany: https://forschungsdatenzentrum.de/de/bildung/studenten.

Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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Preparing Transitions: The Impact of Vocational Role Models on Occupational Aspirations Within Social Contexts

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Abstract

The formation of occupational aspirations, an important prerequisite of successful school-to-work transitions, is embedded in different social contexts, including youths' families and peers. At the same time, adolescents are guided by various career orientation activities, including vocational role models, that provide them with information on available career options and stimulate career decision-making. In this study, we combine both strands of research and examine how vocational role model effects unfold in the different social contexts that students are embedded in, potentially enabling or constraining intervention effects. Based on a large-scale role model intervention study comprising 1,190 students in Germany, we first examine how peer and family contexts are associated with students' occupational aspirations as key dimensions of social influence. Our results show that both peer and parental social contexts are related to students' career aspirations, with descriptive peer norms and injunctive peer and parent norms being the most relevant. Second, we show that unique encounters with vocational role models are, on average, related to increased occupational aspirations for the presented occupation, extending previous empirical findings to the VET context. Third, we examine whether and how role modelling interacts with students' social embeddedness. We do not find statistically significant interactions between the examined social contexts and the role model intervention. Hence, role model effects apply even in contexts that convey strong norms. Nevertheless, we find subtle patterns suggesting that role model effects are more pronounced when peers convey adverse norms and less knowledge regarding an occupation and when peers' self-efficacy is high. Theoretical and practical implications are discussed.

Keywords

career orientation; intervention; occupational aspirations; role models; social contexts

1. Introduction

The school-to-work transition is a challenging task in which adolescents have to navigate their own identity and decision-making within their social environment, alongside opportunity structures and many other factors (Yates, 2021). Career orientation processes are complex and vary for each individual; nevertheless, the development of occupational aspirations typically marks a crucial starting point in shaping career trajectories (Schoon & Parsons, 2002; Sewell et al., 1969; Ziegler, 2023). From an early age, children start developing occupational aspirations in light of social contexts and perceived social norms (Gottfredson, 1981). Prior research has emphasised the impact that peer groups, parents, and socio-economic status can have on adolescents' occupational aspirations and career choices (e.g., Buchmann & Dalton, 2002; Schoon & Parsons, 2002; Sewell et al., 1969; Zimmermann, 2018, 2020). Peers' occupational aspirations and social valuation of certain occupations, both in friendship groups and classroom contexts, may establish social norms on which occupations are socially desirable (Raabe & Wölfer, 2019; Sewell et al., 1969). Furthermore, peers act as reference groups, providing knowledge and serving as a standard of comparison (Singer, 2017). Additionally, socialisation in the family, information and guidance by parents, as well as the parental educational background and parental expectations, mark another meaningful social context with regards to occupations that adolescents could or should aspire to, perhaps also with the motive of maintaining a certain social status (Boudon, 1974; Bourdieu, 1987).

To support students in navigating school-to-work transitions, secondary schools in Germany have implemented various career orientation activities. Although the empirical evidence can be described as rather scarce overall, previous studies have shown that career orientation activities can support young people, for example by broadening their career aspirations (e.g., Piepenburg & Fervers, 2022; S. L. Turner & Lapan, 2005) or increasing their career competences (e.g., Kunert & Sommer, 2023; Ratschinski et al., 2018). These findings highlight the importance of vocational guidance opportunities for increasing young people's career choice skills. Increasing aspirations for a wider range of occupations is a common goal of career guidance activities, both because young people's career aspirations are still stratified along specific social categories like gender (e.g., Barone et al., 2018; Yazilitas et al., 2013) and social status (e.g., Herbaut & Geven, 2020), and because young people have a limited field of occupational aspirations (e.g., Covacevich et al., 2021). This is even more important as the shortage of skilled workers has become more severe in Germany due to a number of factors, particularly in light of demographic change and especially in the vocational education and training (VET) sector (Bundesagentur für Arbeit, 2024; Oeynhausen et al., 2023). This makes it important to increase the visibility of occupations in this sector from a societal and policy perspective. Recently, vocational role models have been increasingly implemented in career guidance activities at school to address this issue (e.g., Athanasiadi et al., 2020). Prior research has shown that role models can increase occupational aspirations, for example among girls for academic STEM occupations (Gladstone & Cimpian, 2021; Lawner et al., 2019).

Therefore, considering that both social contexts and role model interventions have been shown to influence adolescents' occupational aspirations, we investigate how these influences interact with each other and whether vocational role models can increase students' occupational aspirations above and beyond long-term influences conveyed in peer and parental social contexts. The majority of previous intervention studies have investigated average treatment effects, which may, however, disregard the possibility that students could differ in their response to vocational role models depending on their embeddedness in different social

contexts. Perceived parental and peer contexts may alter the way students incorporate external cues from career orientation activities in their career-decision process (e.g., Bruch & Feinberg, 2017). For example, in the presence of strong normative expectations from social contexts, role modelling may be less influential, preventing students from engaging in thoughtful and reflective decision-making, an expectation routed in dual-process theories of decision-making (see, e.g., Esser, 1999; Evans & Frankish, 2009; Paternoster et al., 2011; Xu, 2021). To date, we are not aware of any study that has explicitly modelled how career and role model interventions unfold in different peer and parental social contexts. Given that social contexts influence occupational aspirations as outlined above, research on this issue is important to inform and further improve career orientation activities and their effectiveness for students in the school-to-work transition.

Thus, the aim of this study is first to investigate how different social contexts within the peer group and the family shape individuals' occupational aspirations for certain VET occupations (RQ1). In contrast to previous studies, we compare the effects of key dimensions of social influence, distinguishing between normative social influence from parents and peers, as well as informational and comparative peer effects.

Following this, the study explores how the short-term event of meeting a vocational role model in school impacts students' aspirations for the presented VET occupation, considering the influences of long-term social contexts in the family, peer group, and school (RQ2).

Lastly, this study examines whether the effect of a vocational role model on students' aspirations for the respective occupation is moderated by peer and parent social contexts, i.e., whether the vocational role model increases students' aspirations for the respective occupation more strongly in certain social contexts (RQ3).

To achieve this aim, we analysed primary data from a quasi-experimental intervention study (the BIBB-TUDa Career Orientation Study) on VET role models among a regional sample of secondary school students in Germany.

2. Theoretical Framework

2.1. The Impact of Social Contexts on Occupational Aspirations

A social context can be defined as a structure that is connected to expectations, opportunities, and restrictions for individuals, thereby influencing aspirations and behaviour (Friedrichs & Nonnenmacher, 2014). Early research has highlighted the impact of families, peers, and schools on the development of occupational aspirations, as specified in the "Wisconsin model" by Sewell et al. (1969, 1970). Accordingly, significant others shape young people's aspirations through parental expectations, friends' educational and occupational aspirations, and teachers' encouragement (Sewell et al., 1969). Social contexts become relevant through the expression of normative attitudes that shape individuals' perceived opportunities and restrictions (Friedrichs & Nonnenmacher, 2014). A common distinction of social norms affecting a person's actions is made between injunctive norms "which [guide] the behaviour via the perception of how most others would approve/disapprove of a person's conduct," and descriptive norms "which [guide] the behaviour via the perception of how most others would behave" (Cialdini et al., 1991, p. 201). In addition, social contexts can be understood as opportunity structures that provide resources and transmit knowledge via informational social influence (Guimond, 1997). Finally, social contexts can act as a frame of reference in

students' career orientation process and provide grounds for comparative social influence (Festinger, 1954). As prior research suggests, peers and parents are particularly influential in students' career orientation process (e.g., Raabe & Wölfer, 2019; Zimmermann, 2020). Respective theoretical and empirical findings are outlined below.

2.1.1. Peer Influences

Throughout adolescence, the school context and classmates become more important as a frame of reference for young people as they spend time together and share similar developmental tasks and transitions (LaFontana & Cillessen, 2010; Wicht & Ludwig-Mayerhofer, 2014). Although there is empirical evidence that close friends may be more relevant to educational decisions in comparison to loose ties (e.g., Rubineau et al., 2024), classroom contexts remain structurally relevant for students' career decision-making. For example, Raabe and Wölfer (2019) have shown that both the educational aspirations of the friendship group and the educational aspirations of classmates are relevant to the development of students' educational aspirations. Peer effects can be related to the development of occupational aspirations via normative social influence, informational social influence, and social influence based on social comparison (e.g., Festinger, 1954; Laursen & Veenstra, 2021; J. C. Turner, 1991).

First, in the process of peer socialisation, similar sets of values and norms are transmitted such that students become more similar to their peers in their attitudes and aspirations through norm enforcement (Laursen & Veenstra, 2021). The desire to be accepted by the peer group is strong in adolescence (e.g., Kiesler, 1969; Osterman, 2000). Peer conformity is routed in the desire to belong and gain status, maintain a positive self-concept, and make accurate decisions (Cialdini & Goldstein, 2004; Laursen & Veenstra, 2021). Different studies have empirically assessed this, showing, for example, that individual aspirations are related to the average aspirations in the classroom (e.g., Raabe et al., 2019; Raabe & Wölfer, 2019; Zimmermann, 2020). Accordingly, we expect that students express higher aspirations towards a VET occupation when their classmates also have higher aspirations for this occupation (H1a, descriptive normative peer effects).

Such normative peer effects might also be injunctive in nature in the way that students consider their peers' social approval or disapproval of occupations in their career choice process, which might be negatively framed as "peer pressure" (Clasen & Brown, 1985; Laursen & Veenstra, 2021). For example, students tend to adjust their aspirations to those of their friends (e.g., Raabe et al., 2019). Hence, we expect that students express higher aspirations towards a VET occupation when they expect a higher social valuation of this occupation by their peers (H1b, injunctive normative peer effects).

Second, peer influence can be informational in nature, contributing to gain representations of reality (Festinger, 1954). Career choices can be thought of as a decision-making task under high uncertainty since students may not be perfectly informed about all of the available career options. Therefore, social influence from classmates can contribute to students' knowledge about specific occupations through the dissemination of information in daily interaction. Hence, we expect that students express higher aspirations towards a VET occupation when their classmates are well informed about this occupation (H1c, informational social influence).

Third, peer effects may become relevant through social comparison processes. Social comparison is a fundamental need of human behaviour that serves to evaluate one's own abilities, goals, and ambitions by comparing oneself to others (Festinger, 1954). Accordingly, individuals may adjust their aspirations or

behaviour based on how they perceive themselves relative to others. A reoccurring finding in the literature suggests that at the same level of ability, students will develop more negative academic self-concepts in the presence of higher-achieving peers through negative upward comparisons, known as the big-fish-little-pond effect (Marsh, 1987). A comparable relationship has also been found for the development of occupational aspirations (Nagengast & Marsh, 2012); for example, youths develop lower aspirations for STEM fields when the overall classroom environment displays high mathematical achievement (Mann et al., 2015; Beckmann, 2021). In the setting of career orientation, individuals may, therefore, adjust their occupational aspirations based on comparisons with their classmates. If students perceive their classmates as more successful and confident regarding a specific occupation, they might be more reluctant to express an aspiration toward it, in line with negative upward comparisons suggested by the big-fish-little-pond effect. Thus, we expect that students express lower aspirations towards a VET occupation when their classmates show higher levels of self-efficacy for this occupation (H1d, comparative social influence).

2.1.2. Parent Influences

Socialisation processes in the family, such as informational, motivational, and guidance functions of parents as well as the parental educational background and their expectations have been shown to impact children's educational and occupational aspirations (e.g., Breen & Jonsson, 2005; Broschinski et al., 2022). Bourdieu (1987) emphasised the socialisation function of parents concerning class-specific experiences that differ depending on the educational context of parents and shape work-related family values and norms. These values and norms are "adapted" by the growing children (Bourdieu, 1987). Class-specific educational inequalities and their effects on aspirations and educational pathways have received major focus in empirical research (e.g., R. Becker & Hecken, 2008; B. Becker & Tuppat, 2013; Kleinert & Jacob, 2024). Recent administrative German data shows a strong link between family socio-economic background and children's career development (Autor:innengruppe Bildungsberichterstattung, 2024). Further, not only educational status but also occupations tend to be transmitted from parents to their children (Mischler & Ulrich, 2018). According to parents' socio-economic background and class-specific family experiences and socialisation, adolescents whose parents have a vocational qualification may aspire more often towards VET occupations than children with an academic family background. We therefore expect that students' aspirations towards a VET occupation are lower when parents have an academic degree compared to students whose parents have a VET degree or no occupational degree (H2a, descriptive normative parent effects).

The Wisconsin Model (Sewell et al., 1969, 1970) postulates a significant impact of parental expectations on adolescents' occupational aspirations. The desire for belonging and social appreciation through parents is especially strong for career choices when adolescents seek to build their own social identity (Gottfredson, 2005). There is strong empirical evidence that adolescents take the occupational expectations of their parents into account (e.g., Fischer-Browne, 2022; Matthes, 2019; Schoon & Parsons, 2002; Zimmermann, 2020), perhaps to fulfil parents' interest in maintaining a social status (Boudon, 1974) and to avoid social costs for example through family conflict (Schmaus et al., 2024). Hence, we expect that students express higher aspirations towards a VET occupation when they expect a higher social valuation of this occupation from their parents (H2b, injunctive normative parent effects).

Figure 1 conceptually summarises the outlined hypotheses regarding the impact of peer and parent contexts on occupational aspirations.

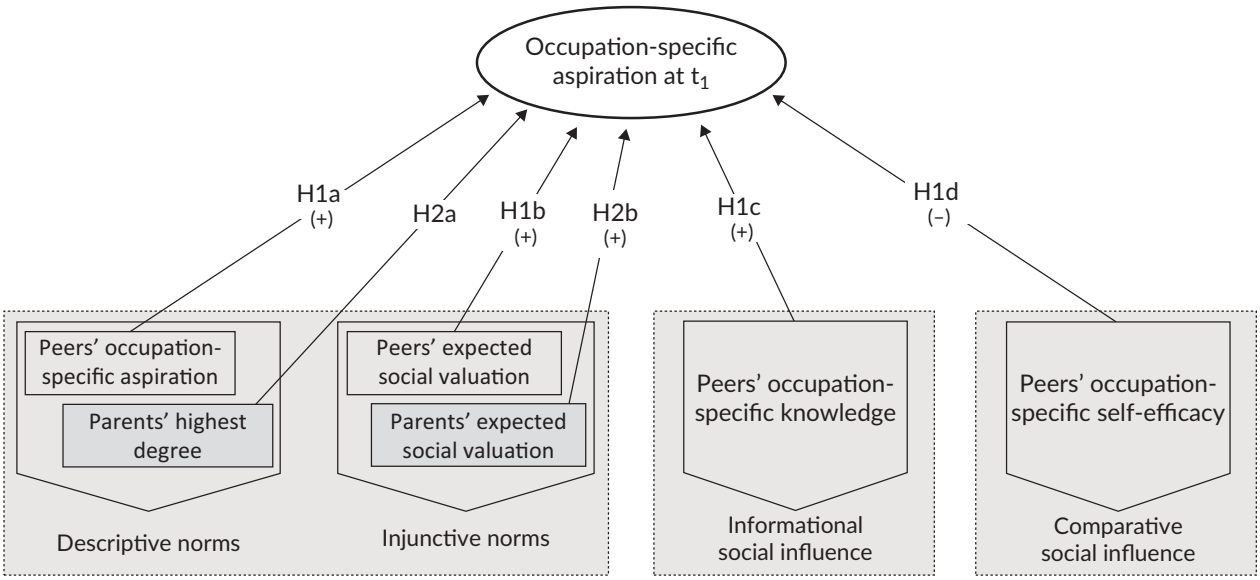

Figure 1. Hypotheses: The association of social context characteristics and occupational aspirations.

2.2. The Impact of Vocational Role Models on Occupational Aspirations

Career choice is a complex, long-lasting process shaped by individuals' identities, interests, and abilities, among other restricting and enabling factors (e.g., Yates, 2021). In addition to the long-term social contexts outlined above, research points to the relevance of short-term vocational guidance interventions for the development of students' occupational aspirations (e.g., career workshops; see Jemini Gashi et al., 2023; Mutlu et al., 2023; Piepenburg & Fervers, 2022; S. L. Turner & Lapan, 2005). These guidance activities stimulate students' career decision-making, for example, by educating them about the world of work or even about students themselves, facilitating the cognitively demanding task of choosing among available career options. Even if career guidance activities are incidental, they may create new insights and opportunities, as posited by the happenstance learning theory (Krumboltz, 2009; Mitchell et al., 1999). Vocational role models present another short-term career orientation approach. As Morgenroth et al. (2015) argue, role models have three main functions:

> (a) [They] show us how to perform a skill and achieve a goal—they are *behavioral models*; (b) they show us that a goal is attainable—they are *representations of the possible*, and (c) they make a goal desirable—they are *inspirations*. (p. 467)

Thus, vocational role models may function as a career orientation approach that is not only based on providing information but also involves motivational and emotional cues while offering opportunities for identification. Role models may increase the motivation both for existing goals and also inspire new goals by increasing the subjectively expected probability of success and the subjective value connected to these goals (expectancy-value theories of motivation; Morgenroth et al., 2015). In their systematic review of STEM role models, Gladstone and Cimpian (2021) propose that role models are "individuals who can positively shape a student's motivation by acting as a successful exemplar" (p. 1). Social learning theory (Bandura, 1972) highlights the relevance of observational learning for developing career aspirations, adapting and imitating behaviour by observing others perceived as similar and identifiable. In the process of students developing their career orientation, we can assume that vocational role models of similar age may stimulate

students' thoughtful and reflective decision-making about their attitudes and valuation of the presented occupation, as students process new information about the presented occupations through the personal and motivational insights of role models. There is abundant empirical evidence, mainly for academic STEM occupations, that even short-term role models can contribute to increasing STEM aspirations (e.g., Gladstone & Cimpian, 2021; Lawner et al., 2019). The role model's perceived competence, whether their success was perceived as attainable, and the perceived similarity to students have been shown to moderate STEM role model effects (Gladstone & Cimpian, 2021). From a theoretical perspective, gender is a crucial dimension in the role modelling process, first, because gender is a relevant social category in identification and social influence processes (e.g., Spears, 2021) and, second, because counter-stereotypical role models may provide relevant counter-evidence to break stereotypes related to gender-skewed occupations (e.g., Stout et al., 2011). The empirical evidence is, however, less clear and provides inconclusive results on gendered role modelling effects (see, e.g., Carsten Conner & Danielson, 2016; Cheryan et al., 2011; Stout et al., 2011).

We suppose that the theoretical and empirical arguments outlined above can also be applied to role models in VET occupations. Therefore, we expect that vocational role models will, on average, increase students' aspirations for the presented VET occupation (H3).

2.3. The Interrelation of Vocational Role Models and Social Contexts

As outlined above, vocational role models mark a short-term social influence that may encourage reflection on potential career options. According to the model of frame selection (MFS) by Esser (1999) and Kroneberg (2005, 2010, 2014), individuals follow an *automatic-spontaneous* (as) mode or a *reflecting-calculating* (rc) mode in their actions and decision-making. The interpretation of a situation (frame selection) and normative influences or other internalised routines shape which mode individuals will use (Kroneberg et al., 2010). According to the MFS, the as-mode is more likely to be activated when stronger and unambiguous norms are perceived for the situation, and a clear action script is available, reducing the time, energy, and mental effort needed to decide on actions (Kroneberg, 2014). Individuals will be more likely to follow the rc-mode in uncertain situations, ambiguous scripts, or unclear social norms (Esser, 1999; Kroneberg, 2005). In the rc-mode, individuals evaluate the available alternatives according to the subjective expected utility with calculated incentives (i.e., costs, benefits, and expectations), with social norms being just one of many other factors taken into account (Kroneberg et al., 2010). Career decision-making can theoretically be assumed to involve both processes: If strong norms and clear action scripts are perceived, individuals are assumed to follow the as-mode, thereby reducing the complexity of occupational choice. Adolescents are also assumed to weigh career options and, according to the rc-mode, take a variety of options into account, for example, when considering their personal professional interests and how they match with occupations (e.g., Holland, 1997).

Applied to a vocational role model intervention, the MFS suggests that new information and different viewpoints transmitted through a vocational role model are considered in the rc-mode, unless strong social norms prevent students from reflective thinking and, therefore, they stay in the as-mode and follow the perceived normative action scripts from their social environment. Therefore, we would expect that vocational role models can affect aspirations for their presented occupation more strongly when social norms are less salient. This would imply that both affirmative and opposing norms towards the presented VET occupation would be associated with smaller role model effects and that more neutral normative

positions by peers and parents allow for more reflective thinking and, hence, result in a stronger role model effect on occupational aspirations. However, in line with empirical findings on peers' and parents' influences on occupational aspirations outlined in Sections 2.1.1 and 2.1.2, we expect that also the effect of a vocational role model intervention on increasing aspirations for the presented occupations is influenced (i.e., moderated) by peers' and parents' social context characteristics. In particular, we expect individuals to seek conformity with the descriptive and injunctive norms they perceive from parents and peers (Cialdini & Goldstein, 2004; Laursen & Veenstra, 2021). Non-conformity with social norms could carry social costs, which are assumed to be highly relevant in the subjective expected utility assessment, given the substantial empirical findings on parental and peer influences on occupational aspirations. Hence, we expect that vocational role models will increase students' aspirations for the presented VET occupation more strongly when this occupation is supported by affirmative descriptive and injunctive norms by parents and peers (H4a).

With regards to informational peer effects, we expect that vocational role models will increase students' aspirations for the presented VET occupation more strongly when classmates have less knowledge about this occupation before the intervention (H4b), as the role model could function as an alternative information channel to peers outlined in Section 2.2.

With regards to comparative peer effects, we expect that when peers display a high degree of occupation-specific self-efficacy, this may pose a barrier for students to adapt their aspirations toward the presented occupation. Hence, we expect that vocational role models will increase students' aspirations for the presented VET occupation more strongly when classmates show lower levels of self-efficacy for this occupation (H4c), in line with the big-fish-little-pond effect outlined in section 2.1.1.

Figure 2 conceptually summarises the outlined hypotheses regarding the impact of vocational role models on occupational aspirations and the moderating effects of peer and parent contexts.

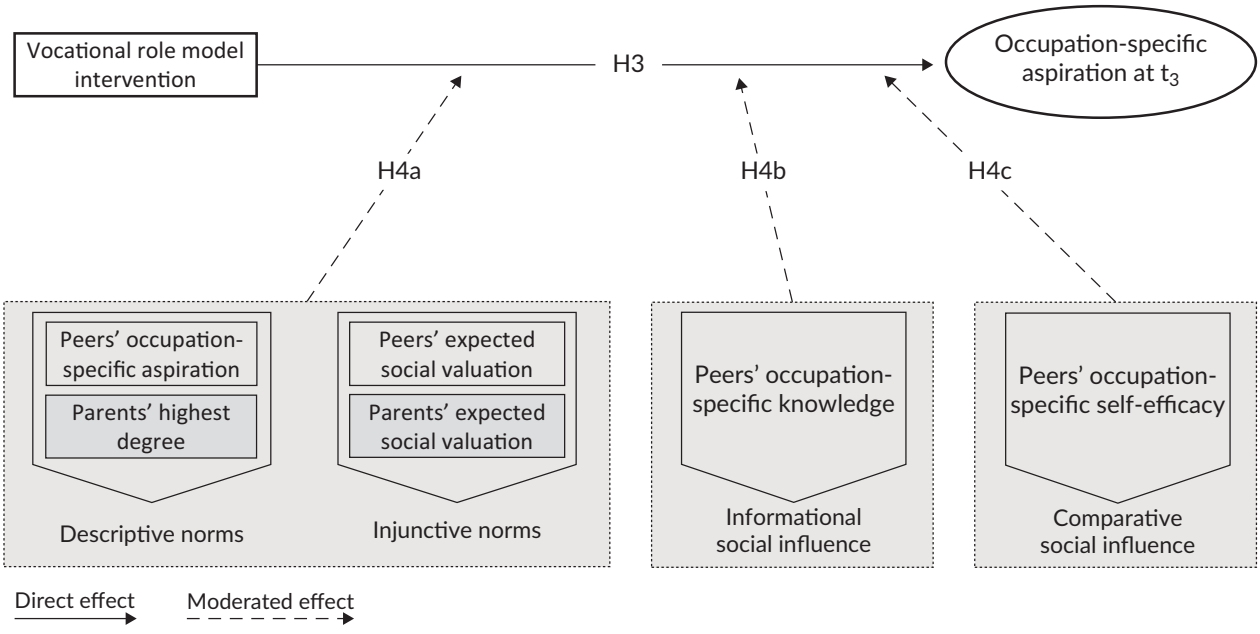

Figure 2. Hypotheses: Treatment effect and effect heterogeneities by peer and parent context characteristics.

3. Methodology

3.1. The Vocational Role Model Intervention

The "VET ambassadors" (German: *Ausbildungsbotschafter*), a career orientation initiative, was implemented by different local chambers of industry and commerce and chambers of crafts in Germany, in support of regional governments and the Federal Ministry of Education and Research. The aim is to strengthen the visibility and attractiveness of VET and to broaden students' occupational aspirations (MAGS NRW, n.d.). To achieve this goal, apprentices (typically in their second or third year of apprenticeship) visit secondary school classes and present their vocational occupations. During a 45–60 minute presentation, usually, two or three VET ambassadors provide information and personal insights on different topics related to their VET occupation, for example, daily tasks, work conditions, career progression opportunities, their career choice, and how their social environment reacts to their occupation. Afterwards, they answer students' questions. The presented occupations cover many different fields from the dual VET system, for example, IT, commercial occupations (e.g., office management), or crafts (e.g., electricians).

As part of the BIBB-TUDa Career Orientation Study (German: BIBB-TUDa-Berufsorientierungsstudie), conducted jointly by our team at the Federal Institute for Vocational Education and Training (BIBB) and the Technical University of Darmstadt (TUDa), over 70 visits by VET ambassadors at a regional sample of secondary schools in North Rhine-Westphalia were evaluated in terms of their effect on individuals' aspirations for the presented VET occupations. In a quasi-experimental research design (Figure 3), data was collected from students immediately before the VET ambassadors' presentation (survey t_1, pre-measure), immediately after the intervention (survey t_2), and approximately seven to 11 weeks (Median: 8.14, IQR: 7.00–11.00, Range: 4.00–13.29) after the role models had visited the school (survey t_3, post measure).

The sample depended on schools taking part in the VET ambassadors project as organised by regional chambers of industry and commerce and chambers of crafts. Schools were assigned to the treatment group and the control group pragmatically based on the regional chambers' coordination. The control group participated in the intervention after the post-measure was collected (Median distance between measurements: 6.00 weeks, IQR: 4.29–10.43, Range: 4.00–25.00). At least two classes participated per school. In most cases, schools either participated as part of the treatment group or the control group.

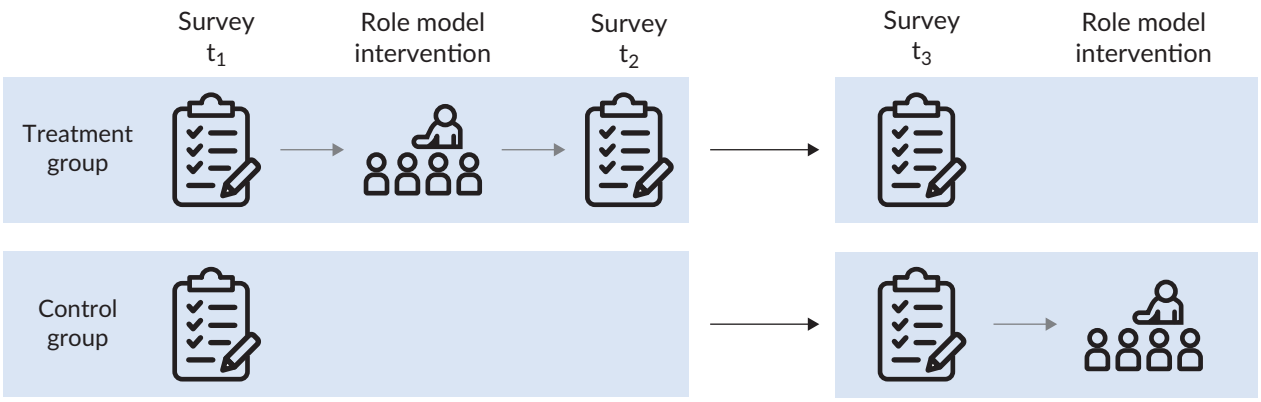

Figure 3. Quasi-experimental research design of the BIBB-TUDa Career Orientation Study.

However, at some schools, data was collected both for classes in the treatment group and the control group, but in different school years. Data collection took place in the school years 2021–2022 and 2022–2023 through a self-administered pencil-and-paper or online questionnaire in the classroom setting. The pre- and post-measures data were later linked through self-generated identification codes (SGIC).

3.2. Measures

3.2.1. Occupation-Specific Aspiration

The participants were asked at t_1 and t_3 to respond to two items on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*) if they would like to do an apprenticeship or work in the VET occupation presented by the VET ambassador. The average score of these two items was computed to receive an overall score of the individual's aspiration for this occupation. The internal reliability of this measure was high with Cronbach's $\alpha = .938$ in t_1 and $\alpha = .950$ in t_3.

3.2.2. Peers

Characteristics of peer group contexts were either computed as aggregate classroom measures based on students' responses at t_1 or reflect students' individual perceptions of their friendship group.

Peers' occupation-specific aspiration for occupations presented by the VET ambassadors was computed as the average value of all students' occupation-specific aspirations in each classroom context. The resulting aggregate occupation-specific aspiration in each classroom was used to operationalise *descriptive normative peer effects*.

Peers' occupation-specific knowledge of occupations presented by the VET ambassadors was computed as an aggregate variable based on how well students in the classroom reported knowing the occupation and if they could picture what someone working in this occupation does (Cronbach's $\alpha = .723$). Higher values on the 5-point scale indicate better knowledge of the specific occupation. This measure was used to operationalise *informational peer effects*.

Peers' occupation-specific self-efficacy for occupations presented by the VET ambassadors was computed as an aggregate variable based on how students in the classroom agreed to the two statements that they are confident in their ability to learn the occupation and that they would have a good chance of securing an apprenticeship in this occupation (Cronbach's $\alpha = .859$). Higher values on the 5-point scale indicate higher self-efficacy with regard to the specific occupation. This measure was used to operationalise *comparative peer effects*.

Peers' expected social valuation of the specific occupation presented by VET ambassadors was assessed through a combined score for two items, asking students if they expect to receive social approval from their friends for working in this occupation and if they think that their friends would find it 'cool' if they worked in this occupation (Cronbach's $\alpha = .861$). Higher values on the 5-point scale indicate higher expected social valuation for the specific occupation. In contrast to the other peer group characteristics, this variable is not related to classmates and thus not aggregated at the classroom-level but aims at the individual's *friends*, who may or may not be in the same class. This measure was used to operationalise *injunctive normative peer effects*.

3.2.3. Parents

Characteristics of parent contexts were measured based on students' responses at t_1.

Parents' expected social valuation of the specific occupation presented by VET ambassadors was assessed similarly to peers' expected social valuation of the presented occupation. Students responded on a scale from 1 to 5 how they agree with two statements that they would receive social approval from their parents for working in this occupation and if they think that their parents would like it if they worked in this occupation (Cronbach's $\alpha = .896$). This measure was used to operationalise *injunctive norms for parents*.

Parents' highest degree was categorised based on students' responses for each of their parents. If both parents had no occupational degree or the information was unknown for one of the parents, they were categorised as (1) *no occupational degree*. Students with *at least one parent with VET degree* were categorised as (2). If at least one parent had an academic degree and the other parent had a VET degree, no degree, or the information was unknown, they were categorised as (3) *at least one parent with academic degree*. If both parents had an academic degree, they were categorised as (4) *both parents with academic degree*. The final group (5) captures students who did not know their parents' degree, did not answer, or provided invalid responses. This measure was used to operationalise *descriptive norms for parents*.

3.2.4. Control Variables

Control variables were used to account for differences between treatment and control groups at baseline:

- *Gender*: Students were asked to respond if their gender was male (0), female (1), or diverse (2).
- The individual scores of the respective peer aggregate variable outlined above were used as control variables for *individual occupation-specific knowledge* and *individual occupation-specific self-efficacy*.
- *General occupational aspirations*: A dummy variable captured whether students indicated they might have already developed their own occupational aspirations (1) or that they did not yet have any specific occupational aspirations (0).
- *Language spoken at home*: Students were asked about languages they learned as a child in their family home, which we used as an approximate measure of migration background. Category (0) includes all students who learned only German and category (1) includes students who responded that they also learned other languages than German in their family home. It should be noted that this measure represents an approximation of migration background, as not all people with a migration background learn other languages than German in their family home.
- *School type*: The school system in Germany is federally administered. In North Rhine-Westphalia, students leave primary school after grade 4 at 10 or 11 years of age and continue secondary school in either of four different school types: (0) lower secondary school (*Hauptschule*), (1) intermediate secondary school (*Realschule*), (2) upper secondary school (*Gymnasium*), or (3) comprehensive school (*Gesamtschule*).
- *School grade level*: The grade level accounts for students' approximate age and prior career orientation activities.
- *Occupation*: The 18 occupations used in the "occupation-specific" survey questions were used as a categorical control variable to account for occupation-specific differences, for example, in terms of

popularity, social valuation, or gender distributions within these occupations. For the treatment group, the surveyed occupation corresponded to the occupation presented by the VET ambassadors.
- *Distance between pre- and post-measures*: The distance between the surveys at t_1 and t_3 was controlled for when examining treatment effects.

3.3. Sample Description

A total of 2,396 participants were surveyed at the outset of the study, of which 1,614 students (67.36%) participated both at t_1 and t_3. The sample attrition is mainly due to students' absence on survey days and failure to match some participants due to missing matching information. After preparing the data for analysis, 1,190 students (77 classes) from 20 different schools comprised our study sample. Since most classes were visited by two VET ambassadors (71.03% of students; 20.90% of students were visited by one VET ambassador and 8.07% were visited by three VET ambassadors), each presenting their occupation, the data results in 2,012 occupation-specific observations used for analysis. Due to this data structure, students of the treatment group were included once or twice in the sample when they were visited by one or two VET ambassadors, respectively. In the case of three VET ambassadors, students were surveyed only for two of the VET ambassadors' occupations. Participants with missing information on any of the measures outlined above were excluded from the study's sample (n = 134). Further, data on each VET occupation presented by ambassadors had to be available for both the treatment and the control group in order for the occupation to be included in the present study. With these sample restrictions in place, no participants in upper secondary school remained in the sample for analysis. The demographic information of the final study sample (n = 1,190 individuals) is displayed in Table 1 for the treatment and control groups, respectively.

3.4. Analysis

3.4.1. Specification of the Multilevel Model

Three-level multilevel models were used to account for the hierarchical data structure of occupation-specific and repeated observations (level 1) being nested in individuals (level 2) who are nested in classrooms (level 3). First, a cross-sectional intercept-only multilevel model of the occupation-specific aspiration as dependent variable was conducted to assess the variance components for the higher levels. The estimated variance component of the classroom intercepts was 0.030 (CI 0.016–0.059), which was rather small but statistically significant. The intraclass correlation (ICC) indicated that the classroom level accounted for 3.26% of the total variance. To account for the nesting of classrooms within schools, cluster robust standard errors at the school level were calculated. All statistical analyses were conducted using Stata 18.

3.4.2. Cross-Sectional Analyses at t_1

To examine the association of social context characteristics and occupation-specific aspirations at baseline (RQ1; Figure 1), random intercept fixed slope multilevel models of students' occupational aspirations and the characteristics of peers and parent contexts were conducted with the baseline sample at t_1. We conducted random intercept and fixed slope models because we theoretically expect differences in the intercepts between classes depending on classmates' characteristics but similar impacts (i.e., slopes) of the normative, informational, and comparative social influences in each class. The model presented in this article considered

Table 1. Sample characteristics.

Characteristic	Treatment Group		Control Group		Total	
	n	%	n	%	n	%
Gender						
Male	390	53.50	256	55.53	646	54.29
Female	329	45.13	198	42.95	527	44.29
Diverse	10	1.37	7	1.52	17	1.43
Language spoken at home						
Only German	326	44.72	170	36.88	496	41.68
(Also) other languages than German	403	55.28	291	63.12	694	58.32
School type						
Lower secondary school (Hauptschule)	131	17.97	84	18.22	215	18.7
Intermediate secondary school (Realschule)	58	7.96	195	42.30	253	21.26
Comprehensive school (Gesamtschule)	540	74.07	182	39.48	722	60.67
School grade level						
9^{th} grade	525	72.02	439	95.23	964	81.01
10^{th} grade	204	27.98	22	4.77	226	18.99
Parents' highest degree						
No occupational degree	35	4.80	26	5.64	61	5.13
At least one parent with VET degree	293	40.19	184	39.91	477	40.08
At least one parent with academic degree	146	20.3	82	17.79	228	19.16
Both parents with academic degree	67	9.19	26	6.64	93	7.82
Non-response/don't know/invalid response	188	25.79	143	31.02	331	27.82
Total	729		461		1190	

all social context variables in a joint model, which allows us to compare the relative contribution of each social context characteristic. All continuous variables were z-standardised.

3.4.3. Pre/Post Analyses (t_1, t_3)

To assess the intervention effect (RQ2; Figure 2), we compared the observed pre/post change in the treatment group with the change we observed in the control group used as a counterfactual. The difference in the changes between treatment and control group corresponds to the average treatment effect on the treated (ATT; see Shadish et al., 2002). First, we identified the ATT with a random intercept fixed slope multilevel model of students' occupational aspirations on the treatment indicator. Technically, this model comprises a cross-level interaction term between treatment assignment (level 3) and the wave (t_1 or t_3; level 1). Control variables were included to account for baseline differences between treatment and control group. Second, to investigate whether the treatment effect varies by different social context characteristics (RQ3; Figure 2), we introduced a three-way interaction with the relevant social context variable (i.e., interacting treatment status with the wave and the social context variable).

4. Results

4.1. Descriptives

The average occupation-specific aspiration across all surveyed occupations was M = 1.825 (SD = 0.955) for the treatment group, which was statistically significantly lower than the average occupation-specific aspiration of the control group with M = 1.945 (SD = 0.971) (t[2010] = 2.779, p = 0.006). On the scale ranging from 1 to 5, this indicates that the average occupational aspiration was rather low, with a strong positively skewed distribution and an interquartile range from 1 to 2.5 due to a bulk of responses at the lower end of the scale (see Figure A1 in the Supplementary File). For further analyses, the outcome variable was z-standardised to assess the impact of predictor variables in terms of standard deviations from the mean value.

4.2. How Are Social Contexts Associated With Occupational Aspirations at Baseline (t_1)?

Table 2 shows the multilevel model exploring the impact of each social context characteristic on students' occupation-specific aspirations at t_1 while considering individual control variables. Peers' occupation-specific

Table 2. Baseline model examining the association of social context characteristics and occupational aspirations.

Peer context	*b*
Occupation-specific aspiration	0.265***
Occupation-specific knowledge	–0.071***
Occupation-specific self-efficacy	–0.117***
Expected social valuation of the occupation	0.112**
Parent context	***b***
Expected social valuation of the occupation	0.198***
Highest degree (Ref. Both parents with academic degree)	
No occupational degree	0.046
At least one parent with VET degree	< –0.001
At least one parent with academic degree	< –0.001
Non-response	0.091
Control variables	***b***
Gender (Ref. male)	
Female	–0.065
Diverse	–0.173
Language spoken at home: (also) other languages than German	0.170***
School type (Ref. lower secondary)	
Intermediate secondary	–0.028
Comprehensive	–0.044
School grade level (10^{th} grade, ref. 9^{th} grade)	–0.017
Individual occupation-specific knowledge	0.230***
Individual occupation-specific self-efficacy	0.329***
Listed general occupational aspirations (yes)	–0.160***

Notes: * $p < .05$; ** $p < .01$; *** $p < .001$; n = 2,012; the coefficients for the presented occupations are not presented in this table.

aspiration for the presented occupations and both peers' and parents' expected social valuation of these occupations were statistically significant predictors of students' occupation-specific aspirations. Thus, the influence of descriptive norms by peers (H1a) and injunctive norms by peers (H1b) and parents (H2b) was supported by our findings, with the descriptive normative peer influence (peers' occupation-specific aspiration) being the strongest predictor in the model followed by the injunctive normative parental influence (parents' expected social valuation). When the occupation-specific aspiration among classmates increased by one standard deviation, the model predicted that individual students' aspirations for this occupation increased by .265 standard deviations. Peers' occupation-specific knowledge and peers' occupation-specific self-efficacy also had a statistically significant impact and were negatively associated with the student's aspiration for the presented occupation under consideration of all other social context characteristics. Thus, H1c expecting a positive association with informational peer effects was rejected and H1d expecting a negative association with comparative peer effects was supported: When peers' occupation-specific self-efficacy increased by one standard deviation, the model predicted that the individual students' occupation-specific aspiration decreased by −0.117 standard deviations. The parents' highest degree appeared to have no impact on students' occupation-specific aspirations. Thus, the influence of descriptive norms by parents (H2a) was not supported by our findings. The impacts of peer and parent social context characteristics are visualised in Figure 4.

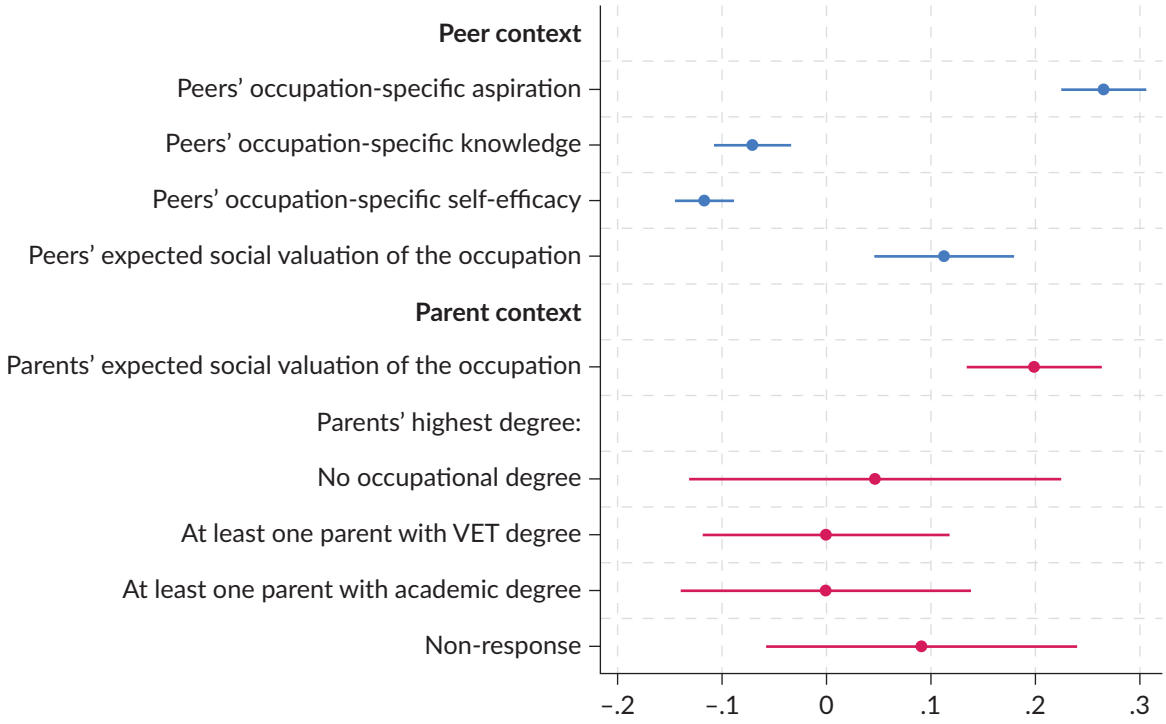

Figure 4. Illustration of the impacts of social context characteristics on occupational aspirations at baseline.

4.3. What is the Effect of Vocational Role Models on Occupational Aspirations?

Against the background of the associations outlined above, we examined whether vocational role models affect students' occupational aspirations for the occupations presented by VET ambassadors while controlling for peer and parent context characteristics. The model yields a statistically significant interaction

term ($p < 0.001$) between the wave and the treatment status, indicating that the treatment and control groups significantly differ in their pre-post changes. Figure 5 shows that the average pre-post change in aspirations is close to zero for the control group (0.004 SD) and positive for the treatment group (0.151 SD). This corresponds to an ATT of 0.148 standard deviations (corresponding to 0.141 scale points). Participating in the role model intervention is therefore associated with an average increase in aspirations for the presented occupation, thus supporting H3.

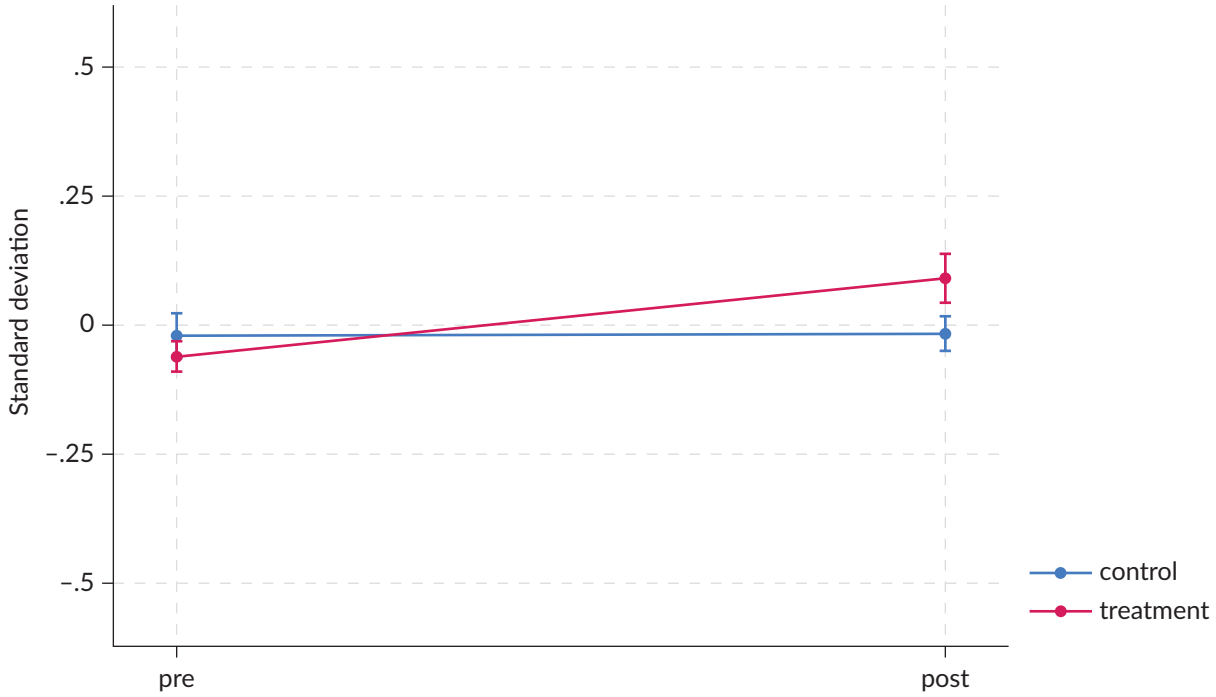

Figure 5. Pre/post changes in occupation-specific aspirations and treatment effect

4.4. Do Vocational Role Model Effects Vary by Students' Embeddedness in Different Social Contexts?

To assess whether the ATT differed by students' social embeddedness, we first inspected the three-way interaction terms between treatment status, wave, and the different peer and parent social contexts, as displayed in Table 3. None of the interaction terms reach statistical significance, suggesting that differences in the treatment effect between the examined social contexts cannot be precisely estimated (potentially also due to lower statistical power for the upper and lower ends in the distribution). Taking this into account, we next inspected the substantive meaning of the effect sizes as recommended by Bernardi et al. (2016). Figures 6 and 7 display the predicted ATT along the distribution of the peer and parent social context variables in standardised units. Some noteworthy patterns emerge. First, regarding the peer contexts in Figure 6, we find three negative associations between the context characteristic and the size of the treatment effect. Treatment effects are larger in size when peers' aspirations for the presented occupation are less pronounced, when peers' occupation-specific knowledge is relatively low, and (to a smaller extent) when peers' expected social valuation of the occupation is lower. For example, when classmates express an average occupation-specific aspiration of two standard deviations below the mean, the treatment effect is approximately 0.20 standard deviations, whereas, for classroom contexts characterised by strong aspirations for the respective occupation of two standard deviations above the mean, the treatment effect is rather

small with approximately 0.04 standard deviations. This finding is contrary to H4a, expecting a positive association for descriptive and injunctive peer norms. With regards to parental descriptive and injunctive norms (Figure 7), no particular patterns emerge, therefore not supporting H4a either. The negative association pattern regarding peers' occupation-specific knowledge in Figure 6 supports H4b; however, it does not have statistical significance. A positive association is visible for peers' occupation-specific self-efficacy such that a lower self-efficacy expressed by classmates is associated with a smaller treatment effect (of approximately 0.09 SD when the classmates' occupation-specific self-efficacy is 2 SD below the mean) and classrooms characterised by a high degree of self-efficacy (i.e., 2 SD above the mean) are associated with a larger treatment effect of approximately 0.19 standard deviations. This was contrary to the expectations from H4c concerning comparative social peer influence.

Table 3. Effect heterogeneities in the intervention effect by different social context characteristics.

	Three-way interaction: Pre/post #treatment #social context variable
Peer context	*b*
Occupation-specific aspiration	–0.041
Occupation-specific knowledge	–0.042
Occupation-specific self-efficacy	0.022
Expected social valuation of the occupation	–0.030
Parent context	*b*
Expected social valuation of the occupation	0.011
Highest degree (Ref. Both parents with academic degree)	
No occupational degree	0.338
At least one parent with VET degree	0.276
At least one parent with academic degree	0.083
Non-response	0.207

Notes: * $p < .05$.

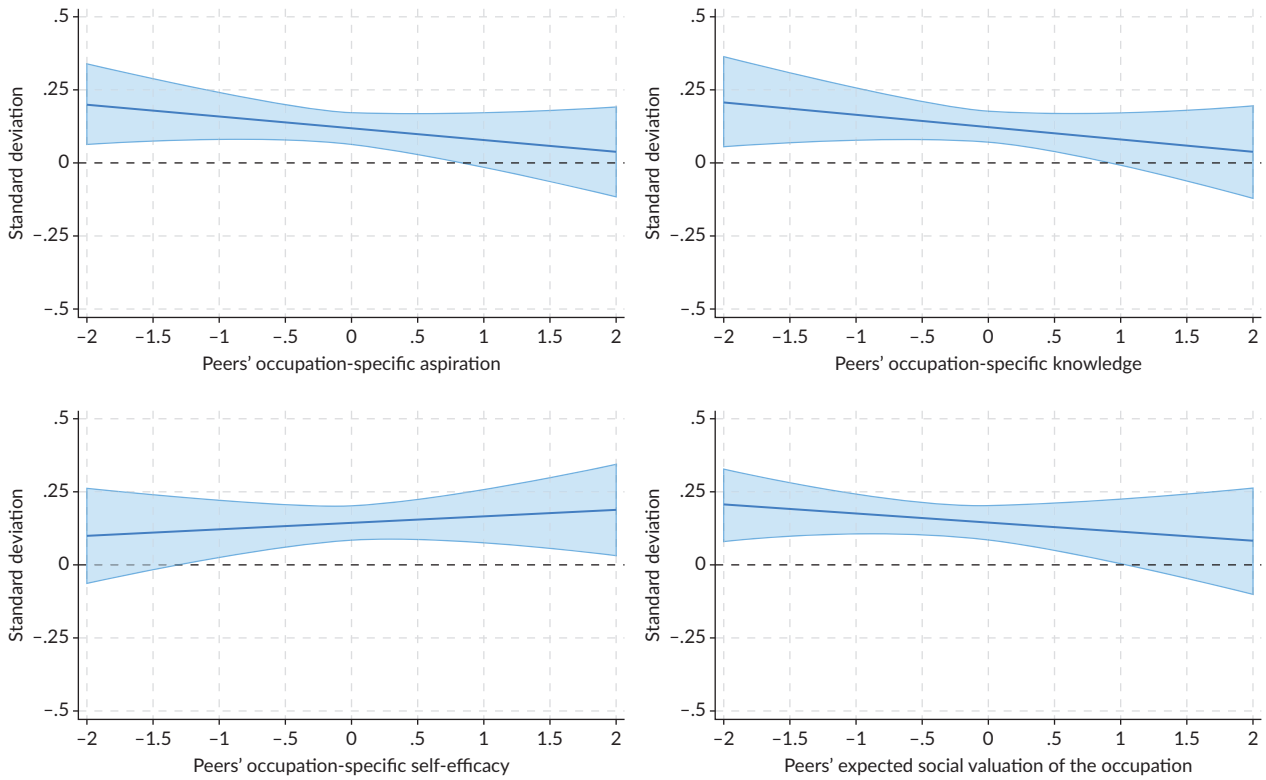

Figure 6. Intervention effects by peer social context characteristics. Notes: Based on regression results displayed in Table 3; the x-axis refers to the peer context in terms of standard deviations below/above the mean denoted as 0.

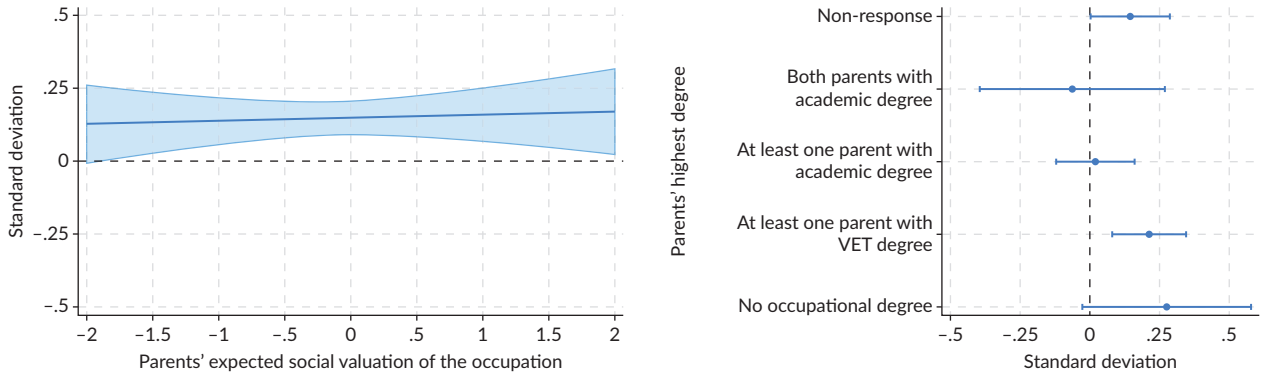

Figure 7. Intervention effects by parental social context characteristics. Notes: Based on regression results displayed in Table 3; the x-axis refers to the parent context in terms of standard deviations below/above the mean denoted as 0.

5. Discussion

The results of our quasi-experimental study explored short-term social influence effects from vocational role models as well as long-term social influences from social context characteristics for students' career orientation processes, and the interrelation of both. Using students' occupational aspirations as outcome variable, we addressed an important developmental outcome in students' career orientation processes

related to after-school pathways and career choices, which is highly relevant for successful school-to-work transitions (Schoon & Parsons, 2002; Sewell et al., 1969).

Overall, our findings resonate with previous studies showing a strong link between different social context characteristics and occupational aspirations (e.g., Cialdini & Goldstein, 2004; Fischer-Browne, 2022; Raabe & Wölfer, 2019; Zimmermann, 2020) in terms of injunctive social norms by parents and peers and descriptive social norms for peers among a regional sample of secondary school students in Germany. Unexpectedly, parents' highest degree as a descriptive normative influence was not statistically significantly associated with students' aspirations for the presented VET occupations (for possible reasons see Section 6). Importantly, we simultaneously assessed different key dimensions of social peer contexts (i.e., normative, informational, and comparative) that have previously remained unconnected in separate strands of literature. Our results point to the distinct importance of each of these contexts, with descriptive peer norms being most relevant in comparison to the other examined social context characteristics.

In view of the relevance of social contexts shown in the baseline model, our results indicate that vocational role models statistically significantly increase students' aspirations for the presented VET occupations. This suggests that short-term social influences can have an impact on students' occupational aspirations despite significant long-term influences by parents and peers in the career orientation process. The effect size of the intervention may be rather small; however, based on career development theories that highlight the complexities and multifaceted influences of career choices (e.g., Yates, 2021), it cannot be expected that interventions involving meeting vocational role models in class increase every student's aspiration for the presented occupation. Further, considering the skewed distribution of the outcome variable towards low aspirations for the presented occupations overall, 0.141 points on the original 5-point scale are notable. This finding is in line with happenstance learning theory (Krumboltz, 2009; Mitchell et al., 1999), which emphasises the power single events can have on career choices. One of the major strengths of our study is the quasi-experimental research design that allows a causal interpretation of this result linked to the direct effect of vocational role models in schools. This evidence suggests that vocational role models can be a useful asset for the policy goal of strengthening the attractiveness of VET in Germany by enlarging students' aspirations for certain VET occupations. Nevertheless, future research should assess whether role model effects remain relevant for students' long-term pathways, unfolding over a longer period.

Another strength of our study is the exploration of possible effect heterogeneities of the vocational role model intervention in terms of social contexts, a theoretical expectation based on situational decision-making models, which has not previously been examined empirically. We found that the vocational role model intervention is mostly unrelated to students' embeddedness in different social contexts. Therefore, this finding supports the practice of vocational role models as a useful and widely applicable career orientation activity in schools. Nonetheless, a closer examination of the effect heterogeneities in substantial terms revealed some noteworthy patterns, suggesting some tendencies of higher effectiveness in certain social contexts.

First, the intervention appeared to increase the occupation-specific aspirations more strongly when peers in the classroom aspired to the occupation less and when lower social valuation by peers was expected for this occupation. This was an unexpected and surprising result contrary to hypothesis H4a, expecting a positive relationship between the peers' occupation-specific aspiration and a stronger treatment effect in that case,

due to individuals seeking conformity with their peer group (Cialdini & Goldstein, 2004; Laursen & Veenstra, 2021). Despite this finding being theoretically unexpected, it highlights the potential of the vocational role model intervention to increase aspirations for less popular occupations among students. A possible alternative explanation for this unexpected pattern could be derived from the MFS (Esser, 1999; Kroneberg, 2005, 2010, 2014). Since the VET-ambassadors typically presented their occupations in a rather positive and engaging manner, they may have offered new information, viewpoints, and motivation to previously less aspired and less valued VET occupations. Therefore, students may have crossed the threshold of not acting according to the as-mode but entering the rc-mode due to shifted social norms perceived for this occupation through the role model. Consequently, students would re-assess the subjective expected utility of aspiring to the specific occupation (Kroneberg, 2014). Perhaps the role model would also reduce the expected social costs of aspiring to a previously unfavoured occupation by delivering a positive image. This could have resulted in a higher increase of aspirations for those less favoured VET occupations and, thus, in a higher ATT. By contrast, for highly aspired and socially valued VET occupations, the information and positive portrayal delivered by the vocational role model would match students' preconceptions and, therefore, they might follow the as-mode and not question their decision-making process regarding their aspirations for these occupations. Accordingly, the intervention has less impact and does not increase the occupation-specific aspirations in that case.

Second, the analysis of effect heterogeneities showed a statistically insignificant but noteworthy pattern in terms of the peers' occupation-specific knowledge and peers' occupation-specific self-efficacy. In line with our hypothesis H4b, the intervention appeared to increase the aspiration for the presented VET occupation more strongly when classmates were less informed about this occupation. Contrary to our hypothesis H4c regarding occupation-specific self-efficacy, the intervention appeared to increase the students' aspiration for the presented VET occupation more strongly when peers in the classroom showed higher self-efficacy for this occupation. A possible explanation for this could be that vocational role models empower students interested in the specific occupation but who might be reluctant to aspire to this occupation because their classmates show great self-efficacy for this occupation. This suggests that vocational role model interventions might empower students to overcome the big-fish-little-pond effect (Marsh, 1987), perhaps by showing what is possible and how to achieve it (Morgenroth et al., 2015). In light of career orientation activities at school, empowering students to follow their occupational interests less influenced by their peers' self-efficacy would be an additional major strength of vocational role models.

6. Limitations

Regarding the social contexts that we addressed with this study, three shortcomings should be noted. First, we found no statistically significant differences in students' occupation-specific aspirations (t_1) and in the treatment effect (t_3) by parents' highest degree. Potentially, parents' occupations could be more important in structuring students' career orientation process than their parents' general educational level and occupational degree. Future research investigating occupational role models could thus consider how treatment effects vary by parents' occupations.

Second, regarding the different peer context characteristics, it should be noted that despite controlling for students' gender, future research should additionally investigate gender influences in more detail, which is relevant for career choice processes (e.g., Ridgeway, 2011) and a relevant line of demarcation in social influence processes. For example, friendship groups are strongly segregated by gender (e.g., McPherson et al., 2001)

and peer influence happens along gender lines (e.g., Thijs et al., 2010). Therefore, exploring gender-specific role-modelling effects could provide further insights.

Third, we used a common way of measuring peer norms as part of the overall classroom climate (e.g., Mackie & Moneti, 2015) by operationalising social norms as aggregate variables. However, another aspect of peer norms involves their salience, i.e., whether norms are considered relevant by the individual in order to influence their behaviour (see Cialdini & Goldstein, 2004). Therefore, future research should consider norm salience, for example, by depicting social network structures and friendship networks within classrooms.

Lastly, the overall study design should be considered when interpreting our results. Our results are based on a non-representative regional sample of secondary schools in Germany. The study sample is marked by a specific cohort that was surveyed during and at the end of the Covid-19 pandemic, when students spent more time than usual in family contexts rather than in school. Hence, intervention effects and social context effects could be different for other student cohorts.

7. Conclusion

The finding that role models increase students' occupational aspirations for the presented VET occupation irrespective of peer and parent social contexts in which students are embedded substantiates the great potential of vocational role modelling as a career orientation approach. It appears that these long-term social contexts do not hinder students from incorporating their short-term experiences with role models into their formation of occupational aspirations. Although effect sizes were small, this finding lends support to the practical relevance of short-term career activities such as role modelling interventions in the German school system. Regarding the policy implications of our findings, vocational role models could hence be implemented in a more targeted manner to increase the visibility and attractiveness of specific VET occupations that suffer, for example, from a lack of workforce. Moreover, our findings suggest that the role model intervention effect might be larger for previously less aspired occupations in particular.

It should be noted, however, that increasing aspirations for specific occupations does not necessarily imply that these occupations will always be a fitting career choice for students, as young people navigate a range of individual and environmental factors and resources in their career orientation. Hence, when implementing role models to promote VET occupations, policymakers and stakeholders should consider presenting a variety of occupations with different role models to show the diversity of the world of work and the variety of people in those occupations, thereby painting a realistic and authentic picture of different career options.

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methodology, formal analysis, writing of original draft, review, and editing (JB); conceptualisation, writing of original draft, review, and editing (MG). All authors approved the final version of the manuscript.

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Conflict of Interests

The authors declare no conflict of interest. In this article, editorial decisions were undertaken by Ulf Hedetoft (University of Copenhagen, Denmark).

Data Availability

The collected primary data associated with this article is currently not available to the public. All respondents and the participating schools gave their informed consent prior to their participation in the research, and adequate steps were taken to protect participants' confidentiality. The data collection and data management approach was approved by the data protection officer of the BIBB.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

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ARTICLE

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Adaptations in Youths' Willingness to Be Spatially Mobile: Influence of Status Aspirations and Regional Disparities

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Abstract

Spatial mobility is key to facilitating successful transitions into vocational education and training (VET), especially for youths from disadvantaged regions. In line with the agency-structure framework, the decision to become mobile is conceptualized as an adaptive strategy that young people employ to achieve their goals when faced with persistent challenges or regional barriers. This study investigates how youths applying for VET adapt their willingness to be spatially mobile over time. It examines the influence of occupational status aspirations and the regional opportunity structure on this decision-making process. Using data from the National Educational Panel Study (NEPS), multilevel growth curve models are estimated to analyze adaptations in the mobility radius of VET applicants over up to three years (N = 1,017). To assess the regional opportunity structure, small-scale administrative geospatial data on the availability of youths' aspired occupations are used as an individualized indicator of regional mismatch. The results show that VET applicants' willingness to be mobile increases over time. High-status aspirations are consistently associated with a greater willingness to be mobile, largely independent of search duration or regional mismatch. Conversely, VET applicants with lower status aspirations exhibit notable adaptations, adjusting their mobility radius, particularly in response to increasing search duration or regional mismatch. These findings highlight the complex interplay between individual aspirations and the regional opportunity structure in shaping adaptations in the willingness to become mobile of unsuccessful VET applicants.

Keywords

agency and structure; regional disparities; school-to-VET transitions; spatial mobility; status aspirations

1. Introduction

Vocational education and training (VET) is a central pathway in the transition from school to work in Germany, where about half of young people enter VET programs after lower secondary education (Ludwig-Mayerhofer et al., 2011). Access to VET is shaped by a highly stratified system, with early school tracking at the lower secondary level determining access to different vocational and academic pathways at the upper secondary level. The VET system in Germany includes school-based and dual programs that combine company-based training with vocational schooling. This structure has significant implications for social inclusion, as it can reinforce educational inequalities and hinder youths' access to stable career prospects. Amid the benefits of the highly institutionalized system, every year tens of thousands of youths face difficulties in achieving successful school-to-VET transitions (M. Granato et al., 2015). Around 30% of VET applicants do not enroll in fully qualifying VET but enter the transition system, which encompasses preparatory programs to support access to VET but does not provide formal vocational qualifications (Baethge & Wolter, 2015; Protsch & Solga, 2016). Low-achieving youth in particular often stagnate within the transition system, with only one-third transitioning to regular VET or employment (Beicht & Eberhard, 2013; Solga et al., 2014). As a result, the risk of youths ultimately ending up not in education, employment, or training (NEET) remains considerable, which can have adverse consequences on their life trajectory (Achatz et al., 2022; Brzinsky-Fay, 2022; Schoon & Lyons-Amos, 2017).

Shedding light on the drivers and barriers of successful school-to-VET transition, research highlights the relevance of individual or agentic factors, such as application efforts, goal-related self-efficacy, or occupational status aspirations (Holtmann et al., 2017; Schoon & Lyons-Amos, 2017; Wicht et al., 2024), and institutional or socio-structural factors, such as educational certificates and parental socio-economic status (SES), which often reinforce inequalities (Dietrich et al., 2019; Schels & Wöhrer, 2022; Schoon, 2021). Further, recent studies underscore the importance of regional opportunity structures, which impose additional barriers for youths from disadvantaged regions. This is especially evident in countries like Germany, with a highly market-dependent dual VET system and significant regional disparities (Achatz & Schels, 2023; Hickmann et al., 2025; Hillmert et al., 2017; Wicht & Nonnenmacher, 2017).

Spatial mobility is essential to facilitate successful school-to-VET transitions and mitigate structural inequalities (N. Granato et al., 2015; Herzer & Ulrich, 2020; Jost et al., 2019). Recent studies reveal that a substantial number of VET students become spatially mobile (Hoffmann & Wicht, 2023; Kindt et al., 2024; Schmidt, 2024) and highlight its association with positive individual-level outcomes, such as status returns, job-match quality, and life satisfaction (Ganesch et al., 2019; Stawarz et al., 2022; Wicht et al., 2024). Corresponding research is often limited to cross-sectional data and focuses primarily on the actual mobility of VET students who commute or relocate to attain VET positions outside their home region (Herzer & Ulrich, 2020; Schmidt, 2024; Wicht et al., 2024). Yet, this does not capture the preceding decision-making process and the development of the willingness to become mobile during the transition to VET. Based on time-to-event data, a recent study found that in addition to higher occupational status aspirations and limited regional opportunities, longer search durations significantly increase spatial mobility among youths entering VET (Hoffmann & Wicht, 2023). This implies that VET applicants' willingness to become mobile is an adaptive decision-making process shaped by individual and regional factors over time.

However, the progression and extent of adaptations in the willingness to be mobile over time and the interplay between individual and regional factors in predicting these adaptations remain uncertain. Therefore, this study aims to address this research gap by investigating the following research questions:

1. Do VET applicants adapt their willingness to be spatially mobile while searching for a training position?

2. How do individual status aspirations and the regional opportunity structure impact these adaptations over time?

Representative longitudinal data from the German National Educational Panel Study (NEPS; Blossfeld & Roßbach, 2019; NEPS Network, 2025) are used to address these research questions. This panel data offers detailed information on the application behavior of youths seeking VET, including their willingness to be mobile and their occupational aspirations. In addition to considering VET applicants' occupational status aspirations, small-scale NUTS-3 administrative geospatial regional data on the regional availability of their aspired occupations (German Federal Employment Agency, 2022) are merged to establish the regional mismatch as an individualized measure of youths' perceived regional opportunity structure.

The article makes several contributions. First, it focuses on the willingness to be spatially mobile among young people who have unsuccessfully applied for VET, a vulnerable group (M. Granato et al., 2015) whose decision-making behavior has largely been overlooked in previous research. Second, employing a longitudinal approach to analyze changes over time regarding the willingness to be mobile, captured by the distance to the furthest training position they applied for, grants nuanced insights into adaptations in VET applicants' mobility decisions during their search. Third, extending the agency-structure framework (Schoon & Heckhausen, 2019), this study highlights the joint role of individual status aspirations in interaction with the regional opportunity structure in predicting adaptations in VET applicants' willingness to become mobile over time. This underscores the vital interplay of agency and structure for youth transitions. It reveals adaptations in the willingness to be spatially mobile as a relevant strategy for youths to achieve their goals and successfully transition into VET.

2. The Importance of Agency, Structure, and Spatial Mobility for VET Applicants

The importance of agency in shaping individuals' life courses has received increasing attention in research (Bandura, 2006; Hitlin & Elder, 2007; Shanahan, 2000). Agency is understood as the ability of individuals to set and achieve their goals, with scholars generally distinguishing between agentic goals and agentic actions (Goller & Paloniemi, 2022; Schoon & Heckhausen, 2019). The agency-structure framework (Eccles, 2008; Holtmann et al., 2017; Schoon & Heckhausen, 2019) describes successful school-to-VET transitions as a complex process that depends on the interplay between youths' individual agency and structural opportunities. This process involves adaptive actions that youths engage in to achieve their goals, especially when encountering difficulties. This study extends this framework to adaptations in the willingness to become spatially mobile as a possible adaptive strategy among VET applicants when they fail to make a successful transition over time or are faced with limited regional opportunities.

In the following sections, I will focus on VET applicants' occupational status aspirations as agentic goals (*goal setting*) and spatial mobility as agentic actions to achieve these goals (*goal engagement*). Further, a distinction is made between *action planning* and *action regulation* as parts of goal engagement to highlight the time dependence of the adaptation process. Lastly, the relevance of the regional opportunity structure is emphasized, and presumed influences on VET applicants' willingness to be mobile over time and in interaction with their occupational status aspirations are addressed.

2.1. Goal Setting: Status Aspirations as Agentic Goals

Youths establish their agentic goals at critical stages like school-to-VET transitions. In this context, *goal setting* is closely tied to occupational aspirations (Heckhausen & Tomasik, 2002; Schels & Abraham, 2023; Schoon & Parsons, 2002). Social status emerges as a key dimension of these aspirations. It shapes the perceived value of the aspired occupation in terms of prestige and monetary returns but also reflects the social identity of youths formed during socialization (Gottfredson, 2002; Holland, 1997; Sewell et al., 1970). Accordingly, youths' occupational status aspirations are a crucial driver of successful transitions (Ashby & Schoon, 2010; Haller & Portes, 2019; Hitlin & Johnson, 2015) and spatial mobility (Hoffmann & Wicht, 2023; Waibel, 2019; Wicht et al., 2024). While occupational status aspirations and their realization are related to socio-structural factors such as SES background and educational certificates (Becker & Blossfeld, 2022; Klein, 2016; Valls et al., 2022), studies have shown that their positive impact on successful transitions persists even when these factors are controlled for (Holtmann et al., 2017; Reynolds et al., 2007; Schoon & Polek, 2011).

2.2. Goal Engagement: Spatial Mobility as Agentic Action

To achieve their agentic goals, youths engage in agentic actions. This aspect of agency relates to *goal engagement*, which involves action planning to pursue the goal, e.g., when initially applying VET, and action regulation when unsuccessful over time or faced with obstacles (Haase et al., 2008; Lechner et al., 2016; Schoon & Heckhausen, 2019). Goal engagement is not only dependent on youths' agentic goals but is an adaptive decision-making process in which youths (re-)assess the probability of success by evaluating their options, considering available opportunities and barriers (Eccles & Wigfield, 2002; Heckhausen & Wrosch, 2016; Mühlböck et al., 2022; Tomasik et al., 2009). Spatial mobility can increase both the probability of success and available opportunities, making it a potentially viable agentic action for youths striving to transition to VET successfully. Whether VET applicants increase their willingness to become mobile as part of goal engagement remains an open question.

Research on job-related spatial mobility in general identified search time as a key factor in increasing job seekers' willingness to be mobile, but it is mainly focused on individuals in the workforce or labor force (Détang-Dessendre & Gaigné, 2009; Magrini & Lemistre, 2013; Windzio, 2008). Despite a lack of research on adaptations in the willingness to become mobile in the context of school-to-VET transitions, longitudinal studies have shown that youths seeking VET often engage in goal-engagement and adapt their search strategies over time, e.g., making compromises regarding factors such as occupational interests, social status, or gender type (Beckmann et al., 2023; Fischer-Browne et al., 2024; Schels & Abraham, 2023; Tomasik et al., 2009). Based on these findings and aligned with the theoretical notion of goal engagement, it can be assumed that VET applicants similarly adapt their willingness to be spatially mobile as an agentic strategy if faced with difficulties achieving a successful transition over time. Therefore, VET applicants are

hypothesized to increase their willingness to become mobile while searching for a training position (Hypothesis 1). Yet, different adaptive goal engagement strategies can be assumed, contingent on VET applicants' status aspirations.

A crucial part of "action planning" is foresight—the ability to plan the pursuit and attainment of agentic goals (Schoon & Heckhausen, 2019). Research has shown that youths with higher status aspirations are more likely to pursue and attain their goals (Hitlin & Johnson, 2015; Holtmann et al., 2017; Schoon & Parsons, 2002) and are also more inclined to be spatially mobile for VET (Hoffmann & Wicht, 2023; Wicht et al., 2024). Theoretically, this can be explained by the higher expected value of successfully attaining their status aspirations, which acts as a direct motivational driver for these youths to engage in action planning to achieve their goals (Eccles & Wigfield, 2002; Heckhausen, 2018; Shane et al., 2012). Therefore, it is assumed that VET applicants with higher status aspirations have a higher initial willingness to be mobile at the beginning of their search for a suitable VET position than VET applicants with lower status aspirations (Hypothesis 2a).

However, when goal attainment is not directly successful, *action regulation* becomes necessary, entailing commitment to or adaptations of agentic actions to cope with difficulties over time (Eccles & Wigfield, 2002; Schoon & Heckhausen, 2019; Tomasik et al., 2009). As VET applicants with higher status aspirations are likely to start with a higher initial willingness to be mobile, they should either further increase or maintain their high willingness to be mobile over time. In contrast, VET applicants with lower status aspirations might initially lack strong motivation to pursue spatial mobility due to the lower anticipated value of their aspired occupation. Yet, when faced with challenges in securing a VET position over time, they should be more likely to (re)assess their chances and engage in adaptive action regulation by adjusting their willingness to become mobile to increase their probabilities of a successful transition. Hence, it is assumed that VET applicants with lower status aspirations exhibit a higher increase in their willingness to be mobile over time than VET applicants with higher status aspirations (Hypothesis 2b).

2.3. The Role of the Regional Opportunity Structure

While individual agency is an essential driver of successful transitions, the agency-structure framework equally highlights the significant role of structural opportunities and barriers for youths to achieve their goals and make successful transitions (Schoon, 2021; Schoon & Lyons-Amos, 2017). Most previous research has emphasized the importance of the social structure, with studies underscoring the relevance of youths' SES background or educational certificates in interplay with agentic goals (Descary et al., 2023; Eberhard et al., 2022; Gellermann & Fuchs, 2022; Kay et al., 2017; Parker et al., 2012). However, mixed results indicate either selection or cumulative effects, where youths with a higher SES background or educational certificates exhibit greater agency in terms of higher status aspirations and better abilities and resources to achieve them, thereby reinforcing social inequality (Eccles, 2008; Holtmann et al., 2017; Jansen et al., 2024). Other studies suggest compensatory effects, whereby youths with a lower SES background or educational certificates but high aspirations can utilize agency to compensate for limited socio-structural opportunities and achieve their goals (Duckworth & Schoon, 2012; Mortimer et al., 2014; Schoon & Polek, 2011).

The role of the regional opportunity structure has received less attention in this area of research. However, especially in countries such as Germany, VET opportunities vary considerably across different regions, limiting the probability of successful transitions for VET applicants in disadvantaged regions (Eckelt & Schauer, 2019; Kleinert, 2015; Weßling et al., 2015). Accordingly, research has revealed that youths from unfavorable regions are more likely to become spatially mobile for their VET. Yet, most studies are limited to broad regional measures such as unemployment rates, population density, or VET vacancies. (Beicht & Eberhard, 2009; Bogai et al., 2008; Herzer & Ulrich, 2020). Bearing in mind the relevance of regional disparities for successful transitions to VET and spatial mobility, examining the role of the regional opportunity structure in influencing adaptations in the willingness to be mobile among VET applicants can provide more comprehensive and relevant new insights.

In line with the agency-structure framework (Schoon & Lyons-Amos, 2016), the regional structure defines given opportunities and barriers for youths seeking VET. Youths' evaluations of their perceived opportunities are crucial for their goal engagement strategies and should be considered in accordance with their occupational aspirations. Previous research has identified the mismatch between youths' aspired occupation and its availability in their home region as a relevant measure for youths' perceived opportunity structure and a key driver for spatial mobility (Edwards et al., 2002; Flohr et al., 2020; Hoffmann & Wicht, 2023; Ulrich et al., 2006). This individualized measure accounts for the interplay between individual occupational aspirations and structural opportunities and, hence, should be decisive in shaping VET applicants' evaluations of their regional opportunities and possible agentic actions to increase the probability of a successful transition. Whether youths anticipate the regional opportunity structure from the beginning of their search (action planning) or adapt to it over time (action regulation) remains an open question. Therefore, it is examined if VET applicants from regions with a higher mismatch will either have a higher initial willingness to be mobile (Hypothesis 3a) and/or exhibit a higher increase over time (Hypothesis 3b).

Moreover, VET applicants should exhibit varying goal engagement strategies depending on their status aspirations. Hence, it is crucial to investigate whether the regional opportunity structure impacts these patterns. Since a higher regional mismatch imposes additional barriers that necessitate agentic actions to circumvent them, it is assumed to reinforce the presumed differential goal engagement strategies of VET applicants with higher and lower status aspirations. VET applicants with higher status aspirations are expected to engage more readily in action planning at the beginning of their search. Therefore, they should exhibit an even greater initial willingness to be mobile in regions with a higher mismatch than regions with a lower mismatch (Hypothesis 4a). Conversely, VET applicants with lower status aspirations will likely engage in action regulation over time. Therefore, in regions with a higher mismatch, they should exhibit a higher increase in their willingness to be mobile than in regions with a lower mismatch (Hypothesis 4b).

3. Present Study

This study sheds light on adaptations in the willingness to be spatially mobile among VET applicants over time, depending on their individual status aspirations and the regional opportunity structure. Data from the German NEPS (Blossfeld & Roßbach, 2019; NEPS Network, 2025) are used, providing comprehensive information on the application behavior of youths seeking VET, including their status aspirations and willingness to be mobile. Additionally, based on merged administrative small-scale geospatial data on the regional availability of youths' aspired occupations (German Federal Employment Agency, 2022), the regional mismatch is measured

as an individualized indicator to reflect youths' perceived regional opportunity structure in alignment with their individual aspirations. Further, this study extends previous research on the importance and interplay of individuals' agentic goals and actions with structural opportunities during school-to-VET transitions, providing in-depth insight into adaptations in search behavior over time.

Building on the agency-structure framework (Schoon & Heckhausen, 2019; Schoon & Lyons-Amos, 2016), this study provides a theoretical model focusing on the interplay of individual and structural factors in shaping VET applicants' willingness to be mobile over time, as illustrated in Figure 1. At the micro level, individual agency is differentiated into two components: (a) VET applicants' status aspirations, which reflect their agentic goals, and (b) their mobility radius, which represents their agentic actions employed as goal engagement strategies to achieve their goals. Given the focus on temporal changes, a distinction is made between the initial mobility radius (action planning) and subsequent adaptations to it (action regulation) over the search time. At the structural level, the regional mismatch's direct influences and possible interactions with youths' status aspirations over time are examined.

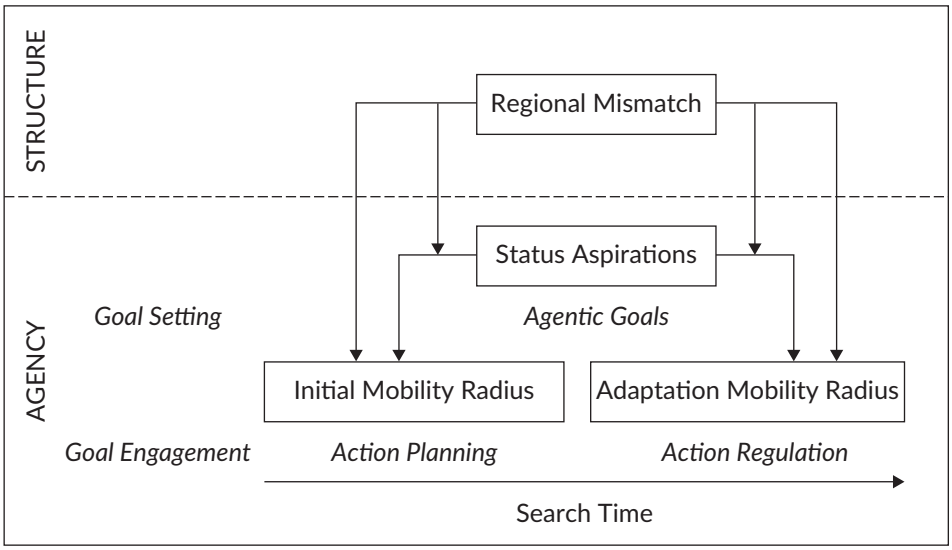

Figure 1. Graphical representation of the research design.

The following *search time hypothesis* is formulated to address the first research question: VET applicants increase their mobility radius over their search time (H1).

Furthermore, the role of individual status aspirations and the regional opportunity structure over time is examined. Therefore, two *status aspiration hypotheses* are proposed: VET applicants with higher status aspirations have a higher initial mobility radius than VET applicants with lower status aspirations (H2a). VET applicants with lower status aspirations exhibit a higher increase in their mobility radius over time than VET applicants with higher status aspirations (H2b).

Regarding the regional opportunity structure, two *regional mismatch hypotheses* are formulated: VET applicants in regions with a higher mismatch have a higher initial mobility radius (H3a) and/or exhibit a higher increase over time than VET applicants in regions with a lower mismatch (H3b).

Two *reinforcement hypotheses* are presented to examine the interplay between individual status aspirations and the regional mismatch: VET applicants with higher status aspirations have a higher initial mobility radius in regions with a higher mismatch than regions with a lower mismatch (H4a). VET applicants with lower status aspirations exhibit a higher increase in their mobility radius over time in regions with a higher mismatch than regions with a lower mismatch (H4b).

4. Methods

4.1. Data

This study uses longitudinal data from the German NEPS, Starting Cohort Grade 9 "School and Vocational Training: Educational Pathways of Students in Grade 9 and Higher" (Blossfeld & Roßbach, 2019; NEPS Network, 2025). This representative panel started in 2010, with an initial sample of 14,540 ninth graders at regular German secondary schools. Surveys of students were conducted (bi-)annually using paper-and-pencil interviewing in the classroom. Respondents who left school were subsequently interviewed twice a year and later annually using computer-assisted telephone interviewing. After initially leaving school, all respondents were surveyed using a comprehensive transition module that included detailed retrospective questions about their application behavior. In the subsequent years, a condensed version of the transition module was administered exclusively to respondents who had not completed or were not currently engaged in (further) education or VET programs or had recently started such a program. Additional administrative regional data from the German Federal Employment Agency (2022) on the regional share of employees in respondents' aspired occupational segment at the district level (NUTS-3) are merged to measure the degree of regional mismatch.

4.2. Sample

As this study focuses on adaptations of the willingness to become mobile among VET applicants' during the search for a VET position, the sample is restricted to respondents who applied for a VET position in the first year after leaving school (N = 4,990) and at least twice within three years (N = 1,380). Further restrictions were made to ensure that the sample does not include cases of drop-outs or reorientations, as these may involve different adaptation processes. Respondents who entered VET or further education in the first year but (re-)applied for VET in the following years were excluded (N = 1,156). Similarly, respondents who started VET or further education in the second year but (re-)applied in the third year were only observed for the first two years. Respondents who indicated they did not apply for a VET position in the second year were excluded (N = 1,079). Lastly, the observation period was limited to the first two years for respondents who indicated they did not apply for a VET position in the third year.

Missing values in the dependent variable were retained for multiple imputations if respondents reported that they applied for VET in the observation year. They were also retained if information on the application behavior in the observation year was unavailable but respondents had applied both in the previous and the following years. The final analysis sample (N = 1,079) includes school-leaving cohorts from 2011 to 2016, consisting of 692 respondents with a two-year and 387 respondents with a three-year observation period.

4.3. Measures

Table 1 below provides an overview of the descriptive statistics of all relevant variables in the analysis sample. Correlations between the variables can be found in Table A1 in the Supplementary File.

Table 1. Descriptive statistics.

Variables	Mean or %	SD	Min	Max	N(valid)
Dependent variable					
Mobility radius					
at 1st year	2.54	1.28	1	5	950
at 2nd year	2.75	1.29	1	5	862
at 3rd year	2.91	1.26	1	5	365
Independent variables					
Search time					
1st year	100.00		0	1	1,079
2nd year	100.00		0	1	1,079
3rd year	35.87		0	1	1,079
Status aspirations					
at 1st year	40.22	12.92	11.56	88.31	1,070
at 2nd year	40.22	12.92	11.56	88.31	1,070
at 3rd year	39.99	13.09	11.56	88.31	383
Regional mismatch					
at 1st year	−9.39	4.32	−38.12	−0.44	1,070
at 2nd year	−9.40	4.31	−38.12	−0.44	1,070
at 3rd year	−9.22	4.27	−25.24	−0.44	383
Regional VET mismatch					
at 1st year	−10.34	5.80	−37.77	0.00	1,070
at 2nd year	−10.39	5.76	−37.77	0.00	1,069
at 3rd year	−10.30	5.73	−25.80	0.00	383
Control variables					
Gender					
male	51.48				555
female	48.52				523
Migration background					
native	70.18				746
migration background	29.82				317
Age	17.68	1.11	15.17	22.75	1,078
SES background	48.60	19.16	14.21	88.70	1,039
Educational certificate					
low	38.00				410
medium	45.69				493
high	16.31				176
Regional competition	−102.66	4.96	−13.65	−86.68	1,065

Notes: N(valid) refers to the number of individuals with valid information; descriptive statistics of time-varying variables are calculated for each time point, time-constant variables based on the first time point; percentages for the search time categories indicate how many individuals of the sample are observed at each time point.

4.3.1. Dependent Variable

To capture VET applicants' willingness to be spatially mobile, respondents were asked to provide the distance in time to the furthest applied-to VET position, with the categories: *up to 20 minutes* (1), *21 to 40 minutes* (2), *40 minutes to 1 hour* (3), *more than 1 hour* (4), and *I would have had to move* (5). As the mobility radius was surveyed each year, information is available on the initial mobility radius in the first year they applied for a VET position and adaptations in the mobility radius in the second and third years of their search. The average mobility radius by search time indicates a slight increase over time (see Table 1). Differences in the mean level of the mobility radius over time are statistically significant ($p < 0.001$) with a Cohen's d of −0.16 standard deviations between the first and second years and −0.29 between the first and third years, indicating small to medium effect sizes (Gignac & Szodorai, 2016). Differences between the second and third years are slightly smaller (Cohen's $d = -0.13$) and statistically significant at a lower confidence level ($p < 0.05$). Figure A1 in the Supplementary File depicts the detailed distribution of the mobility radius by search time.

4.3.2. Independent Variables

As VET applicants were asked about their application behavior each year, a measurement of the *search time* in years (first year, second year, third year) was used, with the first year as the reference category. All VET applicants were observed in the first and second years; 35.87% of the VET applicants in the sample remain seeking VET in the third year.

To assess the *occupational aspirations* of VET applicants, the first occupation they applied for was used, classified by NEPS via the International Standard Classification of Occupations (International Labor Office, 2012). The status of the aspired occupation was measured based on the International Socio-Economic Index from 2008 (ISEI; Ganzeboom, 2010), which NEPS assigned to the aspired occupations. The ISEI provides a well-established continuous measure of occupational stratification, ranging from 10 to 90, with higher scores indicating higher occupational status aspirations. Figure A2 in the Supplementary File depicts the distribution of VET applicants' occupational status aspirations in the sample. High-status aspirations (>60) are mainly related to occupations in IT or healthcare, while low-status aspirations (<30) refer to occupations in e.g., agriculture, construction, or retail.

VET applicants' perceived regional opportunity structure is measured through an indicator of the *regional mismatch* between their aspired occupations and the availability of these occupations in their home region, as Flohr et al. (2022) proposed. In the first step, information on the first occupation they applied for is used and categorized by the occupational segment this occupation belongs to, based on the occupational segment categorization from the Classification of Occupations in Germany (KldB 2010; Paulus & Matthes, 2013). These occupational segments consist of 14 distinct groups of occupations categorized by similarity in task profiles and required skills at the two-digit level of the KldB 2010 (Matthes et al., 2015). Figure A3 in the Supplementary File provides an overview of the aspired occupational segments of VET applicants in the sample. The three most frequently aspired to occupational segments among VET applicants are "occupations concerned with production technology" (14.94%), "medical and non-medical health care occupations" (14.82%), and "occupations in commerce and trade" (13.91%). Only up to 3% of VET applicants aspire to occupations in each of the segments "safety and security occupations" and "occupations in agriculture, forestry, and horticulture."

Next, the regional mismatch indicator is constructed to map the regional availability of occupations in the aspired segments as a measure of VET applicants' perceived regional opportunity structure. For this purpose, administrative data (German Federal Employment Agency, 2022) on the total labor force are used. Precisely, the share of employees in the aspired occupational segment within respondents' home regions at the small-scale district level (NUTS-3 regions) is merged. This constitutes an individualized measurement of the (mis)match between VET applicants' regional opportunities in alignment with their aspirations. A higher regional share of employees in VET applicants' aspired occupational segments indicates a higher match between their aspired occupations and their availability in the home region. Lastly, this measurement was inverted for ease of interpretation, so higher values represent a lower availability and, hence, a higher regional mismatch. As reported in Table 1, there is substantial variation in the regional mismatch indicator, ranging from low mismatch regions (around 38% of employees in the aspired occupational segment) to high mismatch regions (with less than 1% of employees in the aspired occupational segment). To ensure that this variation is due to regional differences and not rooted in the over-regional availability of occupational segments, Figure A4 in the Supplementary File depicts the distribution of the regional mismatch indicator for each occupational segment.

As an alternative measure for the regional opportunity structure, an indicator of the *regional VET mismatch* is constructed to map the availability of VET positions in the region. The same approach as detailed above was applied, but administrative data (BIBB, 2023) on the regional share of newly signed apprenticeship contracts per year in the aspired occupational segments were used. The regional VET mismatch indicator shows a similar distribution to the regional mismatch indicator (see Table 1), and the correlation between the two measurements is 0.65 (see Table A1 in the Supplementary File).

4.3.3. Control Variables

First, a distinction is made between the two majority *gender groups*, female and male (reference category). NEPS did not provide further categories to measure gender.

A dichotomous variable indicates the respondents' *migration background*. Respondents with a migration background include those who have immigrated to Germany themselves or through at least one parent. Respondents without a migration background form the reference group.

The *age* of respondents at the start of their search was determined based on their date of birth and the date of the first interview after leaving school. To account for the multicollinearity between age and search time, age at the start of the search is included as a time-constant variable.

Respondents were classified according to the highest school-leaving certificate (*educational certificate*) they attained before the observation period. This classification distinguishes between three levels, reflecting the three-tiered school system in Germany: low (basic secondary education certificate [*Hauptschulabschluss*] or no school leaving certificate), medium (secondary education certificate [*Mittlere Reife*]), and high (university entrance certificate [*Fachhochschulreife/Abitur*]) educational certificate, with low educational certificates as the reference category.

In line with respondents' occupational status aspirations, *SES background* was measured by the highest ISEI-08 value associated with parents' occupations.

Administrative data on the supply-demand ratio (BBSR, 2022) in the respondents' home regions were merged to measure *regional competition*. The supply-demand ratio is based on the sum of newly signed apprenticeship contracts and unfilled training positions divided by the sum of newly signed apprenticeship contracts and applicants still seeking placement or unplaced applicants per year, multiplied by 100. This measurement was inverted, so higher values indicate higher regional competition.

4.4. Analytic Strategy

Multilevel linear growth curve models were employed using Stata 17 (StataCorp, 2021) to analyze adaptations in the mobility radius over time. Due to the panel structure of the data, with up to three observations per individual, two-level random intercept models were estimated using the "xtmixed" command. Additionally, ordered logistic regression models were estimated to account for the ordinal nature of the dependent variable. The results did not differ substantially from the linear estimation (for full regression results see the Supplementary File, Tables A2 and A3). For ease of interpretation of the interaction effects, figures plotting the predicted values based on the linear growth curve models are presented in the following section.

Addressing the first research question, a preliminary model predicting the mobility radius by search time was estimated. Second, the main predictor variables, status aspirations, regional mismatch, and interactions between these variables and search time were included. Next, a third model was estimated to incorporate a three-way interaction between the main predictor variables to examine the interplay between status aspirations and regional mismatch over time in predicting VET applicants' mobility radius. Further, a sensitivity analysis was conducted by including the control variables to assess the stability of the results. Lastly, supplementary models were estimated using the alternative regional VET mismatch indicator, which yielded similar results (for full regression results see Supplementary File, Table A4).

To deal with missing values in the dependent and independent variables, multiple imputations using Blimp 3.1.2 (Enders et al., 2018) were performed. A two-level multiple imputation procedure with random intercepts was applied. All variables used in the analysis models were included. For every missing value, 50 imputations were calculated.

5. Results

5.1. Adaptations in VET Applicants' Mobility Radius Over Time

Figure 2 depicts the linear predictions of VET applicants' mobility radius in the first, second, and third years of their search (see Model 1 in the Supplementary File, Table A2). The results confirm the search time hypothesis, indicating a significant increase in VET applicants' mobility radius over time (H1). Compared to the first year, VET applicants increase their mobility radius by 0.11 standard deviations in the second year and by 0.24 standard deviations in the third year.

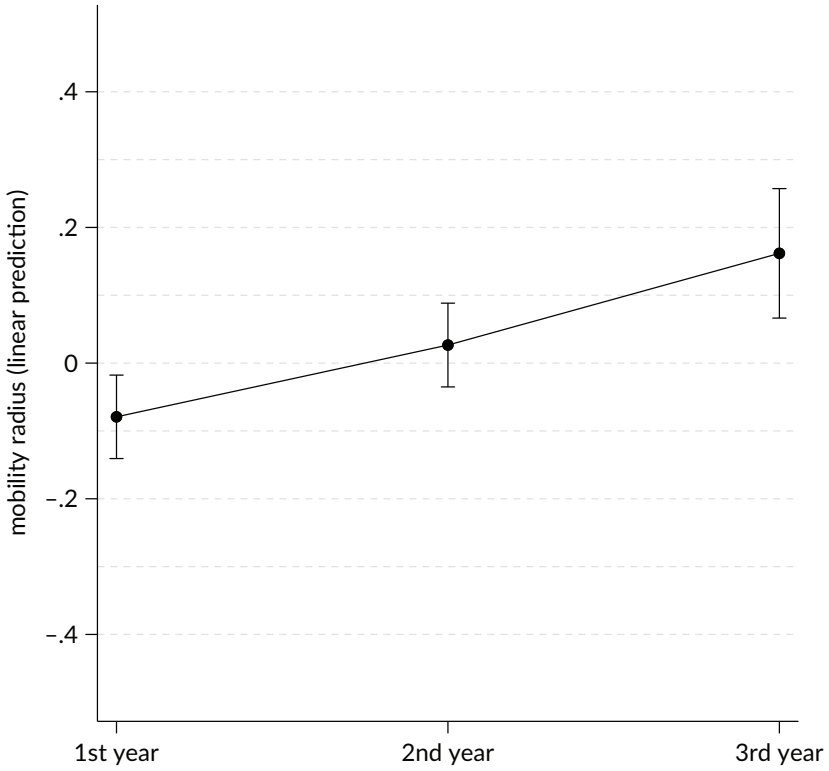

Figure 2. Mobility radius over search time. Notes: Continuous variables are *z*-standardized; point estimates with 95% confidence intervals.

5.2. The Role of Individual Status Aspirations for VET Applicants' Mobility Radius Over Time

Figure 3 depicts the predicted mobility radius of VET applicants with lower (−1 *SD*) and higher (+1 *SD*) status aspirations over time (see Supplementary File, Table A2, Model 2). Notable differences appear, particularly in the first year: VET applicants with higher status aspirations begin with a mobility radius 0.07 standard deviations above the average, while those with lower status aspirations start 0.23 standard deviations below the average. Over time, both groups exhibit an upward trend in mobility radius: VET applicants with higher status aspirations experience an increase of 0.20 standard deviations between the first and third years, whereas those with lower status aspirations see a slightly more pronounced increase of 0.28 standard deviations over the same period. Hence, the results align with the status aspirations hypotheses, stating that VET applicants with higher status aspirations have a higher initial mobility radius (H2a) and that VET applicants with lower status aspirations exhibit a higher increase in their mobility radius over time (H2b).

5.3. The Role of Regional Mismatch for VET Applicants' Mobility Radius Over Time

Figure 4 depicts the predicted mobility radius of VET applicants over time in regions with lower (−1 *SD*) and higher (+1 *SD*) levels of regional mismatch (see Supplementary File, Table A2, Model 2). No significant differences in the initial mobility radius in the first year are observed, and both groups display a similar upward trajectory in mobility radius over time. Therefore, the regional mismatch hypotheses, that VET applicants from regions with a higher mismatch exhibit a higher initial mobility radius (H3a) and/or a higher increase over time (H3b), cannot be confirmed.

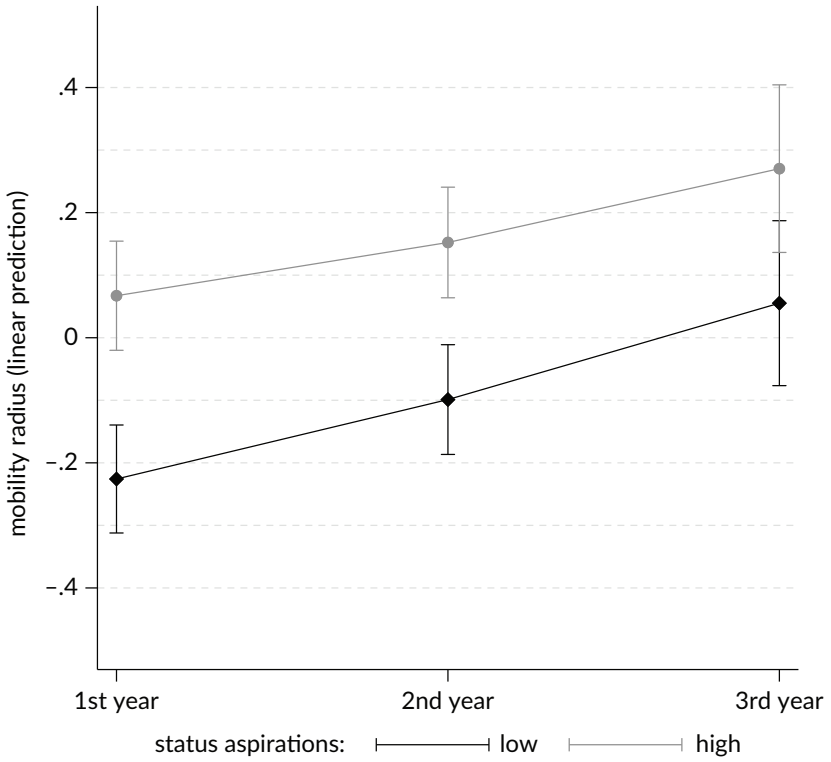

Figure 3. Mobility radius by status aspirations over search time. Notes: Continuous variables are *z*-standardized; point estimates with 95% confidence intervals.

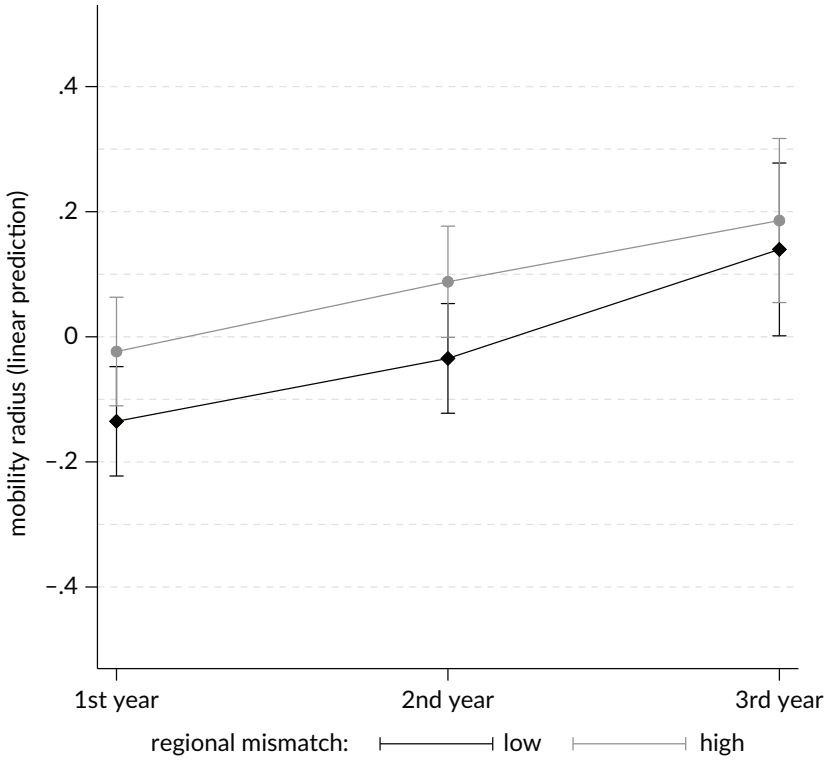

Figure 4. Mobility radius by regional mismatch over search time. Notes: Continuous variables are *z*-standardized; point estimates with 95% confidence intervals.

5.4. The Interplay of Individual Status Aspirations and Regional Mismatch for VET Applicants' Mobility Radius Over Time

Figure 5 depicts the predicted mobility radius of VET applicants with lower (−1 *SD*) and higher (+1 *SD*) status aspirations in regions with lower (−1 *SD*) and higher (+1 *SD*) regional mismatch (see Supplementary File, Table A2, Model 3). Overall, differences in the mobility radius of VET applicants with lower and higher status aspirations are more pronounced in regions with a lower mismatch than regions with a higher mismatch. Variations in the mobility radius of VET applicants with lower status aspirations mainly drive this convergence.

For VET applicants with higher status aspirations, no significant differences in the mobility radius are evident, contingent on the regional mismatch. In both lower and higher mismatch regions, they start with a mobility radius approximately 0.1 standard deviations above the average in the first year. This contradicts the first reinforcement hypothesis (H4a), which posits that VET applicants with higher status aspirations exhibit a higher initial mobility radius in regions with a higher mismatch than in lower mismatch regions. Likewise, there are no substantial differences in the development of their mobility radius over time between these regions.

In contrast, VET applicants with lower status aspirations demonstrate divergent adaptive patterns in their mobility radius depending on the extent of regional mismatch. These results do not align with the second reinforcement hypothesis (H4b), predicting that VET applicants with lower status aspirations experience a higher increase in their mobility radius in regions with a higher mismatch than regions with a lower mismatch. Precisely, in lower mismatch regions, they start with a noticeably lower initial mobility radius, 0.38

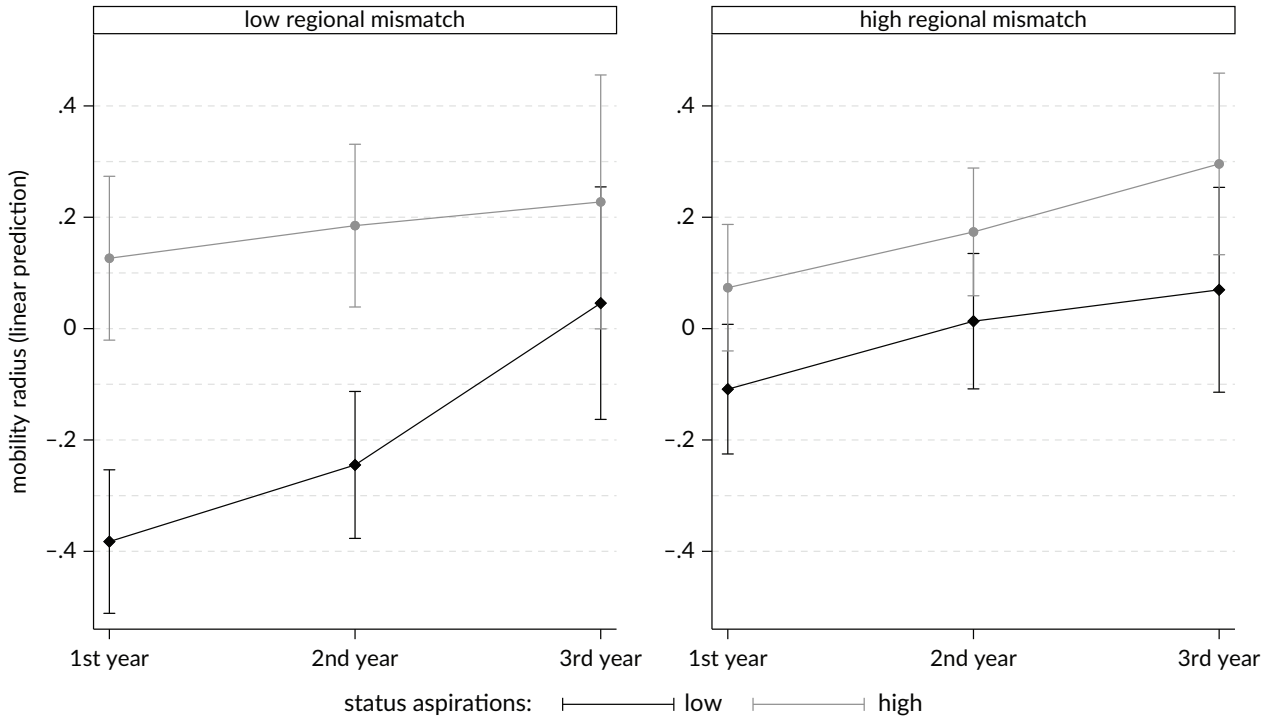

Figure 5. Mobility radius by status aspirations and regional mismatch over search time. Notes: Continuous variables are *z*-standardized; point estimates with 95% confidence intervals.

standard deviations below the average, but demonstrate a substantial increase over time, rising by 0.43 standard deviations. In contrast, in higher mismatch regions, VET applicants with lower status aspirations start with a significantly higher initial mobility radius, just 0.11 standard deviations below the average, and show a more modest increase over time, ultimately reaching a mobility radius of 0.07 standard deviations above the average in the third year—similar to their counterparts in lower mismatch regions.

5.5. Sensitivity Analysis

Sensitivity analyses were conducted to evaluate the robustness of the findings and to gain a deeper understanding of the associations under investigation. First, a model was estimated controlling for gender, migration background, and age, as these factors could potentially confound the relationship between the main predictor variables and both the initial level and subsequent changes in mobility radius (see Supplementary File, Table A2, Model 4). Including these control variables did not result in significant changes to the overall results, reinforcing the stability of the findings. Yet, the impact of status aspirations was slightly reduced, possibly due to the interrelation between post-school age, educational certificates, and status aspirations.

Second, the analysis was expanded by incorporating SES background and educational certificate to account for socio-structural influences related to status aspirations (see Supplementary File, Table A2, Model 5). Figure 6 shows the joint role of status aspirations and regional mismatch in predicting the mobility radius over time, with these additional controls included. The differences in mobility radius between individuals

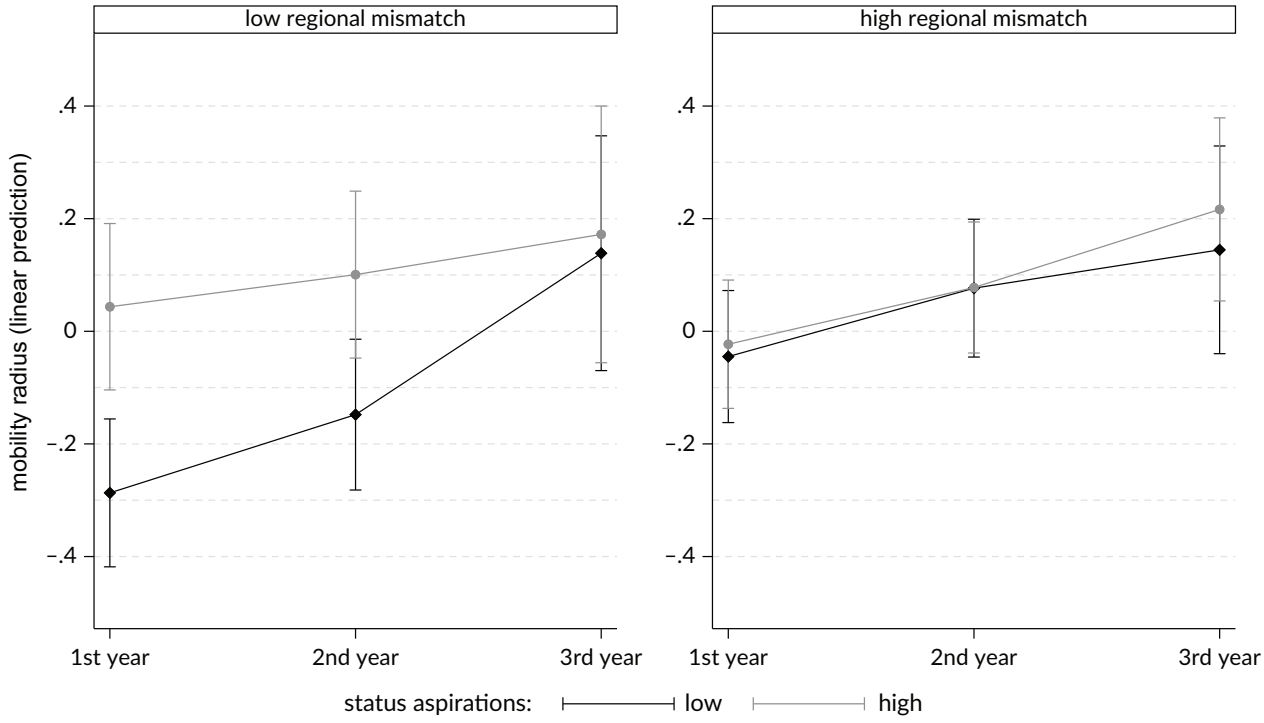

Figure 6. Mobility radius by status aspirations and regional mismatch over search time. Controls: gender, migration background, age, SES background, educational certificate. Notes: Continuous variables are *z*-standardized; point estimates with 95% confidence intervals.

with lower and higher aspirations decrease considerably. However, while notable differences based on status aspirations persist in regions with a lower mismatch, these differences disappear in regions with a higher mismatch once socio-structural factors are controlled for. This result is primarily attributable to considering educational certificates rather than SES background (see Supplementary File, Table A2, Models 6 and 7). Lastly, a model was estimated to account for the regional supply-demand ratio, including regional competition as an additional control variable. This did not influence the findings in a significant way (see Supplementary File, Table A2, Model 8).

6. Discussion

6.1. Key Findings

This study illuminates how VET applicants adapt their willingness to be spatially mobile over time, emphasizing the interplay between individual status aspirations and the regional opportunity structure. The results reveal a significant expansion of the mobility radius of VET applicants during their search. This supports the theoretical assumption that youths adapt their willingness to be mobile as an agentic action to increase their chances of a successful transition in line with the agency-structure framework (Schoon & Heckhausen, 2019).

Notably, VET applicants' status aspirations emerge as a key driver of this agentic behavior. Overall, those with higher status aspirations exhibit a higher willingness to be mobile, indicating that their higher agentic goals act as motivational drivers in pursuing VET opportunities. This is consistent with previous research identifying status aspirations as a key predictor of spatial mobility and successful school-to-work transitions (Hitlin & Johnson, 2015; Hoffmann & Wicht, 2023; Schoon & Polek, 2011).

Moreover, the results reveal differentiated adaptations in the willingness to become mobile over time based on status aspirations, corroborating presumed distinct goal engagement strategies depending on agentic goals (Heckhausen & Buchmann, 2019; Schoon & Heckhausen, 2019). VET applicants with higher status aspirations rather maintain their initially higher willingness to be mobile, indicating early and steady engagement in action planning to achieve their goals. Conversely, those with lower status aspirations begin with a significantly lower mobility radius but adapt by increasing it over time. This suggests a shift towards action regulation in response to barriers encountered during their search for a successful transition.

The findings reveal no significant differences in VET applicants' willingness to be mobile based solely on regional mismatch, diverging from previous research that highlights the regional availability of aspired occupations as a key factor in perceived opportunity structure (Flohr et al., 2022; Hoffmann & Wicht, 2023; Ulrich et al., 2006).

However, subgroup analyses indicate a more complex reality, suggesting that the level of regional mismatch, in conjunction with VET applicants' status aspirations, plays a significant role in determining their willingness to be mobile. Contrary to the theoretical expectations, an unfavorable regional opportunity structure does not reinforce distinct goal engagement strategies of VET applicants with higher and lower status aspirations. Instead, the regional opportunity structure appears more impactful for VET applicants with lower-status aspirations.

VET applicants with higher status aspirations maintain a consistently high mobility radius and are relatively unaffected by regional mismatches or search durations. This suggests that their willingness to be mobile is more likely motivated by their higher agentic goals rather than an adaptive strategy when faced with difficulties. In contrast, those with lower status aspirations adjust their willingness to be mobile depending on regional opportunities. In regions with a lower mismatch, they initially display low willingness to be mobile, likely perceiving fewer barriers and thus feeling less need for agentic actions. However, in the event of an unsuccessful transition, they markedly increase their mobility radius over time. Conversely, in regions with a higher mismatch, they commence with a higher initial mobility radius, suggesting that they anticipate limited regional opportunities and employ compensatory agentic actions by increasing their mobility radius from the outset. Aligned with the agency-structure framework (Heckhausen & Buchmann, 2019; Schoon & Heckhausen, 2019), these findings indicate that, despite lower motivational drive from higher agentic goals, youths with lower status aspirations still engage in agentic actions to improve their chances of successful transition to VET—whether through action regulation in response to prolonged search challenges or action planning when faced with limited regional opportunities.

Further sensitivity analyses identified educational certificates as a key factor in mitigating the influence of status aspirations on VET applicants' willingness to become mobile. This aligns with the notion that status aspirations are closely tied to educational certificates, especially in countries like Germany, where a highly stratified educational system is strongly linked to a market-dependent VET system. In this context, educational certificates predetermine access to VET opportunities (Becker & Blossfeld, 2022; DiPrete et al., 2017; Solga et al., 2014). Consistent with previous research (Holtmann et al., 2017; Schoon & Lyons-Amos, 2017; Wicht & Ludwig-Mayerhofer, 2014), the findings indicate that part of the impact of status aspirations can be attributed to educational certificates and institutionally predefined opportunities that alter the utility of agentic goal engagement strategies. Particularly in regions with a higher mismatch, no differences in the mobility radius of VET applicants with higher and lower status aspirations are observed once educational certificates are accounted for. In this case, institutional and regional opportunity structures appear to present such substantial barriers that spatial mobility is an unfeasible agentic strategy for VET applicants to overcome cumulative disadvantages. Conversely, in regions with a lower mismatch, the findings reveal that differentiated adaptations in VET applicants' willingness to be mobile based on status aspirations persist even after controlling for educational certificates. This supports the theoretical assumption that, within favorable opportunity structures, spatial mobility can be a strategic agentic action for VET applicants to achieve their aspirations and increase the chances of a successful transition. Moreover, these findings highlight the complex interplay between agency and structure over time in shaping youths' adaptive goal engagement strategies in the transition to VET.

6.2. Limitations and Directions Towards Future Research

The present study is not without limitations. First, a notable limitation of this study is the inability to account for potential adaptations in VET applicants' occupational aspirations over time. Data on respondents' aspired occupations were constrained to the first year they applied for VET, preventing the modeling of any subsequent adaptations. Based on the agency-structure framework and previous research (Ackermann & Benz, 2023; Fischer-Browne, 2022; Nießen et al., 2022), it can be assumed that youths adjust their occupational aspirations during their search for a VET position. Adaptations may occur in youths' occupational aspirations, willingness to become mobile, or both. Not accounting for this could potentially

introduce bias. If adaptations in aspirations over time could be accounted for, the results might indicate more pronounced adaptations in the willingness to be mobile. Research suggests that youth lower their status aspirations over time (Schels & Abraham, 2023; Tomasik et al., 2009). These adaptations may be primarily relevant for VET applicants with higher initial status aspirations. They may contribute to why the results indicate fewer adaptations in the mobility radius for this group. Future studies based on appropriate longitudinal data should investigate the possible interplay between adaptations in VET applicants' willingness to be mobile and the development of occupational aspirations over time.

Second, the results do not fully support the relevance of the regional opportunity structure for VET applicants' willingness to become spatially mobile. One reason for this could be that the indicator—the regional mismatch reflecting the availability of their occupational aspirations based on the share of employees in the aspired occupational segments—may not adequately capture all aspects relevant to VET applicants' perceptions of their regional opportunity structures and subsequent mobility decisions. To address this issue, additional analyses were conducted using the regional VET mismatch as an alternative indicator based on the share of newly signed apprenticeship contracts in the aspired occupational segment. Both measures are highly correlated (0.65) and lead to similar results. Although the share of newly signed apprenticeship contracts might more accurately reflect VET applicants' actual opportunities in the local VET market, this measurement is more prone to fluctuations over time. It is affected by multiple factors that may not be immediately apparent to young people. Yet, based on previous research and theorizing, the regional mismatch is intended to reflect youths' perceived opportunity structures. The share of employees in the aspired segment should be a more stable and reliable measure, which VET applicants are more likely to assess when forming their perceptions of the regional availability of their aspired occupations, e.g., through the employed individuals in their surroundings and the prevailing occupational structure in their home region. This is further supported by previous research based on the same measurement (Flohr et al., 2022; Hoffmann & Wicht, 2023; Malin & Jacob, 2019).

An alternative explanation is that the regional opportunity structure may already shape youths' willingness to be mobile and/or their occupational aspirations before they apply for VET. This is supported by previous studies highlighting the relevance of the regional opportunity structure in shaping youths' occupational aspirations while still in compulsory education (Flohr et al., 2020; Hartung et al., 2022), as well as the finding that in higher mismatch regions VET applicants with lower status aspirations exhibit a higher mobility radius from the start. Unfortunately, the study lacked suitable data on youths' willingness to be mobile before they applied for a VET position. Future research should further explore the influence of regional opportunity structures on the willingness to become spatially mobile, considering various time points and employing alternative measures to capture these dynamics and early adaptations better.

Third, the sensitivity analyses indicated that educational certificates reflect institutionally predefined opportunity structures that shape and constrain VET applicants' engagement in spatial mobility as a strategy to achieve their aspirations. These findings might be attributed to the specific structure of Germany's stratified education and VET system (DiPrete et al., 2017; Ebner et al., 2013; Protsch & Solga, 2016). Future country-comparative research is needed to evaluate the generalizability of these results. Such studies should examine whether youths' status aspirations are a stronger driver of goal engagement to achieve successful transitions in countries with less stratified systems, such as the US or France.

Furthermore, as this study focuses on changes in the application behavior of unsuccessful VET applicants over time, it is based on a small and selective subsample. This selectivity might lead to underestimating the willingness to be spatially mobile, as the restricted sample may share specific central characteristics influencing their chances of securing a VET position and mobility decisions. To address the sample selectivity, Table A5 in the Supplementary File compares the descriptive statistics of the analysis sample with a sample of VET applicants who successfully attained a VET position in the first year. The restricted analysis sample of unsuccessful VET applicants is characterized by a higher percentage of females, youths with migration backgrounds, and lower educational certificates. No prevalent differences between the samples are observed regarding the percentage of youths with high educational certificates, their mean status aspirations, SES background, the regional indicators, and mobility radius. To test the generalizability of the findings, further research is needed. Yet, as spatial mobility is theoretically conceptualized as an adaptive strategy to overcome obstacles and facilitate successful transitions, unsuccessful VET applicants constitute a suitable sample to test the presumed mechanisms. Additionally, focusing on this vulnerable group, which has received less attention in research so far, may provide new insights relevant for policymakers and practitioners to develop targeted measures to support successful transitions.

7. Conclusion

This study provides new insight into adaptations in VET applicants' willingness to become spatially mobile over time, highlighting the interplay between individual status aspirations and the regional opportunity structure. Using longitudinal data on actual application behavior, the findings indicate that VET applicants adjust their willingness to be mobile as an adaptive strategy to increase their chances of a successful transition.

Consistent with the agency-structure framework (Holtmann et al., 2017; Schoon & Heckhausen, 2019), the study highlights the vital role of individual agency and structural opportunities for youths' transitions. Specifically, it uncovers differences in adaptive goal engagement strategies based on status aspirations and regional opportunity structures. VET applicants with higher status aspirations demonstrate a consistently high willingness to be spatially mobile from the outset. In contrast, those with lower status aspirations adapt their mobility radius significantly over time in more favorable regions and initially in less favorable regions. Additionally, educational certificates appear to impose predefined institutional barriers, mitigating the impact of status aspirations on VET applicants' willingness to engage in spatial mobility.

Given the critical role of spatial mobility in mitigating structural inequalities and increasing the likelihood of successful transitions, practitioners should focus on measures to promote spatial mobility, especially for unsuccessful VET applicants with limited opportunities, to counteract cumulative disadvantages for this vulnerable group. In particular, early interventions implemented at the beginning of the application phase are crucial to prevent disadvantageous transitions into NEET status.

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Conflict of Interests

The author declares no conflict of interest.

Data Availability

This article uses data from the National Educational Panel Study (NEPS), Starting Cohort Grade 9, https://doi.org/10.5157/NEPS:SC4:15.0.0 (Blossfeld & Roßbach, 2019; NEPS Network, 2025). The NEPS is carried out by the Leibniz Institute for Educational Trajectories (LIfBi, Germany) in cooperation with a nationwide network. The data are available for scientific use under restricted conditions to comply with the relevant data protection regulations and to ensure the anonymity of the participants. The regional data and code for replicating the data preparation and analyses are available at https://doi.org/10.7802/2871.

Supplementary Material

Supplementary material for this article is available online in the format the author provides (unedited).

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About the Author

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Refugee Women's Transition to VET in Germany: Examining the Role of Gender Norms and Human Capital Endowments

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Abstract

The article examines the extent to which gender roles as well as the human capital resources acquired in the country of origin are associated with refugee women's chances of taking up vocational education and training (VET) in Germany. It follows the assumption that traditional gender roles, which assign women to the domestic sphere, can affect refugee women's behavior either directly or through social contacts who impose these roles upon them. Additionally, it argues that the human capital that refugee women acquired in their country of origin can affect the trainers' decision to hire them as trainees. The focus of the investigation is women between the ages of 18 and 30 who applied for asylum in Germany between 2015 and 2019 and mainly originate from Syria, Afghanistan, Iraq, and Iran (= 945). By applying a piecewise constant exponential model to monthly data from the IAB-BAMF-SOEP Survey of Refugees, the analysis shows that neither the women's endowment with human capital acquired in their country of origin (i.e., level of education and work experience) nor their own gender role attitudes, having children, or the frequency of contact with persons from the same country of origin are significantly associated with their chances of transitioning to VET. Having a partner is, however, associated with almost 60% lower chances of refugee women entering VET.

Keywords

gender roles; human capital; Middle Eastern women; migration; refugees; vocational education and training; women

1. Introduction

Between 2015 and 2019, almost 600,000 women applied for asylum in Germany, most of whom originated from Syria, Afghanistan, Iraq, and Iran (Eurostat, 2023). Over a third of these women were aged between 15 and 30 and were therefore of the appropriate age to enter vocational education and training (VET; Cardozo, 2023). Completion of a VET program represents a promising prospect for their long-term socio-economic integration in Germany for two reasons: First, a corresponding degree is a general prerequisite for a favorable position in the highly segmented German labor market (Protsch & Dieckhoff, 2011) and can provide a stepping stone to higher education (BIBB, 2022, p. 124). This applies particularly to women who have sought refuge in Germany and who disproportionately often work in jobs with the lowest requirements as well as in atypical employment relationships (Kosyakova, 2021). Second, the German VET system can be accessed by individuals with a lower or even no school-leaving certificate (Granato & Ulrich, 2014). In contrast to the higher education system, there are thus no formal access restrictions to VET for the majority of refugee women, who on average have been shown to have comparatively low educational qualifications upon their arrival in Germany (Brücker et al., 2019). Given the increasing shortage of skilled workers in Germany, especially in those training occupations that are traditionally dominated by women, such as nursing and healthcare professions (Bundesagentur für Arbeit, 2024), and the fact that 67% of the women of working age in the 2015–2016 refugee cohort state their wish to obtain a VET or university degree in Germany (Brücker, Fendel, et al., 2020), this group represents a large, currently untapped reservoir of human potential. However, only very few refugees who are of the appropriate age to enter VET (i.e., between 15 and 30 years of age) have actually taken this pathway in recent years. In this context, the chances of refugee women entering VET appear to be particularly low (Eberhard & Schuß, 2021; Meyer & Winkler, 2023).

Social contextual factors generally constitute an important framework for the vocational aspirations and opportunities of individuals. For women's vocational trajectories in particular, traditional gender roles that assign women to the family or domestic sphere have proven to be highly influential (cf., e.g., Hochschild & Machung, 1989). Women who adhere to norms that advocate a gender-specific division of labor and tend to oppose women's participation in the workforce might thus have a lower propensity to invest in their human capital. In addition, regardless of the women's own attitudes, people in their immediate social environment who uphold such norms have been shown to exert pressure on them to refrain from pursuing vocational aspirations (cf. Read, 2004). Moreover, women often face varying degrees of obstacles in their access to the education and employment systems of different countries, thus leading to considerable differences in precisely those human capital endowments that are most relevant to entering VET (Nussbaum, 2004; Protsch & Dieckhoff, 2011). In their host societies, refugee women face the challenge of navigating their lives in a partially differing social context, having to make decisions in matters of further education and qualification and drawing on existing resources (i.e., their human capital) as needed. They also possibly need to reconcile their own life goals and the subjectively perceived expectations of others concerning their future life trajectories.

For refugee women, little research has been conducted to date on the extent to which gender roles might influence their decision for or against VET and how their human capital endowments affect a corresponding transition. This article seeks to address this gap by examining different contextual conditions (arising from their familial and social circumstances as well as the opportunities given or perceived in the country of origin)

that can be assumed to affect their chances of taking up VET. The research question is: To what extent are gender roles and human capital endowments (educational qualifications and work experience) acquired in the country of origin associated with young refugee women's chances of transitioning to VET in Germany?

With this in mind, the article follows the assumption that gender norms influence the way people perceive and, above all, evaluate their environment. Those refugee women who consciously or subconsciously adhere to more traditional gender roles or are in closer contact with persons who do are therefore more likely not to pursue VET in Germany. Against this backdrop, the variables to be examined are the refugee women's own attitudes toward gender roles, whether or not they have children or a partner, and their frequency of contact with persons from the same country of origin. In addition, this study investigates the refugee women's level of education and work experience acquired in their country of origin as a representation of human capital resources that can be expected to be of particular importance in the search for a training place (cf., e.g., Niehues, 2021). While qualifications acquired in the host country have been shown to be crucial for immigrant and refugee women and their chances of transitioning to VET (Eberhard & Schuß, 2021), less attention has been paid to the role of qualifications that were obtained in the country of origin. To establish a basic understanding of the German VET system, Section 2 provides an overview of the individual VET sectors and the respective access regulations for refugees. This is followed by a description of the general theoretical matching model with a specific focus on those factors that are assumed to be significant for refugee women's transition to VET. The subsequent section demonstrates how the hypotheses formulated in this article were tested by using data from the IAB-BAMF-SOEP Survey of Refugees (2016–2020; e.g., Brücker et al., 2016). For this purpose, the transition rates of 18–30-year-old refugee women of the 2015–2016 refugee cohort in Germany (= 951) to VET were estimated by means of a piecewise-constant exponential model. The concluding section then discusses what the results imply for the living situation of young refugee women in Germany.

2. The Structure of the German VET System

The German VET system is divided into three sectors: the dual system, fully qualifying school-based vocational education programs, and the sector of prevocational training measures called the transitional system. Unlike the first two sectors, the transitional system does not correspond to a fully qualifying VET program but instead offers preparatory measures designed to enable participants to obtain a training place in the coming application year. Since attending prevocational training does not lead to a nationally recognized VET certificate (Solga et al., 2014), this article focuses only on transitions to one of the two fully qualifying VET sectors.

Almost 75% of the new entrants to one of the two fully qualifying VET sectors start a training program in the primary—that is, the dual—VET sector. Dual training programs usually last three years and are characterized by parallel instruction in a company and at a vocational school. The number of training places offered in a given year as well as the final selection of applicants are subject to the discretion of the companies providing the training. Accordingly, there are no formal access restrictions to the dual VET sector, for example, in terms of final grades or the level of education achieved (Solga et al., 2014, p. 8). This can be particularly beneficial for young refugees, who on average exhibit a rather low level of education, both in absolute terms and relative to the German population (Brücker, Kosyakova, & Vallizadeh, 2020, p. 37). However, if their asylum application is still being processed or has been rejected while being granted a temporary suspension of deportation, they

require an employment permit from the local foreigners office to start a dual VET program. This permit is issued explicitly for a specific employment opportunity (OECD, 2017) and is refused in only 6% of the cases, typically because the employment conditions of the desired position do not meet the standards of the German labor market (BMI, 2023; OECD, 2017). Additionally, access is denied to those persons who come from a so-called "safe country of origin" and have been residing in Germany for less than three months (Braun & Lex, 2016, p. 95).

In contrast to the dual sector, the VET programs in the school-based sector last between one and three years and are institutionally affiliated exclusively with vocational schools. Depending on the training occupation, however, some of the programs also include extensive practical components (BIBB, 2022, pp. 40–41; KMK, 2021, p. 147). The relative size of the secondary VET sector, as well as its curricular program, is subject to the discretion of the educational administration of the individual federal states. Owing to its proximity to the general school system, access to the school-based sector is formally linked to the attainment of a lower secondary but de facto to that of an intermediate secondary school-leaving certificate (Eckelt & Schauer, 2019, p. 452; Seeber et al., 2019, pp. 72–73). Unlike in the dual system, trainees in the school-based sector are not remunerated and are sometimes even required to pay a fee (Reimer & Schindler, 2010, p. 256). In terms of access, however, no restrictions apply regarding the length of stay or the possession of a work permit (Braun & Lex, 2016, p. 95). Only in some federal states does admission to a vocational school in the secondary VET sector additionally require proof of a certain level of German language proficiency (cf. the school regulations of the German federal states).

In terms of content, the primary and secondary sectors each train for different occupational groups. While the dual VET sector essentially focuses on training for skilled craft, manufacturing, industrial, and technical occupations, the school-based VET sector trains young people mainly in the fields of healthcare, social work, and education (Ludwig-Mayerhofer et al., 2019; Solga et al., 2014). This occupational differentiation is accompanied by the gender segregation of the German VET system: While the share of women in the dual VET sector was 37% in 2018, it amounted to 76% in the school-based VET sector for the same year. However, as the dual VET sector comprises more training places overall, roughly the same number of women ultimately transition to the dual and school-based sectors each year (own calculations based on BIBB, 2022).

3. Theoretical Considerations and Empirical Evidence

According to matching models, the theoretical framework underpinning this study, the transition to VET represents the result of an interplay between the preferences and decisions of the potential training place applicant and recruiters at companies in the dual VET sector, as well as at vocational schools in the school-based VET sector (Logan, 1996; Sørensen & Kalleberg, 1981). It is further assumed that adherence to traditional gender roles can be associated with lower chances of enrolling in VET, especially for migrant women (cf., e.g., Khoudja, 2017; Read, 2004). A third assumption is that the endowment with human capital is a relevant predictor of refugee women's integration into the German VET market. In a first step, it is outlined how traditional gender roles can affect refugee women's propensity to apply for a training place, both directly and through social contacts who impose these roles upon them. Subsequently, it is explained how the endowment with human capital acquired in the country of origin is likely to be related to refugee women's chances of being hired as trainees.

On the part of the potential training place applicant, refugee women first have to consider the VET pathway itself and, beyond that, must view the specific training position as preferable to alternative educational pathways, direct labor market entry, or unemployment, before applying for a vacant training position. Subscribing to traditional gender roles has been empirically confirmed to pose a potential obstacle to migrant women's integration into the host society's labor market (cf., e.g., Khoudja, 2017; Read, 2004). The theoretical model adopted here argues that attitudes toward gender roles refer to normative beliefs regarding the behavior, responsibilities, and general societal position that is considered appropriate for men and women. While egalitarian attitudes embrace the notion that men and women have the same capability and right to work inside and outside the household, traditional attitudes encompass the belief in a rightful separation of gender roles in the public and private spheres. This separation is characterized by men being assigned a role in public life as the family's primary breadwinner, while women's role is tied to the domestic sphere, where they have the main responsibility for household labor and childcare (Corrigall & Konrad, 2007, p. 847; Davis & Greenstein, 2009; Eagly, 1987).

According to Reykowski (1989), such evaluative standards of appropriate behavior are assumed to be internalized by members of a society through two forms of social interaction: "modeling" and "power execution." "Modeling" refers to the fact that the opinions and actions of other people are observed and subsequently encoded in memory as a cognitive schema, which in turn provides a frame of reference for one's own social conduct. "Power execution" refers to situations in which actors possessing superior power define for another individual what behaviors are acceptable, usually through various forms of expression of approval and disapproval and infrequently through practices such as exclusion from the group or the use of physical force. However, the evaluative standards formed through these processes are not immutable. Changes in how individuals evaluate role behavior can result from both internal cognitive development and external social influences (Reykowski, 1989, pp. 30–37). Although every society features a set of prevalent norms, it is by no means unanimously shared by all its members (cf., e.g., Michaeli & Spiro, 2015).

In the case of refugee women, it can be assumed that both mechanisms of internalizing evaluative standards could come into play in their decision on whether to pursue VET. In line with "modeling," refugee women who have consciously adopted traditional gender roles are more likely to confine their role to women in the domestic sphere and refrain from applying for a training place. Previous research on the association between migrant women's gender role attitudes and their labor market participation has shown mixed results in this regard, which may, however, be due to differences in how the construct was operationalized in various studies (cf., e.g., Kanas & Müller, 2021; Koopmans, 2016; Salikutluk & Menke, 2021; van der Zwan & van Tubergen, 2022).

Furthermore, it can be assumed that their perception of motherhood, socially learned through "modeling," leads refugee women to take on the majority of care work if they have children, regardless of their consciously held attitudes toward gender roles. We can therefore expect refugee women with children to be less likely to pursue VET. Empirically, the probability of labor market participation has been shown to be significantly lower for those refugee women who do have children, although the defined age limits of the children vary greatly in previous studies (cf., e.g., Brücker, Kosyakova, & Schuß, 2020; Fendel & Schreyer, 2022; Kosyakova et al., 2023; van der Zwan & van Tubergen, 2022). On this basis, the following hypotheses can be derived:

> Hypothesis 1a: Refugee women who adhere to more traditional gender role attitudes have lower chances of transitioning to VET.

Hypothesis 1b: Those refugee women who have children have lower chances of transitioning to VET.

Regardless of the refugee women's own preferences, it can be theorized that other persons in their social environment who uphold traditional gender role attitudes may oppose their application for a training place and thus limit their chances of enrolling in VET via the mechanism of "power execution." First and foremost, this includes the women's partners. Interview studies indicate that a certain proportion of men in the 2015/16 refugee cohort in Germany are reluctant to give up their dominant position within the partnership and likewise to concede more rights of self-determination to their female partner. Thus, to prevent a leveling of the culturally established power relations, they often try to hinder the socio-economic integration of their partners (Brücker et al., 2016, pp. 29–31; Hillmann & Toğral Koca, 2021, pp. 10–11). It can therefore be assumed that having a partner is likely to be associated with lower chances of refugee women entering VET. Yet previous research findings on partnership effects regarding the labor market participation of women with a general migration and refugee background in particular have been rather ambiguous (Cardozo, 2023; Donato et al., 2014; Khoudja & Fleischmann, 2015).

Furthermore, even if the woman and her partner have rather egalitarian views on the appropriate lifestyle for women, other persons who firmly advocate traditional gender roles may also exert a strong influence. Various studies on migrant women from the countries of the Greater Middle East indicate that, regardless of their own attitudes, they are sometimes urged by significant other persons of the same country of origin to strictly follow a traditional gender-specific division of labor, partly in order to distance themselves from the seemingly immoral values of the host country (Fernández & Fogli, 2009; Kulik & Rayyan, 2003; Read & Oselin, 2008). However, as far as known, there are as yet no quantitative studies on the association between interaction with people from the same country of origin and migrant women's integration into either the VET or the labor market. Building on this, the following hypotheses can be formulated:

Hypothesis 1c: Those refugee women who have a partner have lower chances of transitioning to VET.

Hypothesis 1d: Refugee women who have more frequent contact with persons from the same country of origin have lower chances of transitioning to VET.

On the other end of the training contract, recruiters at companies that provide training in the dual VET sector as well as their counterparts at vocational schools in the school-based VET sector can generally be assumed to allocate the available training places on the basis of the applicants' endowments with human capital (cf. Becker, 1985). As mentioned in Section 2, the level of education acquired is nearly the only decisive factor for the allocation of training places in the secondary VET sector (cf. the school regulations of the federal states). But also in the primary VET sector, previous education serves as a compelling signal for the prospective performance of the individual applicants (cf., e.g., Protsch & Dieckhoff, 2011).

Another important determinant of classical human capital that the present study theorizes to be advantageous to company recruiters in the primary VET sector to assess the aptitude of applicants is previous work experience (Chiswick & Miller, 2009). On the one hand, it signals a higher willingness and ability to work. On the other, previous experience, especially in skilled craft, technical, and commercial activities, can represent valuable professional qualifications for companies (Damelang et al., 2019, p. 744; Niehues, 2021, p. 5). Those refugee women who were able to acquire a higher level of education as well as

work experience in their countries of origin are therefore likely to have a more advantageous position in the German VET market:

> Hypothesis 2a: Refugee women who acquired higher levels of education in their country of origin are more likely to transition to VET.
>
> Hypothesis 2b: Refugee women who acquired work experience in their country of origin are more likely to transition to VET.

4. Data and Methods

4.1. Data and Sample

The empirical analyses are based on the IAB-BAMF-SOEP Survey of Refugees, an ongoing longitudinal household survey launched in 2016 (Brücker et al., 2018; Kühne et al., 2019). Its target population, for whom the survey is representative, consists of persons who applied for asylum in Germany between 2013 and 2019 (Steinhauer et al., 2022). It provides information at the individual, couple, and household levels, including socio-economic and integration-specific characteristics, the respondents' educational trajectories, personal attitudes, and their social networks.

In Germany, 25% of all new entrants to the VET system are aged between 15 and 18, and an additional 72% between 18 and 30 (Statistisches Bundesamt, 2020, Table 2.7). In the IAB-BAMF-SOEP survey, however, persons under the age of 18 are given an alternative questionnaire that is primarily focused on the situation of minors and in which a wide range of information crucial to the empirical analyses of this article is omitted. For this reason, the initial sample was restricted to women aged 18 to 30. In addition, women who (a) migrated to Germany before 2013 (25 observations), (b) had already obtained a VET degree in their country of origin that was recognized in Germany (40 observations), and (c) were still at school at the time of investigation (190 observations) were excluded. Moreover, concerning Hypothesis 1c, it seems likely that it is predominantly the male partners who might oppose refugee women's pursuit of vocational aspirations and thus limit their chances of taking up VET. The sample was therefore restricted to women living in a heterosexual relationship. The final sample ultimately consisted of 945 individuals.

4.2. Destination State, Explanatory, and Control Variables

The destination state of the empirical analyses was defined as the transition to VET, which includes transitions to both the dual and the school-based VET sector. As attending the transitional system does not lead to a nationally recognized VET certificate (cf. Section 2), transitions to this sector were not considered. Any other known employment status was defined as a non-transition to VET.

With regard to the explanatory variables, various items are available in the IAB-BAMF-SOEP Survey of Refugees that can be used, as established in the literature (cf., e.g., Kosyakova & Kulic, 2022; Salikutluk & Menke, 2021), to assess how traditional refugee women's own gender role attitudes are shaped. The refugees were asked to rate on a scale of 1 to 7 to what extent they agreed with various statements on egalitarianism in the family, education, and work sphere. However, Hartmann and Steinmann (2021) have

pointed out that these items capture multiple dimensions of gender role attitudes and are therefore rather unsuitable for being combined into a joint sum index (cf. Grunow et al., 2018; Knight & Brinton, 2017). Hence, an exploratory factor analysis with varimax rotation was carried out to identify how and on how many dimensions the individual items are loaded. In line with Hartmann and Steinmann (2021), the present analysis identified two dimensions that were classified as attitudes towards women's employment and attitudes towards power relations between men and women. The exact wording of the individual attitude items, their rotated factor loadings, and the overall factor rotation matrix can be found in the Supplementary File, in Tables S1 and S2. Against the background of the research subject of this article, only those two variables that capture the dimension of attitudes towards women's employment were combined into a sum index, whereby a higher agreement value indicates a more egalitarian attitude toward gender roles. The Cronbach alpha reliability is 0.84. The relative distribution of this index in the sample is presented in the supplementary material by means of a histogram (Supplementary File, Figure S1). The variable *children* encompasses children under the age of 14 and was generated, just like that of the respondent's *partner*, as a dummy-coded variable based on the woman's self-reporting on these questions. *Frequency of contact with persons from the same country of origin* was measured using the question: "How often do you spend time with people from your country of origin who are not related to you?" The scale ranged from 1 (*never*) to 6 (*daily*).

The *level of education acquired in the country of origin* was operationalized by the highest level of education attained abroad according to the ISCED classification of 2011. Since many women in the 2015/16 refugee cohort did not attend school in their country of origin, a corresponding category was added to the official classification. The variable thus ranges from 1 to 5 and comprises, in ascending order, non-completion of primary education, completion of primary education, lower secondary education, upper secondary education, and tertiary education (cf. Kosyakova et al., 2021). *Work experience acquired in the country of origin* was generated as a dummy-coded variable from various statements made by the refugee women about their work experience and their age at the time of their first job.

Moreover, those variables that are considered in the literature to be further predictors of young refugees' transition chances to either VET or the labor market were included in the model as controls (cf., e.g., de Vroome & van Tubergen, 2010). In addition to socio-demographic characteristics (age at the time of arrival, country of origin) and information on the current living situation in Germany (period of arrival in Germany, residence title, type of household, perceived discrimination, current health), these variables also comprise human capital resources acquired in the host country (school attendance in the host country, participation in an occupation-specific language course, German writing skills, frequency of contact with members of the majority population). A description of the independent and control variables is presented in Table S3 in the Supplementary File. On average, around 17% of their values are missing and were multiply imputed using iterated chained equations (= 100; White et al., 2011).

4.3. Analytical Strategy

With the destination state of transitioning to VET being a binary variable and the IAB-BAMF-SOEP Survey of Refugees being a panel dataset, event time models were chosen for the empirical analyses. In these models, a population of individuals who are "at risk" of transitioning to the destination state was defined as the "risk set" (Blossfeld et al., 2019). Their transition rate—that is, the "hazard rate" of entry into the VET system—was analyzed. Most VET programs in Germany start on the 1st of August or September (Federal Institute for

Vocational Education and Training, 2018), so considering admission to these programs on a yearly basis would, in principle, largely be sufficient. In event time models, however, it is of particular importance that the risk set comprises only those individuals who are actually eligible to experience an event during a given period of time (Blossfeld et al., 2019). With the exclusive focus on women's transition to VET, it is thus necessary for the accuracy of the empirical analyses to remove those months from the risk set in which the women are on maternity leave and are thus not available to the VET market (cf., e.g., Sunder, 2009, p. 10). Hence, the data is organized as person-month observations, where each row of the dataset corresponds to the temporal state of one month. For the handling of overlapping spells, the Stata program newspell.ado was used (Kröger, 2015). The transition of refugee women to VET is therefore considered on a monthly basis, excluding the maternity months.

In the dataset, most transitions to VET could be observed in August, September, and January, which resulted in so-called "tied ending times" or simply "ties." To handle them most efficiently, a piecewise constant exponential model was used for the empirical analyses. This is a generalization of the standard exponential model, in which the time axis is split into individual intervals. The baseline hazard—that is, the hazard function when all covariates are set to zero—is assumed to be constant within these intervals but can vary between them (Blossfeld et al., 2019). This results in a baseline hazard that changes as a step function of time. Given that the split points on the time axis are defined as $_1$, $_2$, , , the transition rate to the destination state of VET k has the following form:

$$_k = \exp\ \overline{\alpha}^{(k)} + \ ^{(k)}\alpha^{(k)} \quad \text{if} \quad < t \quad _{+1}$$

where $\overline{\alpha}^{(k)}$ is a constant coefficient associated with the th time period, $^{(k)}$ is the vector of covariates, and $\alpha^{(k)}$ is an associated vector of coefficients showing the effects of these covariates in the th time period. The exponentiated coefficients correspond to hazard ratios, which indicate the shift in the hazard rate relative to the baseline hazard that is associated with a one-unit change in the respective covariate. A hazard ratio above 1 implies that the covariate is positively associated with the chance of experiencing the event of interest (in this case, the transition to VET), whereas a hazard ratio below 1 is negatively associated with the corresponding chance (Cleves, 2008).

The period of observation covers the years 2016–2020 and considers all data points that are currently available in the monthly dataset of the IAB-BAMF-SOEP Survey of Refugees. The possible maximum number of observation points (i.e., "single spells") consequently amounts to 60 per person, resulting in a total of 21,470 person-month observations in the imputed dataset.

Three models were estimated. While including the control variables, Model 1 examined those factors that were assumed to depict the influence of gender norms on refugee women's chances of entering VET. This comprised the women's own attitudes toward gender roles, whether or not they have children, whether or not they have a partner, and their frequency of contact with persons from the same country of origin. While again including the selected control variables, Model 2 examined the human capital the refugee women acquired in their countries of origin, that is, their level of education and work experience. Lastly, all of these variables were jointly included in Model 3 to examine which of the associations remained significant when controlling for each other's influence.

4.4. Sensitivity Analysis

To verify the robustness of the results, several sensitivity analyses were conducted on the basis of the models' overall structure (Model 3). These analyses are presented in the Supplementary File (Table S4) and the results in section 5.

First, it can be assumed that the variable of children and that of a partner are highly correlated. To individually assess the transition chances of refugee women to VET who are single parents, in a childless relationship, or have both children and a partner, another model was estimated in which the two variables interacted with each other (Model 4).

Furthermore, it is also conceivable that having children under the age of 14 does not significantly impact refugee women's decision for or against VET, as not all children of this age group still require a substantial amount of care. By contrast, having *children up to the age of six*, who are not yet in school, can be expected to be more time-consuming and thus exert a stronger influence on women's decision to enter VET. Therefore, another sensitivity analysis was carried out to test this variable in place of the original variable for having children (Model 5).

Lastly, those women who come to Germany as part of family reunification often receive a residence permit (Grote, 2017). Since the inclusion of the refugee women's residence status as a control variable can suppress part of the partnership effect, a final robustness check was conducted in which the variable was omitted from the model (Model 6).

5. Results

Of the 945 refugee women in the sample, 85 transitioned to VET in the observation period from 2016–2020 (9.0%). This corresponds with an incidence rate of around two persons per 10,000 individuals.

Table 1 reports the estimated hazard ratio coefficients from the piecewise constant exponential model. Model 1 examined those factors that are related to gender roles and can be assumed to be associated with refugee women's decision for or against VET. Neither their own attitudes toward gender roles, having children, nor the frequency of contact with persons from the same country of origin are significantly associated with their chances of transitioning to VET. Having a partner is, however, associated with about 60% lower chances of taking up VET for refugee women compared to those who do not have a partner. This result is significant at the 5% level.

Model 2 examined those human capital resources acquired by the refugee women in their country of origin that are assumed to be associated with the decision of recruiters at companies in the dual VET sector as well as at vocational schools in the school-based VET sector for or against a specific training place applicant. It became apparent that neither the level of education nor the work experience they acquired in their country of origin are significantly associated with their chances of enrolling in VET in Germany.

Table 1. Piecewise constant exponential models for the transition of refugee women aged 18–30 to VET.

	Model 1	Model 2	Model 3
Independent variables			
Gender roles			
Gender role attitudes	1.112 (0.133)	—	1.122 (0.137)
Children (ref. no)			
Yes	0.731 (0.261)	—	0.732 (0.268)
Partner (ref. no)			
Yes	0.405* (0.144)	—	0.417* (0.151)
Frequency of contact with persons from the same country of origin	0.899 (0.073)	—	0.891 (0.074)
Human capital acquired in the country of origin			
Level of education acquired in the country of origin (ref. no school education)			
Primary education	—	1.371 (0.692)	1.305 (0.669)
Lower secondary education	—	0.994 (0.450)	0.956 (0.444)
Upper secondary education	—	1.450 (0.651)	1.318 (0.607)
Post-secondary/tertiary education	—	1.681 (0.836)	1.334 (0.688)
Work experience acquired in the country of origin (ref.: no)			
Yes	—	0.634 (0.223)	0.616 (0.219)
Control variables			
Age at the time of arrival	1.110* (0.047)	1.047 (0.044)	1.112* (0.050)
Period of arrival in Germany (ref.: before 2015)			
In 2015	0.569* (0.162)	0.608+ (0.173)	0.570+ (0.164)
After 2015	0.625 (0.210)	0.717 (0.241)	0.639 (0.218)
Country of origin (ref.: Syria)			
Afghanistan	1.008 (0.389)	1.108 (0.432)	1.031 (0.410)
Iraq	0.655 (0.266)	0.799 (0.327)	0.668 (0.278)
Somalia/Eritrea	1.282 (0.569)	1.711 (0.767)	1.433 (0.665)
Other	0.995 (0.344)	1.225 (0.434)	1.095 (0.392)

Table 1. (Cont.) Piecewise constant exponential models for the transition of refugee women aged 18–30 to VET.

	Model 1	Model 2	Model 3
Control variables			
Residence title (ref.: temporary residence permit)			
Temporary suspension of deportation	1.640 (1.061)	1.274 (0.818)	1.585 (1.039)
Residence permission	0.839 (0.331)	0.917 (0.363)	0.846 (0.337)
Type of household (ref.: private household)			
Collective accommodation	0.518^{+} (0.202)	0.618 (0.234)	0.522^{+} (0.204)
Perceived discrimination (ref.: never)			
Rarely	0.700 (0.229)	0.675 (0.219)	0.688 (0.226)
Often	0.796 (0.416)	0.822 (0.429)	0.811 (0.426)
Current health	1.111 (0.163)	1.084 (0.162)	1.110 (0.165)
School attendance in the host country (ref.: no)			
Yes	1.762 (0.701)	2.341* (0.914)	1.836 (0.736)
Participation in an occupation-specific language course			
Yes	1.317 (0.385)	1.357 (0.398)	1.244 (0.371)
German writing skills	1.559** (0.239)	1.655** (0.258)	1.539** (0.247)
Frequency of contact with members of the majority population	1.094 (0.083)	1.090 (0.083)	1.099 (0.084)
Period			
2016	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
2017	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
2018	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
2019	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
2020	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Largest FMI	0.163	0.196	0.200
Average RVI	0.383	0.370	0.383

Source: Own calculations based on the IAB-BAMF-SOEP Survey of Refugees (2016–2020). Notes: (observation) = 22,063; imputed data, = 100; hazard ratio coefficients; robust standard errors in parentheses; $^{+}$ $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

In a final step, all of these variables were jointly examined in Model 3. When one controls for their influence on each other, having a partner is associated with 58% lower chances of refugee women transitioning to VET compared to those who do not have a partner, with significance being at the 5% level. Accordingly, of Hypotheses 1a–1d, only Hypothesis 1c could be confirmed. The two human capital resources of the level of education and work experience acquired in the country of origin fail to show any association with refugee women's chances of taking up VET. Neither Hypothesis 2a nor 2b could therefore be confirmed.

Finally, to verify the consistency of the estimates, the four sensitivity analyses described in section 5.4 were carried out. The results were robust to each of the specifications (see Table S4 in the Supplementary File). It is particularly noteworthy that the interaction effect between having children and having a partner is insignificant (Model 4). Furthermore, the chances of transitioning to VET are not significantly lower for single mothers than for women without children and a partner. Women in a childless partnership, on the other hand, exhibit lower chances in this respect compared to women without children and a partner, with significance being at the 10% level. In view of the small number of people in this familial constellation, this significance level should not be regarded as negligible but additionally indicates the negative significance of a partnership for refugee women's chances of entering VET.

6. Discussion

The study investigated the extent to which various contextual conditions related to gender norms as well as the human capital acquired in the country of origin are associated with refugee women's chances of transitioning to VET in Germany. In examining the role of gender norms, the study considered several factors: the women's own attitudes toward gender roles, their having children or a partner, as well as their contact frequency with persons from the same country of origin. In analyzing the role of human capital endowments, the study considered the level of education as well as work experience acquired in the country of origin. The study focused on Germany, as it is an important reception context for almost 600,000 female asylum seekers (Eurostat, 2023). Although its VET system provides highly promising opportunities for the long-term socio-economic integration of refugees in Germany, refugee women have so far only participated in VET to a very limited extent (Niehues, 2021).

The descriptive results of the survival analysis based on the representative panel dataset of the IAB-BAMF-SOEP Survey of Refugees have revealed that only 9% of refugee women between the ages of 18 and 30 entered the German VET system between 2016 and 2020. The multivariate piecewise-constant models indicated that neither their own gender role attitudes, nor having children, nor the frequency of their contact with persons from the same country of origin that were assumed to be associated with refugee women's decision for or against VET are significantly associated with their potential chances of transitioning to VET in the multivariate analyses; only having a partner is associated with almost 60% lower chances in this regard.

The fact that the refugee women's own attitudes toward gender roles are not significantly associated with their chances of enrolling in VET could be attributed to the circumstance that most of the women in the sample already hold fairly egalitarian attitudes in this respect, as Table S3 and Figure S1 in the Supplementary File illustrate. Previous research has suggested that other immigrant groups tend to self-select into host countries on the basis of cultural traits (Docquier et al., 2020). However, this has not yet been confirmed for asylum seekers and calls for further empirical analyses.

Whereas the refugee women's own gender role attitudes are not significantly associated with their chances of transitioning to VET, having a partner exhibits a particularly strong negative association in this regard. This could be an indication that the partner might be exerting pressure on them to adhere to a traditionally gendered role distribution, rendering the women's own gender role attitudes secondary. Alternatively, it is conceivable that the items used to map the refugee women's attitudes toward gender roles are simply too abstract to reflect their actual lifestyle preferences. According to Epstein (1989), values exist at different levels of generality in our consciousness, making it possible to abstractly agree with a value-related questionnaire item but not to align one's empirical actions with that value. Further research is thus needed on this question. Nevertheless, previous research has shown that cultural assimilation takes place not only over generations but also within a generation (cf., e.g., Antecol, 2001). As the length of stay increases, exposure to the values of the host country has been confirmed to contribute to an incremental leveling of the power imbalance between first-generation migrant men and women in a relationship (Shirpak et al., 2011), a more egalitarian division of labor between them (Frank & Hou, 2015), and greater female labor market participation (Blau et al., 2011; Frank & Hou, 2015). However, whether this also applies to refugee women's integration into the VET system, which has usually occurred by the age of 30 and is therefore likely to become less attractive as the length of stay increases, will have to be determined in future studies.

Finally, it is surprising that having a partner, but not having children, exhibits a strong negative association with refugee women's chances of transitioning to VET, as children are likely to be a mediator between partnership and their respective chances. Yet, the strong association between having a partner and refugee women's chances of taking up VET remained stable even in the sensitivity analysis conducted to test the interaction effect between the presence of children and that of a partner (Supplementary File, Table S3, Model 4). This is particularly relevant as the vast majority of studies that examine the educational and employment participation of refugee women typically include children as an explanatory factor in the models but only seldom the partner. The empirical results of this article therefore suggest that partnership could be an important explanatory factor in future studies on these topics.

With regard to the refugee women's human capital endowments, neither the level of education nor work experience acquired in the country of origin appeared to be significantly associated with their chances of enrolling in VET in Germany. This could be an indication that the human capital acquired in the country of origin does indeed experience a devaluation over the course of the migration process, as previous research has already documented for other groups of immigrants (cf., e.g., Chiswick & Miller, 2009; Friedberg, 2000). For refugee women in particular, the fact that the occupational tasks they performed in their countries of origin are not easily transferable to the German labor market could be contributing to this devaluation. Prior to emigration, the refugee women in the present study were mainly employed in knowledge-intensive service professions such as education, which require a high level of country-specific knowledge so that work in such fields cannot be readily resumed in Germany (Kosyakova et al., 2023, p. 3).

One of the most encouraging results of this study is that, although many of the refugee women came to Germany with rather low educational qualifications and little professional experience in their countries of origin, this does not pose a major obstacle to their integration into the German VET system. Building on this insight, it would therefore be interesting for follow-up studies to investigate the extent to which investment in host-country-specific human capital resources, and especially in which ones, supports the integration of refugee women. It also remains for further studies to clarify how one might reduce the strong negative

association between having a partner and refugee women's chances of entering VET. One possible approach in this regard could be to increasingly implement vocational orientation and support measures that explicitly target women and to staff such programs with employees who have been sensitized to consider the influence of culturally divergent values on partnership dynamics and the gender-specific division of labor in their work. In addition, mentoring programs could also be a promising way of bringing refugee women into closer contact with people from the majority population and, accordingly, exposing them to a wider range of different conceptions of life, thus offering them new perspectives on the possibilities of shaping their own lives (cf., e.g., Schermer-Rupprechter, 2022). After all, even though the analytical model did not identify a statistically significant association between the frequency of contact with people from the majority population and refugee women's chances of entering VET, on the basis of these results it is unfortunately not possible to draw conclusions about the quality of the corresponding relationships. It is thus conceivable that many of these social contacts take place at a rather superficial level that does not involve addressing issues such as values and lifestyle opportunities. Further research is therefore needed on the influence of host-country-specific human capital on potential changes in the attitudes and lifestyles of refugee women and, subsequently, on their chances of transitioning to VET.

One major limitation of this article concerns the fact that the IAB-BAMF-SOEP Survey of Refugees, unfortunately, does not allow for differentiating between the dual and school-based sectors in the transition to VET, so that clarifying which specific sector refugee women most frequently transition to remains a question for future studies using a different dataset.

Another limitation that needs to be mentioned is that, while information on when refugee women transitioned to VET is available at the monthly level, information on the values of the independent variables is only available at the annual level. However, as there is no reason to assume major changes in the variables over a few months, this should not distort the results to any substantial extent.

Furthermore, since the observation period covers only five years, the data can be assumed to be heavily right-censored. Many of the refugee women who have come to Germany in the past decade did so in the context of family reunification, often years after the large refugee movement peaked in 2015/2016. This implies that they are currently still in the process of learning the German language before they can realistically consider enrolling in VET. Conversely, as many of the refugee women in Germany entered the country before 2016, which marks the start of the IAB-BAMF-SOEP Survey of Refugees, it was further not possible to use their time since arrival as a timeline, so that the general start of the survey had to serve as a makeshift basis instead.

These limitations notwithstanding, it is hoped that the findings of this article can provide meaningful insights into the role gender norms and human capital endowments play in refugee women's transition to VET. While these findings apply to Germany, it is reasonable to assume that the situation is similar in countries with comparable VET systems.

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Conflict of Interests

The author declares no conflict of interests.

Data Availability

Due to the German data protection legislation, access to data from the IAB-BAMF-SOEP Survey of Refugees is restricted to researchers with an institutional affiliation who have signed a data distribution contract with DIW Berlin. Researchers can apply for data access at https://www.diw.de/en/diw_01.c.601584.en/data_access.html.

Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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Socio-Economic and Gender Differences in Post-Secondary Pathways in the UK, Germany, and Australia

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Abstract

This study investigates variations in school-to-work transitions (SWTs) by socio-economic status (SES), gender, and socio-cultural context. Leveraging data from three nationally representative longitudinal panel studies, we compare the experiences of young people coming of age in the 21st century (2011 to 2023) in the United Kingdom, Germany, and Australia. We examine the role of different support systems that scaffold the SWT process along various post-secondary pathways, including university, further education/vocational training, and employment tracks, with a particular focus on variations by parental education and gender. Utilizing longitudinal data from the Understanding Society Panel in the UK (N = 15,692 observations), the German Socio-Economic Panel (GSOEP; N = 5,464), and the Household, Income and Labour Dynamics in Australia (HILDA) Survey (N = 5,759), we track synthetic cohorts born between 1993 and 1995 from ages 18 to 27 in the three countries. We employ linear probability models to conduct a cross-national comparative analysis, identifying variations in post-secondary pathways across the three country contexts. The choice of countries is motivated by their shared status as developed economies with distinct features in their SWT systems—contrasting the neoliberal deregulatory frameworks of Britain and Australia with Germany's employment-focused dual system. The findings reveal significant effects of parental education on post-secondary transitions, as well as the differing roles of gender across various educational policy contexts. These results underscore the complexity of SWT when considered in different national settings. The insights generated by this analysis highlight the importance of dedicated policies to support low-SES youth and promote gender equality in education and employment outcomes.

Keywords
Australia; cross-national comparative analysis; gender; Germany; post-secondary pathways; school-to-work transitions; socio-economic status; UK

1. Introduction

School-to-work transition (SWT) is a key developmental stage in the transition to adulthood, ranking highly in importance, complexity, and relevance for later outcomes (Schoon & Bynner, 2017; Schoon & Heckhausen, 2019; Zacher & Froidevaux, 2021). SWT generally spans the phase between completing full-time education or training, entering paid employment, and establishing oneself in a labor market career. A problematic start in the labor market, indicated by low-level qualifications or prolonged experiences of unemployment or inactivity, can have long-lasting and detrimental impacts on future career development and later life outcomes, including health and well-being (H.-P. Blossfeld et al., 2008; Schoon & Lyons-Amos, 2017). This study aims to better understand the institutional structures that support a successful SWT by comparing post-secondary pathways taken by young people coming of age in the 21st century (2011 to 2023), specifically examining the experiences of 18–27-year-olds born between 1993 and 1995 in three different countries.

The lives of young people are shaped by the economic circumstances and social contexts in which they live. Their education and employment transitions have been significantly affected by the 2008 recession (Bell & Blanchflower, 2011; Schoon & Bynner, 2017, 2019) and, more recently, by the economic and employment consequences of the Covid-19 pandemic (International Labour Organisation, 2022). For example, the global youth unemployment rate has increased since the beginning of the millennium, spiked after the 2008 recession, and reached its highest level during the Covid-19 pandemic in 2020 (World Bank, 2023). Although these major global events affected all young people, they did not impact everyone equally. Variations in pathways arise due to socio-demographic background characteristics, including family socio-economic status, gender, age, and migration status, as well as country-specific institutional and structural arrangements that shape transition processes and outcomes. While the overall and country-specific effects of the 2008 recession (Bell & Blanchflower, 2011; Schoon & Bynner, 2017, 2019) and the Covid-19 pandemic (Deng et al., 2022; World Bank, 2023) on education and employment outcomes are well-documented, less attention has been given to cross-country variations.

This study takes a life-course perspective, drawing on nationally representative panel data from Australia, Germany, and the UK to follow young people aged 18–27 and examine the relevance of SES and gender for post-school transitions. From a life-course perspective, the SWT is a key *status passage* in the institutionalized life course, where longitudinal trajectories are shaped by available support structures and institutional channeling or canalization (Heckhausen & Buchmann, 2018; Schoon & Heckhausen, 2019). The choice of the three countries is motivated by their shared status as developed economies with distinct features in their SWT transition systems—contrasting the neoliberal framework of Australia and the UK with Germany's employment-focused dual system. Another important factor in selecting these countries was the existence of broadly comparable national household panel studies, which enable the generation of robust evidence for individual-level comparisons of experiences in different age cohorts transitioning after the Great Recession and during the recession following the Covid-19 pandemic.

2. Conceptualizing SWT

2.1. The Role of Institutional Structures

SWT has been defined as a "sequence of educational, labor-market, and related transitions that take place between the first significant branching point within educational careers and the point when—and if—young people become relatively established in their labor-market careers" (Raffe, 2014, p. 177). Transitions from school to post-secondary education and to work occur within a particular socio-cultural and socio-economic context, referred to as a "transition regime," which can be defined by the "relatively enduring features of [each] country's institutional and structural arrangements that shape transition processes and outcomes" (Raffe, 2014, p. 177).

Countries differ in the institutional structures guiding the transition from school to work. Comparative research on youth transitions has focused particularly on the role of welfare regimes, labor market regulation, and the nature of the linkage between educational systems and the labor market (H.-P. Blossfeld et al., 2008; Breen & Buchmann, 2002; Müller & Gangl, 2003). These institutional factors are assumed to influence and channel transition behaviors by offering a diverse set of opportunities and constraints (Schoon & Heckhausen, 2019), which are defined by national contexts, including aspects of the education and training system, the labor market, the welfare system, family structures, and other institutions (Raffe, 2008, 2014; Walther, 2006).

2.2. Transition Regimes

Countries differ markedly in the institutional structures of their education and training systems and labor markets (Brizinsky-Fay, 2007; Gangl, 2000; Pastore, 2016). Walther (2006) differentiates between sub-protective, universalistic, liberal, and employment-centered transition regimes. This differentiation has been highly influential in European comparative youth research, although more recent approaches have advanced a welfare mix approach to clarify the different contributions made by the state, the family, and the labor market in shaping youth transitions (Antonucci et al., 2014). Here, we concentrate on features of liberal and employment-centered transition regimes, given our focus on the UK, Australia, and Germany.

The "liberal" transition regime model, predominant in Anglophone countries including the devolved contexts of the UK as well as Australia, emphasizes individual responsibilities over collective action. Education is mostly comprehensive, focused on general knowledge and skills, while labor markets are largely deregulated, with a relatively large share of lower-skilled and non-standard jobs (Breen & Buchmann, 2002; Brizinsky-Fay, 2017; Brown et al., 2011; Kerckhoff, 2000). University education provides the most direct route to professional occupations. In the UK, initiatives such as integrating work placements into university courses, promoting degree apprenticeships, fostering collaborations between educational institutions and employers, and implementing government policies aimed at improving skills development help align graduates' skills with industry needs; however, only large firms tend to participate (Roberts, 2019). Australia has also extensively integrated work-based components into university curricula—so-called work-integrated learning (WIL)—such as internships, fieldwork, and industry-based projects (Edwards et al., 2015). This setup can create stronger links between study and employment, potentially smoothing the transition from education to work.

For young people not pursuing a degree, further education (FE) colleges in the UK nations and technical and further education (TAFE) colleges in Australia provide the main post-compulsory education route for vocational qualifications and second-chance learning. In recent years, and in response to skill shortages, the UK government has promoted apprenticeships and postsecondary technical and vocational qualifications, such as the new T-levels. However, austerity-driven public funding cuts following the 2008 recession have curtailed resources for FE and contributed to significant increases in university tuition fees and the elimination of Maintenance Grants in England (Callender & Mason, 2017). Meanwhile, employment benefits (when young adults are eligible) remain relatively low, time-limited, and conditional upon active job search.

However, there are differences within the liberal cluster. Despite reforms to broaden institutional autonomy, Australia's higher education system remains relatively centralized compared to the UK, where education is devolved across England, Scotland, Northern Ireland, and Wales. The UK and Australia have different school leaving ages and different higher education support systems. Oversight in Australia is largely national, with the Tertiary Education Quality and Standards Agency regulating higher education and the Australian Skills Quality Authority overseeing vocationally oriented tertiary programs and apprenticeships. Another difference within the liberal cluster relates to the cost of education. While English universities typically charge higher nominal tuition fees—capped at £9,000 and above since 2012–2013 (~US$15,000 in 2012)—Australian tuition fees, or "student contributions," have been typically capped at lower levels, although they vary by course of study. For example, in 2010, the student contribution for a bachelor's degree in sociology was capped at 5,310 AUD per year, equivalent to less than 4,500 USD at the time.

While tuition fees vary between the two countries, both the UK and Australia offer income-contingent loan systems designed to protect students from excessive repayment burdens (Barr et al., 2019). Research is mixed on whether these income-contingent models discourage participation. Some studies suggest minimal impact overall (Murphy et al., 2019), while others point to uneven effects by socio-economic background or study mode (Callender & Melis, 2022). In both countries, flexible labor market structures and an emphasis on individual responsibility—hallmarks of "liberal" regimes—shape young people's paths from school to work, although differences in governance, cost, and work-based learning may produce variations in how easily students from different backgrounds navigate these pathways.

Employment-centered transition regimes are typical in Germany and most German-speaking countries (i.e., Austria and Switzerland). Education is organized selectively, allocating young people to occupational careers and associated social positions at an early age (Breen & Buchmann, 2002; Brizinsky-Fay, 2017; Kerckhoff, 2000; Müller & Gangl, 2003). In Germany, for example, students are tracked by age 10 into different pathways leading to skilled trades, white-collar intermediate occupations requiring apprenticeships, or professional careers requiring university degrees. Participation in higher education is free or very affordable. Since 2012, Germany has officially eliminated tuition fees for most bachelor's and many master's degree students, regardless of country of origin. Nonetheless, vocational training plays a central role and is highly standardized.

Germany has built its (three-year) "dual system" of apprenticeship—work-based training in a company coupled with one or two days per week in a vocational school—for more than a century. Social partners (employers, unions, and local government members) govern and monitor the system at the local level, ensuring its institutional importance across changes in government. Enrollment in universities and dual

studies (combining VET and college) has increased following employment uncertainty created by the Great Recession.

Most liberal transition systems provide no structured path into skilled employment without college, emphasizing university education as a prerequisite for a viable career. By contrast, in German-speaking countries, vocational training is mostly company-based, offering direct pathways into employment. Despite its advantages, employment opportunities in employment-centered countries can be polarized (Rueda, 2014). In Germany, for instance, there is a differentiation between a secure "insider" workforce with generous social security provisions and an "outsider" workforce with access only to low employment levels and residual benefits (Emmenegger et al., 2012). Therefore, access to better educational and employment opportunities is not equally distributed (Brizinsky-Fay, 2017). This article explores how these opportunities are influenced by SES and gender across different transition regimes.

2.3. Youth Labor Market

The youth labor market in Germany and Australia has, at least in recent years, been stronger than the youth labor market in the UK, as reflected in higher labor force participation and employment rates, as well as a lower unemployment rate. From 2011 to 2023, when we assess young people's transitions from school to work, the unemployment rate for individuals aged 15–24 years averaged 7–8% in Germany, compared to 11–12% in Australia and 14–15% in the UK (OECD, 2024b).

Germany's currently low youth unemployment rates are due to a combination of a relatively strong economy and policies that encourage employment among young workers. Although Australia has a smaller economy than Germany or the UK, it has not experienced a recession since the early 1990s. Furthermore, while unemployment rose in Australia in the late 2000s, the country did not reach the levels seen in most other industrial nations (OECD, 2024b). Australia also has active labor market programs designed to aid unemployed youth early in their careers by implementing activity requirements as conditions for some benefits (Davidson & Whiteford, 2012). Although the UK is the sixth-largest national economy, its youth labor market has performed in the middle of the pack for many years within the OECD, with many of the most vulnerable youth remaining inactive for long periods or in precarious, low-paid employment (Schoon & Bynner, 2019)—a situation that was exacerbated during the Covid-19 pandemic (Deng et al., 2022). Given that the youth unemployment rate in Germany and Australia tends to be, on average, lower than in the UK, a separate question is whether inequalities by SES and gender are also less pronounced in these countries—an issue that this article seeks to address.

2.4. SES and Gender Inequalities in Post-School Transitions

Traditionally, SWT has been characterized as an age-related, normative, and linear trajectory (Buchmann & Kriesi, 2011; Shanahan, 2000), comprising the completion of full-time education (either after compulsory school-leaving age or later graduation) followed by entry into stable, long-term employment. However, following the introduction of new technologies, a changing labor market, and frequent periods of economic boom and bust over the last five decades, SWTs have become more prolonged, diverse, complex, and risk-laden (Schoon & Bynner, 2017). Young people are increasingly required to complete higher levels of education to compete in a changing labor market, including those from less privileged backgrounds (Ashton,

2017; H.-P. Blossfeld et al., 2008). Yet, while higher education participation has increased across most countries, tertiary graduation rates across OECD countries remain below 50% (OECD, 2024a) and a significant number of young people do not participate in higher education—a group sometimes referred to as the "forgotten half" (Rosenbaum, 2001). Not all young people can afford an extended education or rely on their parents for financial support. Indeed, there is considerable diversity in the pathways young people take after completing compulsory education, which is shaped by the socio-cultural contexts in which they live, as well as by their characteristics—most notably, their SES and gender.

When assessing variations in SWT, it is necessary to consider the interplay between social background and gender. Significant progress has been made in expanding educational and occupational opportunities for women and individuals from socioeconomically disadvantaged backgrounds. Yet, although increasing numbers of relatively disadvantaged young people participate in higher education, a socioeconomic attainment gap remains (H.-P. Blossfeld et al., 2015; Bukodi & Goldthorpe, 2013; Pensiero & Schoon, 2019), even among those with similar levels of cognitive ability (Bukodi et al., 2014; Tomaszewski et al., 2024). Furthermore, socioeconomic disparities persist in the labor market, even among those with university qualifications (Zajac et al., 2023).

Likewise, although more women are attaining degree-level qualifications and have entered the workforce in increasing numbers, including women with young children (DiPrete & Buchmann, 2013), progress has stalled since the turn of the millennium (England et al., 2020)—particularly in the aftermath of the Covid-19 pandemic (Fisher & Ryan, 2021; Kristal & Yaish, 2020; Yerkes et al., 2020). Despite efforts to reduce inequalities, including policies aimed at increasing women's participation in the labor market (such as employment equity and equal pay legislation), persistent evidence suggests that social (Carmo et al., 2018) and gender discrimination (England et al., 2020; Kowalewska, 2023) continue to affect labor market outcomes. According to the United Nations, women in particular remain disproportionately represented in low-status, low-paying occupations (UN Women, 2022).

3. The Focus of the Study

Against this background, this study examines cross-national variation in SWT across the UK, Australia, and Germany in a cohort born between 1993 and 1995 who turned 18 after the 2008 Great Recession. Specifically, we explore how SES and gender are associated with the likelihood of attaining various post-secondary life-course positions in these three countries, particularly regarding the transition from school to vocational training (here labeled "further education"), university, or high-/low-level employment, as well as the likelihood of being not in education, employment, or training (NEET) from ages 18 to 27. This section frames the study's broad aim against the discussion of the institutional, socio-cultural, and policy contexts of the three countries, as outlined in the literature reviewed in previous sections.

Germany has a highly stratified education system that tracks students into different educational pathways at an early age, usually around 10. These tracks include pathways leading to vocational training or more academically oriented routes leading to university (Matthewes & Borgna, 2025). Early tracking often amplifies SES disparities, as children from higher-SES backgrounds are more likely to be placed in academically oriented tracks that lead to university, while those from lower-SES backgrounds are more likely to be directed toward vocational tracks. By contrast, both the UK and Australia have comprehensive

secondary education systems, and most students, regardless of SES, complete schooling with the option of entering university. The expansion of higher education in recent decades has led to a significant increase in the proportion of young people attending university (van de Werfhorst, 2024), including those from lower-SES backgrounds. As such, we may expect stronger SES associations with post-secondary education choices in Germany compared to Australia and the UK.

Another aspect concerns differences in the costs of university education across the three countries. As discussed earlier, Germany has offered largely free university education (Dietrich & Gerner, 2012), while both the UK and Australia rely on income-contingent loans. However, the systems in the UK and Australia differ. In the UK, university fees tend to be higher, and support for living costs is also provided through loans. In contrast, in Australia, university fees were generally lower during the period covered by this study, and living costs were supported by government grants, resulting in lower overall student debt. These differences in education costs may influence young people's decision-making regarding further study, particularly those from low-SES backgrounds.

University graduates in all three societies are likely to achieve relatively high future earnings, enabling them to engage in longer job searches to secure well-paid employment. In contrast, less-educated individuals in weaker welfare states may be reluctant to endure extended periods of unemployment, as they would struggle to compensate for lost earnings through future high-wage work. However, in stronger welfare states, less-educated individuals may be more inclined to prolong their initial job search if welfare benefits offset much of their lost potential income or if they can remain in education at a low cost.

Given the largely deregulated labor market in Australia and the UK, with a relatively large segment of low-skilled and non-standard jobs, we expect low-SES young people in the UK and Australia to be more likely to enter lower-status, less secure jobs after completing their education or training, even if they access higher education. In Germany, while lower-SES youth may be concentrated in less prestigious sectors or trades, they are still expected to achieve stable employment through apprenticeships. Therefore, the overall gap in employment quality (e.g., as measured through occupational status) between SES groups, such as those identified through parental education, is expected to be most pronounced in the UK and Australia compared to Germany.

Finally, this study also explores gender effects on SWT. Increasing attention has been given to how gender differences are shaped and reshaped during the transition into the labor market, particularly through the role of education and training systems (Saraceno, 1997). Research suggests that horizontal gender differences at labor market entry are more pronounced in countries with higher educational stratification, such as Germany (P. Blossfeld et al., 2016). In Germany, the dual vocational system, combined with traditional gender norms, often leads to pronounced gender disparities in both education and labor market outcomes. Similarly, in Australia, the vocational education system and the prevalence of part-time work are expected to exacerbate gender disparities. In contrast, the UK's focus on widening university access and promoting higher female labor market participation is anticipated to result in more balanced gender outcomes.

4. Data and Methods

4.1. Datasets and Sample

The study leverages data from three nationally representative longitudinal studies: the Understanding Society Panel in the UK, the German Socio-Economic Panel (GSOEP), and the Household, Income and Labour Dynamics in Australia (HILDA). Each follows respondents through annual interviews and covers a range of topics, including education and labor market participation. For our analytic samples, we focus on young people born between 1993 and 1995 and track their post-school destination outcomes from age 18 until age 27.

This study is based on secondary data analysis and no new data collection was involved. Ethics approval was obtained from the University of Queensland's Research Ethics Committee (no. 2024/HE000359). Access to the data was secured following relevant application procedures for academic researchers. The data was stored on secure institutional servers and analyzed by researchers based in the respective countries (UK, Australia, and Germany) using harmonized code.

The analytic sample includes 3,851 individuals in the UK, 840 individuals in Australia, and 1,849 individuals in Germany. We use an unbalanced panel design and apply weights provided with the data to adjust for sample design effects and non-response. The total number of person-year observations in our analytic sample is 15,692 in the UK, 5,759 in Australia, and 5,464 in Germany. Table 1 shows the breakdown of the analytic sample by selected socio-demographic characteristics.

Table 1. Sample descriptive statistics.

	UK (Understanding Society Panel)	Australia (HILDA)	Germany (GSOEP)
SES			
Graduate parents	955 (24.8%)	340 (41.6%)	260 (21.5%)
Non-graduate parents	2,896 (75.2%)	477 (58.4%)	951 (78.5%)
Gender			
Male	1,889 (49.1%)	413 (49.2%)	638 (52.7%)
Female	1,960 (50.9%)	427 (50.8%)	573 (47.3%)
Location			
Metro	3,194 (83.0%)	745 (88.7%)	844 (69.7%)
Rural	655 (17.0%)	95 (11.3%)	367 (30.3%)
Ethnic/minority background			
No	2,542 (66.9%)	749 (89.2%)	951 (78.5%)
Yes	1,260 (33.1%)	91 (10.8%)	260 (21.5%)
Poor health/health limitation			
No	3,318 (86.4%)	645 (76.8%)	1,094 (90.7%)
Yes	522 (13.6%)	73 (8.7%)	113 (9.3%)
N (individuals)	3,851	840	1,849

Notes: Weighted data.

4.2. Key Variables

In our analyses, we focus on the educational and labor market destinations of young people in the UK, Australia, and Germany. Specifically, at different ages, we construct the following mutually exclusive categories of activity:

- Being enrolled in university;
- Being in further/vocational education (or still in upper-secondary education at earlier ages) but not enrolled in university;
- Being employed in a managerial or professional occupation (and not in education);
- Being employed in a routine/service occupation (and not in education);
- Not being in education, employment, or training (NEET).

For each of these possible outcomes, we examine SES and gender associations while controlling for a range of other sociodemographic variables. SES is measured using parental education levels, as previous studies suggest that parental education is a better predictor of post-school choices compared to parental occupation (e.g., Bukodi & Goldthorpe, 2013; Tomaszewski et al., 2024). We distinguish between graduate parents (at least one parent graduated from university) and non-graduate parents. Gender is self-reported in all three studies as either male or female.

In our analyses, we control for a range of factors based on the literature. Specifically, previous research indicates inequalities between the native population and ethnic minorities or migrant groups in terms of educational attainment (Blanden, 2020; Strand, 2014) and employment outcomes (Quillian & Midtbøen, 2021). Rural or regional locations, compared to urban settings, have been shown to limit young people's educational and employment choices (MacDonald et al., 2005; Stockdale et al., 2018), while poor health or disability has also been demonstrated to impact educational and labor market outcomes (Fialho et al., 2022).

4.3. Analytic Approach

We estimate a series of linear probability models in the unbalanced panels independently across the three countries. Indicators of young people's education and labor market activities are regressed on parental education (graduate parents vs. non-graduate parents), with interactions for age and gender to capture age-specific variation in how gender and social inequalities manifest across different destinations in SWT. A small set of sociodemographic (birth cohort, ethnic minority status, non-English-speaking background, health, and disability) and geographic (urban versus rural) controls account for additional differences in opportunity structures.

Linear probability models are appropriate for binary dependent variables when the focus is on average marginal differences in the probability of an outcome, as in the current study. We use survey weights to adjust for unequal sample selection and non-response at various levels. Standard errors are clustered at the individual level to account for correlated error terms within the same individual over time.

5. Results

5.1. SES and Gender Inequalities

We first present the results from the linear probability modeling of SES and gender associations with SWT across the three countries. As noted in the methods section, we use parental education as our SES measure, distinguishing between young people with a graduate parent and those whose parents do not have a university degree. Table 2 presents the effects of having no graduate parents and being female on educational and employment outcomes, relative to having a graduate parent or being male.

In all three countries, we find significant SES effects associated with having a graduate parent. However, gender effects appear to be more attenuated.

In the UK, having no graduate parent reduces the likelihood of staying in education, particularly university education ($\beta = -0.133$; $p < 0.001$), but also non-university education ($\beta = -0.016$; $p < 0.05$). This indicates that young people with non-graduate parents in the UK are more likely to enter employment rather than remain in education. However, there are also significant SES effects on employment pathways, as those with non-graduate parents are significantly less likely to enter managerial or professional occupations ($\beta = -0.04$; $p < 0.01$) and much more likely to enter routine or service occupations ($\beta = 0.11$; $p < 0.001$). Additionally, young people with non-graduate parents are markedly more likely to be in the NEET category ($\beta = 0.082$; $p < 0.001$). Gender inequalities are more attenuated; however, females in the UK are slightly more likely than males to enter university ($\beta = 0.02$; $p < 0.05$).

Table 2. Differences in SWT by SES and gender across the UK, Australia, and Germany.

	FE	University	Managerial/professional occupation	Routine/services occupation	NEET
UK (18–27, *N* = 15,692, weighted)					
Non-graduate parents	−0.016* (0.008)	−0.133*** (0.011)	−0.041** (0.013)	0.108*** (0.018)	0.082*** (0.012)
Female	−0.006 (0.007)	0.021* (0.009)	−0.012 (0.012)	−0.001 (0.017)	−0.002 (0.013)
Australia (18–27, *N* = 5,759, weighted)					
Non-graduate parents	0.053*** (0.017)	−0.169*** (0.024)	−0.055* (0.023)	0.122*** (0.025)	0.050** (0.014)
Female	−0.048** (0.017)	0.074** (0.023)	0.063** (0.023)	−0.092*** (0.024)	0.003 (0.016)
Germany (18–27, *N* = 5,464, weighted)					
Non-graduate parents	0.074*** (0.018)	−0.242*** (0.024)	0.002 (0.006)	0.117*** (0.018)	0.050*** (0.010)
Female	−0.012 (0.015)	−0.001 (0.018)	0.021 (0.005)	0.007 (0.016)	−0.014 (0.011)

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; average marginal effects of parental education and individual sex at birth on job market outcomes; LPM estimates; results weighted using cross-sectional weights; age interacted with parental education interacted with sex; controlled for birth cohort, rural location, general health, ethnicity (UK, GER), nation (UK), Indigenous status (AUS), and Non-English-speaking background status (AUS).

In Australia, having non-graduate parents is negatively associated with the likelihood of pursuing a university degree ($\beta = -0.169$; $p < 0.001$) but positively associated with taking the vocational route ($\beta = 0.053$; $p < 0.001$). Having a non-graduate parent also reduces the likelihood of entering a professional or managerial occupation ($\beta = -0.055$; $p < 0.05$) while increasing the likelihood of entering routine or service occupations ($\beta = 0.122$; $p < 0.001$) or being NEET ($\beta = 0.050$; $p < 0.01$). Compared to the UK, gender differences are more pronounced in Australia: being female is positively associated with pursuing a university education ($\beta = 0.074$; $p < 0.01$) and entering a professional or managerial occupation ($\beta = 0.063$; $p < 0.01$) but negatively associated with taking the vocational route ($\beta = -0.048$; $p < 0.01$) or entering routine or service occupations ($\beta = -0.092$; $p < 0.001$). There is no significant gender effect on the likelihood of being NEET ($\beta = 0.003$; $p > 0.05$).

In Germany, SES effects are similar to those in Australia: having no graduate parent reduces the likelihood of attending university ($\beta = -0.242$; $p < 0.001$) but increases the likelihood of enrolling in vocational education ($\beta = 0.074$; $p < 0.001$). Having non-graduate parents also increases the likelihood of entering routine or service occupations ($\beta = 0.117$; $p < 0.001$) and being NEET ($\beta = 0.05$; $p < 0.001$). Interestingly—and perhaps surprisingly—there are no gender effects with respect to any post-school destination based on our German data.

In the next step, we tested for cross-country differences in the aforementioned effects by running a meta-analysis using Stata's meta command. This meta-analysis allows us to compare country-specific effect sizes and assess whether we can reject the null hypothesis that the coefficient sizes are the same across the three countries. Table 3 presents the results of the meta-analysis, testing the cross-national variation in SES and gender effects for each post-school destination.

The results suggest significant cross-national differences in how social disadvantage shapes educational pathways and transitions into professional work. Specifically, the relationship between parental education (i.e., having a graduate parent or not) and the likelihood of pursuing post-secondary or higher education or entering managerial or professional roles varies markedly across countries. Conversely, the impact of SES on the risk of being NEET (not in education, employment, or training) or entering routine or service work appears more consistent across the three countries.

Significant cross-national differences in gendered SWTs are also evident. Tests for homogeneity indicate variation in gender effects across countries for higher education participation, entry into professional work, and routine or service work. This suggests that gender disparities in these pathways are not uniform across the UK, Australia, and Germany.

Table 3. Results of meta-analysis to test the significance of cross-national variation in effect sizes.

	SES effects	Gender effects
FE	$X^2(2) = 29.2$, $p < 0.001$	$X^2(2) = 5.1$, $p = 0.078$
University	$X^2(2) = 17.5$, $p < 0.001$	$X^2(2) = 15.0$, $p = 0.001$
Work—managerial/professional	$X^2(2) = 13.55$, $p = 0.001$	$X^2(2) = 10.5$, $p = 0.005$
Work—routine/service	$X^2(2) = 0.2$, $p = 0.887$	$X^2(2) = 13.0$, $p = 0.002$
NEET	$X^2(2) = 4.8$, $p = 0.092$	$X^2(2) = 0.08$, $p = 0.962$

Notes: Test of homogeneity after a random-effects meta-analysis.

The final set of results focuses on SES and gender inequalities along the age dimension, comparing SWTs across the three countries over the observed life course (i.e., ages 18–27). To illustrate this, we plot a series of predicted probabilities of entering different post-school destinations over time (along the age dimension) obtained from the models (Figures 1–3). The figures show predictions for different subgroups of young people in the three countries (male vs. female) and low SES (i.e., non-graduate parents) vs. high SES (i.e., graduate parents) at different ages.

In the UK (Figure 1), SES gaps in FE are minimal, with young people who have non-graduate parents tending to leave the sector at slightly younger ages. However, there are pronounced SES gaps in university participation, which peak during the critical ages of 19–21—when most young people in Britain complete their first degree—and narrow in the later age bracket, when postgraduate study typically occurs. Unequal access to university is mirrored by an uneven transition into managerial and professional jobs. By age 27, around 40% of males with graduate parents work in managerial and professional jobs, compared to about 20% of their peers with non-graduate parents. SES differences are less pronounced for women, with an apparent convergence in access to managerial and professional jobs between high- and low-SES groups as they age. SES disparities in routine or service occupations are less pronounced and continue to converge over time. Finally, young people with non-graduate parents face consistently higher risks of being NEET. The SES gap is evident for both men and women and persists with age.

In Australia (Figure 2), young people with non-graduate parents appear somewhat more inclined to take up vocational education, although these differences are largely not statistically significant. By contrast, there are marked SES differences in university enrollment, with the gap being more pronounced early on (until about age 21). After this point, the gap narrows slightly and remains relatively stable, aligning with the typical age for postgraduate studies. Some SES differences exist among males in terms of employment in both managerial or professional and routine or service occupations, which either remain stable or increase with age. These differences are less pronounced among females, particularly in managerial or professional occupations. However, SES disparities in NEET status in Australia are more pronounced among females than males, particularly in the latter part of the observation period (ages 23–27).

In Germany, the results highlight the central role of apprenticeship training (Figure 3). SES gaps in FE participation (particularly apprenticeship training) remain relatively stable between ages 19 and 24, then decrease slightly as young people transition out of education. There are significant SES gaps in university participation, which continue to widen until around age 23 for males and 25 for females. These gaps then narrow, as those who remain in education are likely to pursue postgraduate studies. Because postgraduate students are more often selected based on academic aptitude, SES influence diminishes at this stage. Given the small proportion of young Germans in managerial or professional occupations, SES gaps in this group are not statistically significant, further indicating the delayed labor market entry of German university graduates compared to their peers in the UK and Australia. In contrast, SES disparities in routine or service occupations are pronounced and tend to increase with age, unlike in the UK. Additionally, SES gaps in NEET status for both males and females widen between ages 20 and 23–24—though at a relatively low level compared to the UK and Australia—before narrowing thereafter.

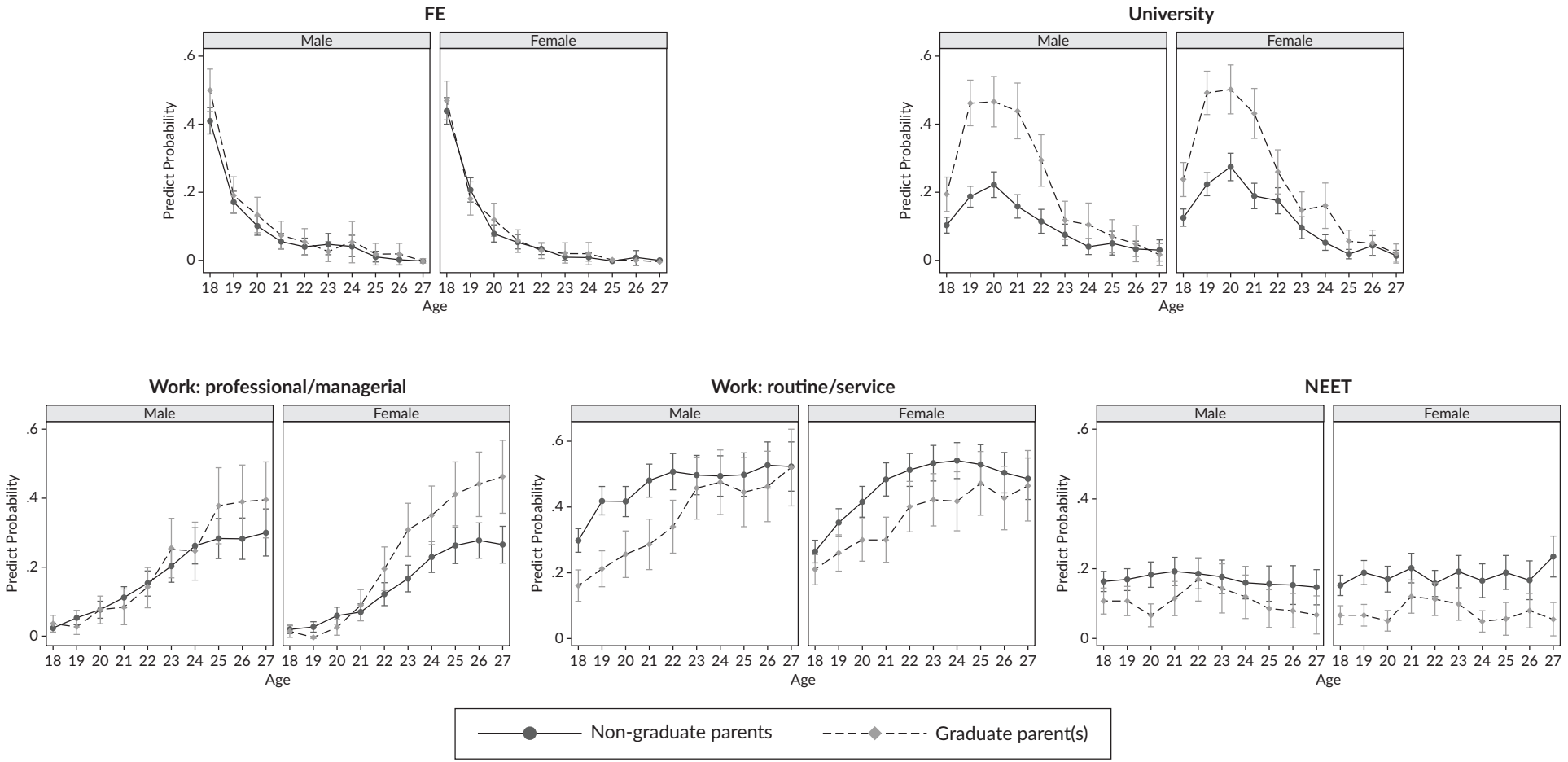

Figure 1. United Kingdom: Predicted probability of post-school destinations by parental education and gender over age.

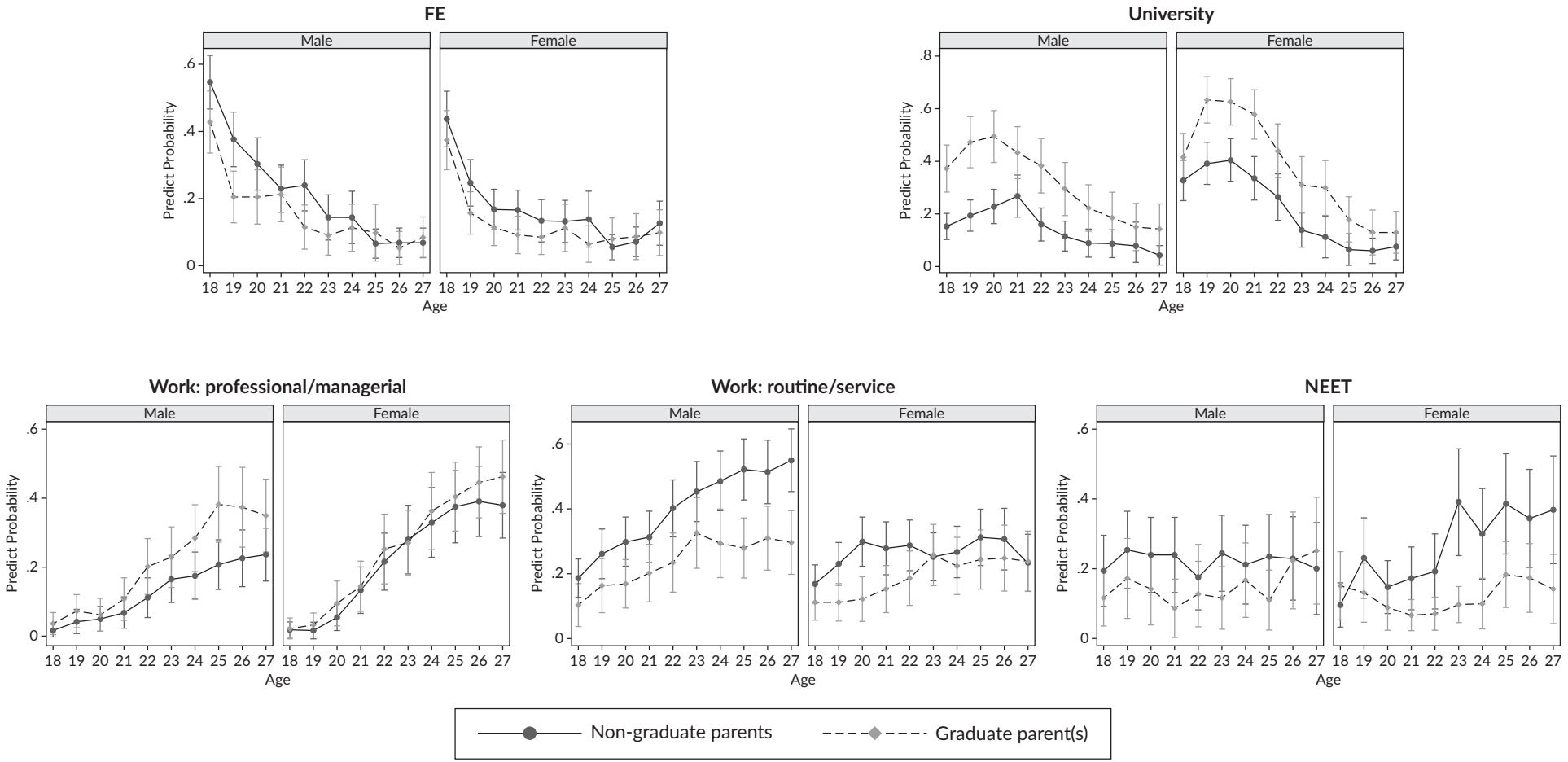

Figure 2. Australia: Predicted probability of post-school destinations by parental education and gender over age.

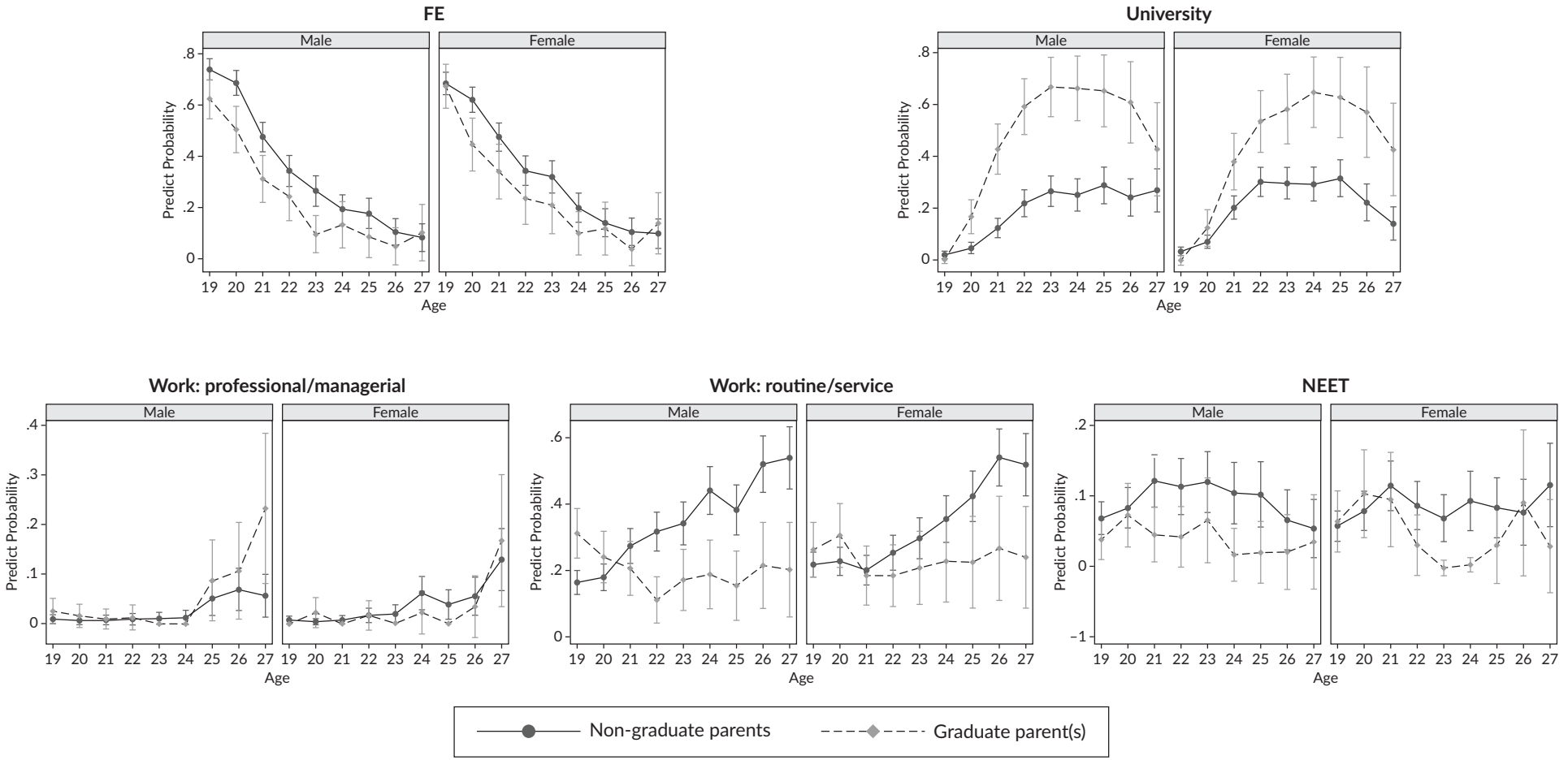

Figure 3. Germany: Predicted probability of post-school destinations by parental education and gender over age.

6. Discussion and Conclusions

6.1. Summary of Key Findings

This study investigated cross-national variations in SES—measured through parental education—and gender disparities in SWTs across the UK, Australia, and Germany, focusing on how these factors influence post-secondary pathways from education to employment. Given that our data cover transitions after the Great Recession and extend up to the Covid-19 pandemic, our findings provide more current evidence on the impacts of institutional contexts and educational systems on young people's transitions compared to most existing studies. As such, our findings offer additional evidence on inequalities, particularly regarding SES, as measured by parental education, that persist over time and across different country contexts.

The analysis of SES effects underscores the institutional stratification in Germany's education system, which tracks students into distinct pathways from an early age, often reinforcing intergenerational status transmission linked to parental SES disparities. Our results show that having non-graduate parents significantly reduces the likelihood of pursuing higher education across all three countries, with the strongest effects observed in Germany ($\beta = -0.242$; $p < 0.001$). This finding confirms previous evidence regarding Germany's high level of stratification (Breen & Buchmann, 2002; Brizinsky-Fay, 2017; Kerckhoff, 2000; Müller & Gangl, 2003) and supports the assertion that, compared to Australia and the UK, young people in Germany experience stronger SES effects on educational choices. The comprehensive secondary education systems in Australia and the UK allow broader access to university for young people, including those from lower-SES backgrounds.

Notably, we also find that young people from less privileged backgrounds in Germany and Australia are more likely to enter further/vocational education; however, this is not the case in the UK. This may reflect the relatively high university participation rate in the UK. At the same time, we note the relatively high likelihood of NEET status among young people with non-graduate parents in the UK, which may also explain the lower likelihood of vocational education enrollment in this group.

While lower-SES youth in Germany may achieve stable employment through vocational training, SES gaps in employment quality remain similar across countries, with low-SES youth more likely to enter routine or service jobs—and if anything, these gaps are relatively larger in Germany. Thus, the findings do not support our assumption that, in a country with a strong link between education and the labor market, the risk for low-SES youth to enter low-status jobs would be reduced. Instead, the results suggest a broader pattern in which socio-economically disadvantaged young people are more likely to enter low-status occupations, regardless of labor market regulation. The high segmentation, early sorting, and vocation-specific training in Germany do not mitigate the risk of low-status employment for low-SES youth compared to their counterparts in the UK or Australia (Brizinsky-Fay, 2017; Müller & Gangl, 2003).

Gender disparities in SWT are also evident across countries, although the patterns differ significantly. Perhaps surprisingly, our findings do not indicate that gender differences are more pronounced in countries with greater educational stratification, such as Germany. Notably, while our data reveal no substantial gender effects in Germany regarding post-school destinations, Australia exhibits more pronounced differences, with females being more likely to pursue university education ($\beta = 0.074$; $p < 0.01$) and enter

professional roles, yet less likely to engage in vocational training or routine service occupations. This pattern aligns with expectations about the interplay between gender norms and vocational education systems.

By contrast, and as expected, the UK—where policy efforts have focused on widening access to higher education and promoting female labor market participation—demonstrates relatively balanced gender outcomes. This suggests that policy initiatives in this area may help mitigate traditional gender disparities, even as SES gaps remain pronounced.

6.2. Policy Implications

The findings of this study have several important policy implications. First, given the significant SES effects on post-secondary education choices—particularly in Germany—policymakers should consider implementing early intervention strategies targeting disadvantaged youth. In the short term, this could involve providing additional academic support, information, and guidance to students with non-graduate parents, enabling them to make informed choices, including transitions into higher education. Over the longer term, reforms could include rethinking the highly selective system to allow for greater flexibility in secondary education, along with better integration between higher education and vocational education sectors to enhance choices and facilitate transitions.

In the UK, where young people are more likely to enter the labor market directly after completing compulsory secondary education—often without further training—enhancing vocational training programs could improve outcomes for those not pursuing higher education. Creating pathways that combine study with relevant work experience may help young people gain valuable experience while continuing their education. This need for flexibility also applies to Germany, where reforms could introduce greater permeability between tracks to allow students to transition between different educational pathways. However, it is essential to ensure that these programs integrate work that provides meaningful experience rather than trapping students in low-paid jobs that increase the risk of dropping out (Hovdhaugen, 2013; Vickers et al., 2003).

Furthermore, given the gender disparities observed in our data—particularly in Australia—policies should prioritize addressing gender stereotypes in education and training. While Australia has traditionally focused on increasing female participation in non-traditional fields such as science, technology, and engineering, recent trends show that females are now more likely to attend university than males (Tomaszewski et al., 2018). Our results confirm this pattern, with females being more likely to enter university and subsequently transition into managerial or professional positions. This shift has the potential to create new gender disparities. Therefore, initiatives should continue to encourage female participation in traditionally male-dominated fields while also promoting academic pathways for males, which are more likely to lead to high-status jobs.

6.3. Study Limitations and Opportunities for Future Research

Despite its contributions, this study has several limitations. The data, drawn from HILDA, Understanding Society Panel, and the GSOEP, while robust, primarily represent general population panel household surveys. As a result, the findings may not fully capture the experiences of specific subgroups, such as young people from rural and remote areas in Australia or migrants in the UK and Germany, who may face unique barriers in education and employment.

Moreover, while we used parental education as a proxy for SES, this measure may overlook other crucial factors, such as income level, parental involvement, and local economic conditions, which could further shape educational and employment outcomes. Additionally, because the study relies on cross-sectional data at specific points in time, our ability to draw causal inferences about the relationships between national contexts, SES, gender, and post-school outcomes is limited. Therefore, the findings should be interpreted as associations rather than causal effects.

Future research could address these limitations by exploring longitudinal outcomes in greater depth, particularly the long-term economic impacts of different pathways for youth from varying SES backgrounds and genders. Formal causal models could also be developed to build on the descriptive patterns presented in this study.

Additionally, qualitative research could complement the existing quantitative data by examining the lived experiences of young people navigating their post-secondary choices. Understanding the motivations, barriers, and perceptions influencing these decisions could inform the design of more effective policy interventions.

6.4. Conclusion

In summary, our analysis provides new insights into how institutional contexts shape the educational and employment pathways of young people in Germany, Australia, and the UK. The significant influence of SES—measured through parental education—on post-secondary pathways, combined with the variable impact of gender across different educational policy frameworks, highlights the complexity of SWT and intersecting (dis)advantages.

These findings suggest that tailored policies are essential to mitigate the barriers faced by low-SES youth across all three countries and to promote gender equity in education and labor market outcomes. Future research should continue to explore these dynamics, particularly by examining the long-term implications of national educational and employment policies on young people's trajectories and how these interact with gender disparities across different country contexts.

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Conflict of Interests

The authors declare no conflict of interests.

Data Availability

The data that support the findings of this study are openly available:

- HILDA at the Australian Government Department of Social Service (DSS Longitudinal Studies Dataverse; https://doi.org/10.26193/3QRFMZ)
- The GSEP at the Deutsches Institut für Wirtschaftsforschung (DIW), Berlin.
- The Understanding Society Panel at https://www.understandingsociety.ac.uk

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Pathways to Inclusion? Labor Market Entry Trajectories of Persons With Disabilities in Europe

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Abstract

Almost a fifth of the population in OECD countries report having a disability and the proportion of students classified as having special educational needs (SEN) has steadily increased over recent decades. While this group faces marginalization in schooling and employment everywhere, there are profound differences in disability-based disadvantages across countries. However, comparative research on the labor market opportunities of persons with disabilities (PwDs) remains limited, especially regarding school-to-work transitions (STWT) that are crucial for subsequent labor market opportunities. Thus, lacking comparative knowledge on how institutional contexts shape these transitions also limits opportunities for policy learning and improvement of supports provided. This study addresses these gaps by analysing longitudinal data from the European Statistics on Income and Living Conditions (EU-SILC). First, using sequence and cluster analysis, we classify these trajectories and provide an in-depth analysis of labor market entry patterns for PwDs compared to those without disabilities across 31 European countries. Second, we explore whether the timing of first employment, instability during the STWT, as well as inclusionary or exclusionary transitions vary between these groups and how the disparities between persons with and without disabilities regarding these indicators are related to institutionalized segregation and support structures. Our findings highlight that PwDs usually do not transition more slowly to (some form of) employment, yet they experience more instability and less inclusion during their STWT. Segregation exacerbates disadvantages, whereas institutional support structures reduce the disadvantages youth with disabilities face when these programs actively facilitate pathways to inclusion.

Keywords
disability; Europe; European comparisons; inclusion; labor market; pathways; school-to-work transition; segregation; sequence analysis; support

1. Introduction

Labor market participation is essential for economic subsistence as it is for meaningful participation in society. The school-to-work transition (STWT) is a crucial phase for successful integration into the labor market (Bynner & Parsons, 2002). In OECD countries, about 18% of the population reports having a disability, with prevalence continuously rising since 2005 (OECD, 2022b, p. 33). The proportion of students with disabilities ("special educational needs" or SEN) in schooling has also been rising globally (Richardson & Powell, 2011). By ratifying the UN Convention on the Rights of Persons with Disabilities (United Nations, 2006), 192 countries have now committed to ensuring equalized access to schooling, vocational education, training, and work. However, research shows that persons with disabilities (PwDs) continue to face significant barriers to entering vocational education and training (VET), post-secondary education, and the labor market (Janus, 2009; Newman et al., 2011; Wells et al., 2003). Still, labor market opportunities for PwDs vary widely across countries (OECD, 2022b), suggesting similar trends for STWT. Despite this, comparative knowledge on STWT of PwDs is scarce and mostly descriptive regarding current labor market status (OECD, 2022b, p. 37). Thus we ask: How do STWT processes differ across European countries for PwDs and persons without disabilities (PwoDs)? Analysing STWT processes and categorizing labor market entry trajectories (Brzinsky-Fay, 2007; McVicar & Anyadike-Danes, 2002) is vital for policy learning and understanding life course trajectories—a key concept in life course theory (Sackmann & Wingens, 2003).

From inequality, educational and social policy perspectives, examining how STWT pathways and processes for PwDs are shaped by institutions is crucial. Differences in institutional environments have been shown to explain varying STWT across countries (Breen & Buchmann, 2002; Buchmann & Kriesi, 2011). However, theories on institutional influences on STWT (e.g., Allmendinger, 1989; Müller & Shavit, 1998) have not explicitly considered PwDs. Hence, many existing institutional explanations cannot fully explain STWT for this particularly disadvantaged group (Blanck et al., 2024). Research on disability policy often addresses general labor market participation (e.g., van der Zwan & de Beer, 2021). Given the dynamic nature of disablement and the importance of phase-specific institutions at the intersection of education and employment, complementary theoretical frameworks are needed to understand how institutions affect STWT for PwDs. The "labelling-resource dilemma" (see Powell, 2016), analogous to the distributive dilemma in social policy generally (Stone, 1984), is relevant for understanding the educational and labor market chances of PwDs, as it emphasizes tensions between providing additional resources to compensate for disadvantages and the risk of segregation and exclusion when resources are provided in segregated settings, such as special schools or sheltered workshops (Malo & Rodríguez, 2022; Menze et al., 2023; Myklebust & Båtevik, 2009; OECD, 2010, p. 80; Rojewski et al., 2015). Support structures often facilitate pathways to inclusion. However, such relevant institutions usually are related closely to other institutions that may not. These factors and tensions are represented by the classifications of transition regimes (Walther, 2006) and analyses of the influence of institutional configurations (Brzinsky-Fay, 2017), requiring analyses to account for these correlations. This raises the question of whether specific country clusters can be identified based

on indicators related to support structures and segregation of PwDs and how they relate to disadvantages in labor market entry trajectories for PwDs compared to PwoDs.

We address these questions by building upon research literatures on STWT, social stratification, and disability policy, and leveraging longitudinal data from the European Statistics on Income and Living Conditions (EU-SILC). First, we provide in-depth analyses of labor market entry trajectories of PwDs in 31 European countries and compare these to those of PwoDs. Applying sequence and cluster analysis, we classify labor market entry trajectories based on speed to employment, instability, and inclusivity/exclusivity. Second, via cluster analysis, we identify four country clusters based on indicators for support structures and segregation provided by the OECD (2025) and the European Agency for Special Needs and Inclusive Education (EASNIE, 2014, 2016, 2018). Third, we analyse how these clusters relate to differences between PwDs and PwoDs regarding speed to first employment, instability, and inclusionary/exclusionary transitions. Following recent international studies (e.g., Hadjar & Kotitschke, 2022; Kangas & Karonen, 2022; OECD, 2022b), we define disability based on subjective evaluations of individual "limitations in activities because of health issues." This approach acknowledges the interaction between impairments and environmental barriers, as in the International Classification of Functioning, Disability and Health (ICF; WHO, 2001). Given limited comparative knowledge on STWT for PwDs, our approach is primarily exploratory, laying the foundation for further comparative research.

2. Previous Research on Disability and Labor Market Entry Trajectories in European Countries

2.1. Labor Market Entry Trajectories of PwDs and PwoDs

Sociodemographic characteristics clearly impact STWT (Iannelli & Smyth, 2008) as do educational credentials: Persons with higher formal qualifications enter the labor market at higher rates (Wolbers, 2007) and have lower risks of unemployment or employment in unskilled jobs (Gangl, 2003). Moreover, low-skilled workers are more likely to experience non-standard employment such as part-time work and self-employment (Schmid, 2017, p. 3). Studies from single countries show that PwDs are also disadvantaged in their STWT: They enter post-secondary education, vocational training, and employment less frequently, with a higher risk of being "not in education, employment or training" (NEET; e.g., Blanck, 2020; Gutman & Schoon, 2018; Menze et al., 2023; Newman et al., 2011).

Yet, researchers have usually analysed STWT solely as single events, e.g., the chances of entering a certain type of employment at a certain age (Buchmann & Kriesi, 2011). This is also true for research on STWT of PwDs. Rare comparative research on STWT of PwDs is mostly descriptive, based on aggregate, cross-sectional data on current labor market status (e.g., NEET prevalence per year; see OECD, 2022b, p. 37). However, to better understand STWT, it is necessary to additionally analyse processes, in particular sequences of labor market entry trajectories. Sequences provide conceptual links between single transitions and trajectories, understood as "any life-course movement that includes at least two transitions between states (in a given state space)" (Sackmann & Wingens, 2003, p. 96). Theoretically, Sackmann and Wingens (2003) distinguish six different types of STWT sequences based on the number and order of different states (Table 1). The sequence type "rupture" consists of only one transition from school to an absorbing state such as work or unemployment. "Interruption" means that a status is interrupted by one other status, in this case, education is continued

Table 1. School-to-work transition types.

Sequence type		School-to-work sequences
Rupture	A → B	School → Work
Interruption	A → B → A	School → Work → School
Change	A → B → C	School → Work → Non-Employment
Bridge	A → AB → B	School → Apprenticeship (= School + Work) → Work
Return	A → AB → A	School → Apprenticeship (= School + Work) → School
Fusion	A → B → AB	School → Work → Further Education (= School + Work)

Source: Authors' representation based on Sackmann and Wingens (2003, p. 102).

after a period of work. "Change" entails three different statuses. The three other transition types—"bridge," "return," and "fusion"—include combined statuses like apprenticeships and further education, which either link two statuses or are the result of two other statuses.

Empirically, four main types of labor market entry trajectories have been identified across studies (with varying frequency in different countries), despite analyses being based on diverse sets of countries (Brzinsky-Fay, 2007; Lorentzen et al., 2019; Quintini & Manfredi, 2009; Scherer, 2001): An important transition type is characterized by states of education (of varying length), followed by those of work (a); other commonly identified types constitute a type marked by long periods of unemployment or inactivity (early) in the STWT (b), return to education after phases of employment or inactivity (c), and a type characterized by instability that comprises several changes between different statuses (d).

Unsurprisingly, the quantitative relevance of types of labor market (entry) trajectories also varies between sociodemographic groups generally and between PwDs and PwoDs specifically (Ballo & Alecu, 2023; Brzinsky-Fay, 2007, 2015; Brzinsky-Fay & Solga, 2016; Scherer, 2005). In a longitudinal study on Norway, Ballo and Alecu (2023) identify four different types of labor market trajectories of persons aged 20 to 34: "permanently work-disabled," "stable employment," which is education followed by work, "early marginalization," with status changes resulting in work-disability, and "unstable employment" with several changes between different status. PwDs had lower probabilities of being in the "stable employment" cluster than PwoDs. A study on Britain showed that over a five-year period, PwDs (aged 15 and above) were more likely to reduce working time or exit the labor market completely (Rigg, 2005). So far, few studies have fully addressed questions related to labor market entry trajectories of PwDs. These show that during the first four years of their STWT, PwDs in many countries spend more time NEET and less time in employment (Blanck et al., 2024) and that PwDs in Germany experience delayed STWT (Reims & Schels, 2022). Negative effects of disability on labor market outcomes also seem to last for a long time after students leave school (Myklebust & Båtevik, 2022; Newman et al., 2011). Examining STWT status distributions over time reveals that many youths with disabilities, like their non-disabled peers, successfully transition from education to employment (Blanck et al., 2024). To date, no study has analysed labor market entry trajectories of PwDs across most European countries and compared them to those of PwoDs.

2.2. Institutional Influences on Labor Market Entry Trajectories of PwDs in European Countries

Country differences have long been a particular focus of STWT research, showing cross-country variation in length, timing, and outcomes (Marczuk, 2024). Although comparative and longitudinal research on STWT of youth with disabilities is still rare, existing cross-sectional studies show that gaps in NEET rates between PwDs and PwoDs vary substantially across Europe (Halvorsen et al., 2016; OECD, 2022b) as well as the impact of health across regions, such as Continental, Eastern, and Southern Europe (Rocca et al., 2022). A descriptive study based on EU-SILC shows that the cumulative length of NEET and employment spells and the respective gaps between PwDs and PwoDs vary highly between countries (Blanck et al., 2024). Theoretical and empirical accounts of the international diversity in STWT have emphasized several institutional features of schooling and labor markets as well as their linkages (Allmendinger, 1989; Bol & van de Werfhorst, 2013; Breen & Buchmann, 2002; Maurice et al., 1986). Also, specific clusters of institutions—"transition regimes"—have been identified that shape labor market entry trajectories (Brzinsky-Fay, 2017; Gangl, 2001; Walther, 2006). However, thus far, institutional explanations for differing STWT have been developed without explicitly considering PwDs. Research on disability policy makes clear that general country classifications differ from clusters of institutional features relevant to PwDs (on welfare states and disability policy see Lee, 2014; Tschanz & Staub, 2017). The varying relevance of interrelated institutions and countries' institutional logics (Tschanz & Powell, 2020) likely explains why established institutional explanations have limited explanatory power for the significant diversity in the STWT of PwDs even within transition regimes (Blanck et al., 2024). Thus, additional and complementary theoretical approaches are needed to better understand country differences in STWT and labor market entry trajectories for PwDs.

3. Theoretical Approach

3.1. Signaling, Stigma, and Discrimination

Theoretically, differences in labor market opportunities have been explained based on assumptions about processes of labor market signaling. Building upon human capital theory (Becker, 1975), the signaling approach assumes that employers use so-called screening devices, like educational certificates, to select the most capable and productive workers (Stiglitz, 1975). However, in this perspective, employers not only use such direct signals for productivity but also a person's background characteristics to assess trainability and subsequent training costs (Thurow, 1975). Additionally, lower employment opportunities for disadvantaged groups have been explained based on processes of stigmatization and discrimination. Stigma can be understood as the negative social reaction to certain characteristics, based on culturally shaped beliefs about ab/normality, as well as the internalization of the negative stereotypes by those affected by them (Link & Phelan, 2001), which may lead to self-selection during STWT and higher probabilities of exclusionary labor market entry trajectories (Pfahl, 2011). Discrimination in this context can be understood as (institutionalized) biased treatment based on individual and culturally shared stereotypes, which may result in exclusion (Phelps, 1972; Rivera & Tilcsik, 2023). PwDs are particularly at risk concerning signaling, stigma, and discrimination. First, due to environmental (physical and attitudinal) barriers, as well as prevalent and persistent segregation in education systems (e.g., Mazzotti et al., 2021; Myklebust & Båtevik, 2009), PwDs are disproportionately represented in the group of those with low formal qualification (OECD, 2022b). Second, disability as such is not only perceived as a strong signal for low productivity and low trainability but, due to stigma, it is also perceived as a marker of membership in an undesirable group (Østerud, 2023). Based

on these assumptions, employers may then discriminate against PwDs by placing them at the end of the labor queue—or excluding them entirely (Thurow, 1975), thereby creating barriers to entering the labor market and making longer search processes necessary, which may result in higher risks of labor market entry trajectories marked by instability or even exclusion. Accordingly, studies from single countries have shown that PwDs—as compared to those without disabilities—are disadvantaged in their access to the labor market and more likely to be excluded (Berre, 2024; Bjørnshagen & Ugreninov, 2021; OECD, 2022b).

Based on these theoretical ideas and previous research, we hypothesize that:

H1: PwDs will have slower transitions to employment compared to PwoDs.

H2: PwDs will more frequently experience exclusionary and unstable labor market entry trajectories.

H3: PwDs will less frequently experience inclusionary labor market entry trajectories.

3.2. Support Structures and Segregation

Although comparative data is limited, transition systems for youth with disabilities clearly vary between countries, and these shape their labor market entry trajectories (EADSNE, 2002). For example, Tschanz and Powell (2020) show that Switzerland provides more support for students with SEN in STWT (through its VET system) than does the United States. A useful theoretical perspective for understanding country differences in institutional environments affecting STWT and labor market entry trajectories of youth with disabilities—particularly through signaling, stigma, and discrimination—is the "resource-labelling dilemma" (see Powell, 2016), akin to the broader distributive dilemma in social policy (Stone, 1984). In welfare states, disability presents a fundamental distributional challenge. Welfare state organizations aim to provide people in need with necessary (additional, specialized) resources. However, since resources are scarce; only the deserving are supposed to receive them. Benefits are granted only after a means test, based on historically developed categories that determine "legitimate" and "deserving" needs. The designation "disabled" is tied to access to support structures during the STWT, which can vary widely (Coñoman et al., 2024). Each approach engages distinct mechanisms to improve labor market outcomes for disadvantaged or disabled youth, targeting systemic barriers to enhance employment opportunities (Holtmann et al., 2020). A widespread measure for supporting successful STWT of PwDs is transition planning and support that focuses on labor market matching by providing information on the transition process and available placement options as well as on improving agency by helping youth to develop "appropriate aspirations" (Yates & Roulstone, 2013), possibly counterbalancing self-selection out of the labor market based on experiences of stigma (Pfahl, 2011). Accordingly, transition planning has been shown to be valuable for improving transitions into postsecondary education or the labor market and thereby being more inclusive (Cobb & Alwell, 2009). Another important aspect of disability policy are transfers (financial and in kind) that may be used to reduce environmental barriers to participation or provide investment in human capital. Both may lower perceived training costs. Empirically, a higher share of disability benefits has been shown to be beneficial to the employment of PwDs (van der Zwan & de Beer, 2021).

However, because of the distributive dilemma, receiving support can also lead to restrictions on other rights. Empirically, we find that the benefits and additional resources are often provided in segregated

environments, such as special classes and special schools, that have been shown to hinder successful transitions from school to vocational training, postsecondary education, and the labor market. They are associated with reduced possibilities for acquiring educational credentials, high risks of stigma and associated self-selection out of the labor force as well as discrimination by potential employers due to institutional labelling (Blanck, 2020; Mazzotti et al., 2021; Menze et al., 2023; Powell & Pfahl, 2019). Yet, in a recent multi-country study, a negative bivariate association between the size of a special school system in a country, NEET length, and the length of employment during the STWT of PwDs, has been shown (Blanck et al., 2024). This counterintuitive finding has been interpreted as a possible association of special school systems with extensive segregated (pre-)vocational rehabilitation measures—educational programs located at the nexus of the school system and the labor market, such as vocational preparation specifically for youth with disabilities (Reims & Schels, 2022, p. 5836). Such programs divert young PwDs away from the regular labor market, because not only employers but also professionals, who engage with youth during the STWT, discriminate against them, channeling them directly into these suboptimal segments, thus hindering their participation in the regular labor market (Powell & Blanck, 2023).

Work in sheltered workshops for PwDs, a particularly strong kind of labor market segregation, has been shown to lead to exclusionary labor market entry trajectories outside of the regular labor market and to continued employment in such settings (Czedik et al., 2021; Malo & Rodríguez, 2022; OECD, 2010, p. 80; Reims & Schels, 2022). Simultaneously, these segments potentially prevent unstable or exclusionary labor market entry trajectories (Solga et al., 2014). While the empirical value of this interpretation still needs to be assessed, it points, first, to the importance of considering segregation not only in schooling, but also in the labor market to better understand the complex labor market entry trajectories of PwDs. Second, institutional influences can hardly be reduced to a single institution but that the linkages and interrelatedness of different institutions shape labor market entry trajectories (Allmendinger, 1989; Bol & van de Werfhorst, 2013; Breen & Buchmann, 2002; Brzinsky-Fay, 2017; Maurice et al., 1986; Walther, 2006). The lack of interinstitutional coordination for STWT of PwDs is particularly problematic (Tschanz & Powell, 2020). Therefore, specific configurations of support structures and segregation should be analysed to better understand how institutions are associated with disability-specific disadvantages in labor market entry trajectories and learn about their differential potentials for providing pathways to inclusion.

4. Data and Methods

4.1. Data and Variables

We use longitudinal microdata for 31 countries across Europe from EU-SILC, which involves rotating panels for individuals starting at the ages 16 to 18 and following them over four years between 2003 and 2020. We selected young persons with non-missing information for the whole 4-year period who left education at least once, resulting in a sample of 13,634 persons (see Supplementary File 1, Tables A1a and A3).

4.1.1. Labor Market Status

EU-SILC provides monthly calendar information on current (labor market) activity status. We distinguish education and full-time, part-time, and self-employment. To capture (temporary) withdrawal from the labor market, the statuses NEET (complete inactivity), care work, and work disabled (total withdrawal from the labor market) were included.

4.1.2. Disability

The main independent variable is disability. Comparative studies of disability are challenging because the formal classification of disability status depends on cultural norms as well as the provision of disability benefits, which leads to differing group compositions. Moreover, STWT imply transitions from school-based (SEN) to labor market definitions of disability (e.g., "work-disabled"; Tschanz & Powell, 2020). To our knowledge, EU-SILC is the only internationally comparative data set that enables analysis of labor market entry trajectories of PwDs. Following recent comparative studies on disability (e.g., Hadjar & Kotitschke, 2022; Kangas & Karonen, 2022; OECD, 2022b), a subjective definition of disability covered in EU-SILC is employed. Respondents were asked whether they experienced limitations in their activities because of health problems with answers ranging from *yes, strongly limited* to *yes, limited* to *no, not limited at all*. An individual was assigned 0 for *no disability* if no limitation was reported and 1 for *disability* if a limitation or a strong limitation was reported during the four surveyed years. This relates to the ICF, which defines disability as a limitation in activities arising from a complex relationship between "health conditions and contextual factors" (WHO, 2001). Nevertheless, this definition has limitations: In a Norwegian study, Molden and Tøssebro (2012) showed that compared to other measures of disability, subjective definitions include more people with chronic pain and mobility difficulties and fewer people with mental and learning/cognitive difficulties, who are particularly disadvantaged in accessing the labor market. Moreover, subjective definitions include more persons who participate in the labor market than those covered by administrative classifications. Also, such a measure of disability introduces variability across countries because respondents classify their limitations according to their socialization, system provisions, and local conditions. However, the latter seems to be less problematic if—as it is implemented here—PwoDs are the comparison group and not PwDs in other countries.

4.1.3. Support Structures

Indicators covering comparative information on institutions relevant to the STWT of PwDs are scarce. We rely on three indicators for support structures from the OECD on public expenditure in a share of the GDP (Supplementary File 1, Tables A1c and A2):

1. Placement and related services, including:

   Open information services, referral to opportunities for work, training and other forms of assistance, counselling and case management of jobseekers, financial assistance with the costs of job search or mobility to take up work, and job brokerage and related services for employers, if spending on these functions can be separately identified. Services provided by the main public employment service and by other publicly-financed bodies are included. (OECD, 2022a)

2. Special support for apprenticeship, including "programs providing incentives to employers to recruit apprentices from labor market policy target groups, or training allowances for particular disadvantaged groups" (OECD, 2022a).
3. Public spending on incapacity, referring to government spending on a country's programs relating to sickness, disability, or occupational injury in kind and financial transfers (OECD, 2024).

In addition, the OECD provides an indicator on "sheltered and supported employment," however, this indicator mixes two very different policy instruments and it is unclear what kind of sheltered employment it actually represents (OECD, 2022a). Therefore, it was not used in the analyses.

4.1.4. Segregation

To capture segregation, we use: (a) information on the national share of primary and secondary students educated in special schools in the years 2012, 2014, and 2016 (EASNIE, 2014, 2016, 2018), and (b) the extent of specific programs for youth with disabilities in a country, measured via an OECD indicator on "vocational rehabilitation": "Rehabilitation refers to vocational rehabilitation for persons with a reduced working capacity which prepares them to move on to work or regular training" (OECD, 2022a; Supplementary File 1, Tables A1c and A2).

4.2. Analytical Strategy

The first question our research poses is: How do STWT processes differ across European countries for PwDs and PwoDs? The first step in our analysis is therefore to analyse which types of labor market entry trajectories can be found generally across our sample. Sequence analysis has been tested and found as an appropriate method for studying labor market entry trajectories (Brzinsky-Fay, 2014; Scherer, 2001, 2005). As an exploratory method, it "enables us to define 'life as an unfolding process' as the research focus, in contrast to limiting our attention to a specific outcome variable" (Aisenbrey & Fasang, 2017, p. 1452). Using optimal matching to compare sequences and cluster analysis for grouping them allows us to identify types of labor market entry trajectories (sequence clusters) and describe them with respect to the length, order, and number of sequences (Brzinsky-Fay, 2007). Optimal matching and cluster analysis usually result in a couple of hierarchically ordered cluster solutions. The selection of the most appropriate cluster solution is a qualitative decision by the researchers. To select the most appropriate cluster solution, we looked at all solutions from 2 to 20 clusters and qualitatively assessed the additional insights compared to other solutions. We finally decided on a 7-cluster solution, because this shows trajectory types of very different kinds without too many repetitive or similar clusters. The revealed sequence clusters should be understood as ideal types, meaning that each of the clusters contains similar sequences, whereas the difference between clusters is maximized (Brzinsky-Fay, 2007). In the second step, we checked for deviations from the average share of PwDs in the clusters. In a third step, we tested H1 through H3. To this end, additional sequence indicators were constructed that allowed us to assess the properties of the labor market entry trajectories addressed in the hypotheses (see also Ritschard, 2023; see also Supplementary File 1, Table A1b):

1. The speed to first employment is measured by the number of months a person needs to enter full-time, part-time, or self-employment after leaving education. Since the observation period for each individual is four years, this indicator ranges from 1 to 48.
2. Instability is assessed based on an indicator measuring sequence turbulence. It counts the number of different statuses and episodes (status changes) within an individual process. Both are normalized and added, which results in an indicator with a range from 0 (*no turbulence*) to 1 (*maximum turbulence*).
3. To determine inclusionary and exclusionary transitions, we classified all status changes as inclusionary, exclusionary, or maintenance transitions. Exclusionary labor market entry trajectories were measured based on an indicator capturing how many of the overall transitions reported by an individual were

made from employment to either NEET, care work, or being work disabled. Inclusionary labor market entry trajectories were measured based on an indicator capturing how many of the overall transitions reported by an individual were made from NEET, education, care work, or being work disabled to states of employment. Maintenance transitions are status changes that do not imply enhancements or deteriorations. For each individual, the shares of inclusionary, exclusionary, and maintenance transitions with respect to all transitions of this individual are calculated, summing up to 100% (Supplementary File 1, Tables A1b and A4).

To test H1 through H3, *t*-tests were calculated comparing PwDs and PwoDs for each indicator.

The second question addresses whether specific country clusters can be identified regarding support structures and segregation of PwDs. Because we assume that the institutional indicators within countries are interrelated, collinearity between the institutional indicators should be eliminated. Cluster analysis (*k*-means) was employed on the standardized institutional indicators to group similar countries together while maximizing the between-group differences. In case of missing values, we conducted mean imputation.

The third question asks how the identified country clusters relate to the disadvantage of PwDs in labor market entry trajectories compared to PwoDs. This step is confronted with some challenges: First, the sequence indicators (first transition into employment, turbulence, inclusionary, exclusionary, and maintenance transitions) have different ranges, limiting their comparability. Second, we assume country-level differences for labor market characteristics generally and for the measure of disability. Therefore, we focused on the relative disadvantage of PwDs compared to PwoDs. We normalized and recalculated the sequence indicators as deviation from their respective country mean. For example, if a person with a disability has a certain value for sequence turbulence, the difference to the overall country mean of sequence turbulence is taken for the analysis.

5. Results

5.1. Labor Market Entry Trajectories of PwDs in European Countries

Figure 1 shows the status proportion plots as well as the share of PwDs in each sequence cluster. Cluster 1 ("Early Employment") is characterized by early transitions into full-time employment. Cluster 2 ("Instability") shows combinations of different statuses with a strongly growing proportion of NEET and a small yet, compared to the other types, substantial and growing proportion of the status work disabled. Cluster 3 ("Early Exclusion") shows stable exclusion from the labor market with a large and stable proportion being NEET and a small proportion also being in care work. Cluster 4 ("Employment Bridge") is characterized by a growing proportion moving from education to full-time or part-time work. Cluster 5 ("Late NEET") exhibits status shifts from education to NEET after the second year of the observation period. Cluster 6 ("Long Education") is mostly characterized by education. Finally, Cluster 7 ("Late Employment") is characterized by education and subsequent full-time employment, which, however, comes later compared to Cluster 1.

The average proportion of PwDs in the sample is 15.8%. Compared to this, remarkable differences between PwDs and PwoDs exist in Cluster 2 ("Instability") with a proportion of PwDs of 20.1%, alluding to problematic job search processes. In contrast, the average proportion of PwDs in Cluster 4 ("Employment

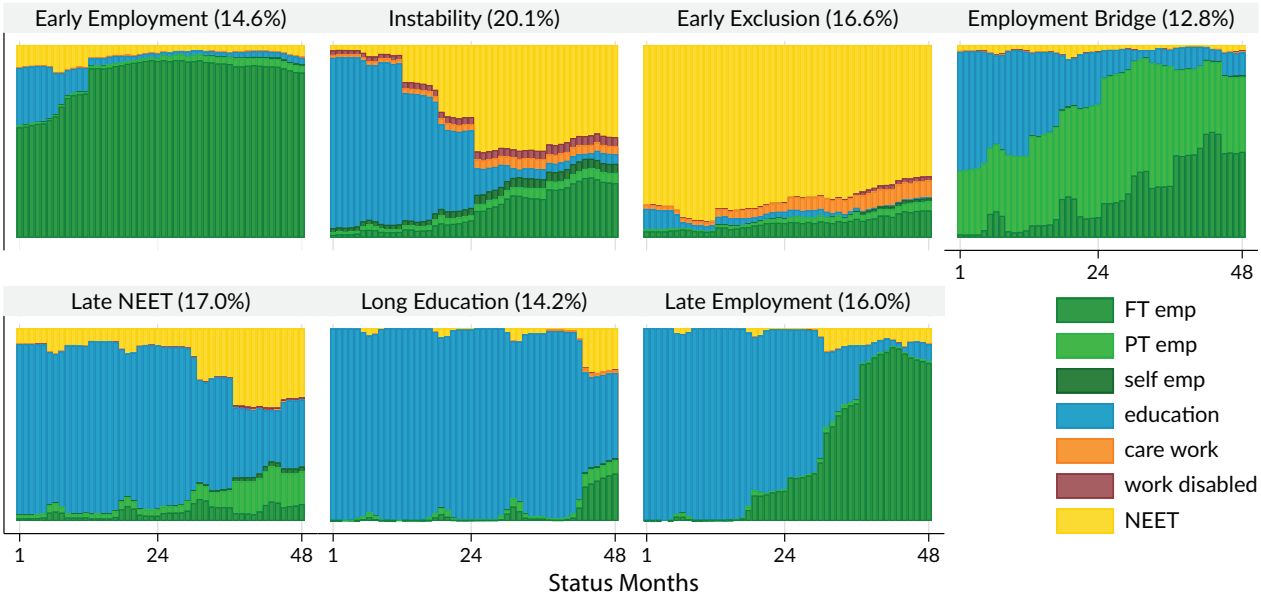


Figure 1. Status proportion plot: activity statuses by month, cluster names (share of PwDs in the cluster in parentheses). Source: Authors' calculations based on Eurostat (2022). Notes: FT = full-time employment; PT = part-time employment; self emp = self-employment.

Bridge") is only 12.8%, potentially pointing to problems of PwDs in following the ideal-typical STWT process of education followed directly by work. The three clusters with the highest share of NEET statuses—"Instability," "Early Exclusion," and "Late NEET"—also show slightly higher shares of PwDs, pointing to more experiences of exclusion during the STWT.

Figure 2 shows the average number of months spent until PwDs and PwoDs enter employment, showing no statistically significant difference between the two groups. Only if we differentiate the type of employment, weakly significant differences between full-time and part-time employment appear. Contrary to H1, PwDs seem to transition to full-time employment a little earlier than PwoDs, whereas the latter transition to part-time employment slightly more quickly (Table 2). Therefore, H1 must be rejected. However, this raises the question of whether this counterintuitive finding is due to PwDs entering specific (segregated) employment programs such as sheltered workshops, where they are employed without facing market competition but might be trapped, posing a barrier to further employment in the regular labor market. This dataset unfortunately does not allow us to distinguish the type of employment and investigate this further.

H2 is related to unstable and exclusionary labor market entry trajectories, which are expected to be more frequent among PwDs. The results in Figure 3 display statistically significant differences between PwDs and PwoDs. PwDs experience exclusionary transitions more often than do PwoDs. The results also show significantly higher turbulence for PwDs, although substantially the differences are small. Based on H3 we expected less inclusionary labor market entry trajectories. Small but statistically significant differences between PwDs and PwoDs regarding this indicator exist.

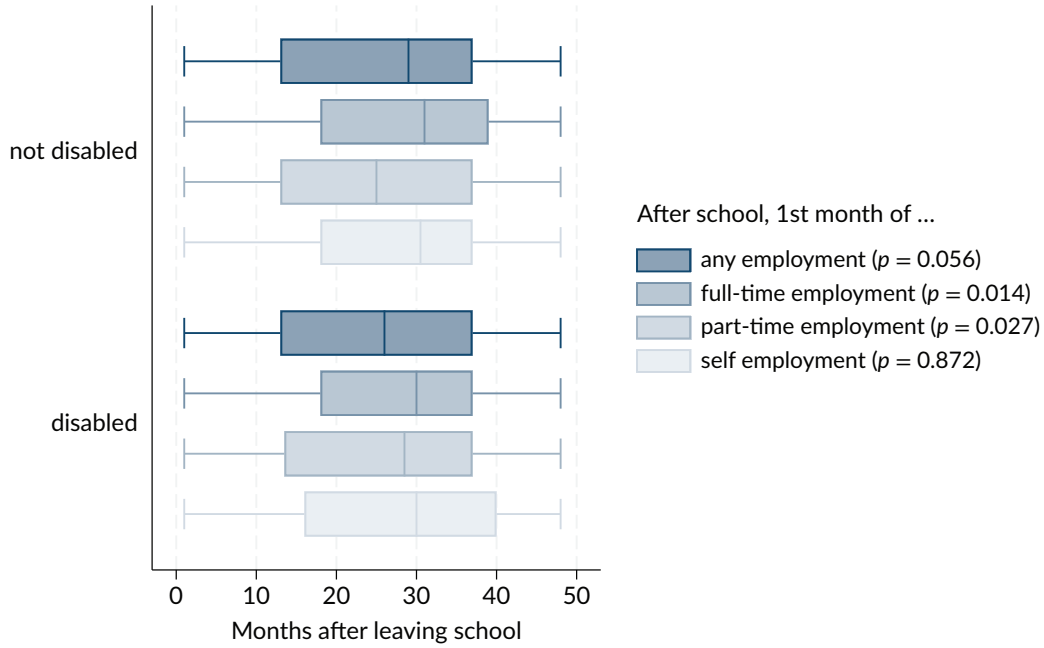


Figure 2. Average number of months until first employment of persons with and without disabilities in European countries. Source: Authors' calculations based on Eurostat (2022). Notes: *p*-value results from *t*-tests between persons with and without disabilities.

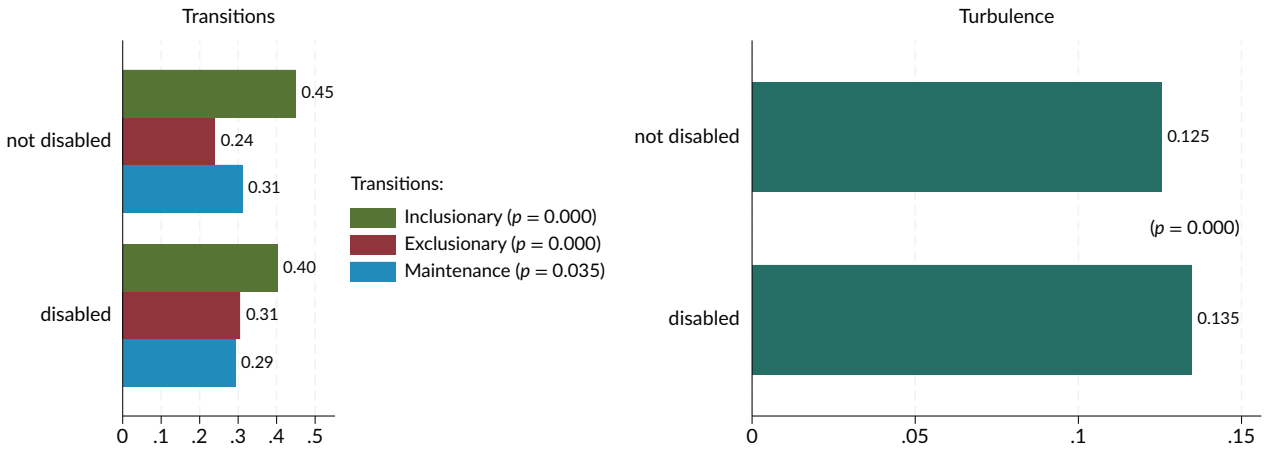


Figure 3. Inclusionary, exclusionary, and maintenance transitions and turbulence during the labor market entry trajectories of persons with and without disabilities in European countries. Source: Authors' calculations based on Eurostat (2022). Notes: *p*-value results from *t*-tests between persons with and without disabilities; the unit of the inclusionary, exclusionary, and maintenance transitions is the share as a fraction of all transitions, i.e., 0.40 means 40%; turbulence is the measure of instability (minimum value of 0 and a maximum value of 1).

Table 2. Overview of corroborated (+) and rejected (–) hypotheses.

H1	PwDs will have slower transitions to employment compared to PwoDs.	–
H2	PwDs will experience exclusionary and unstable labor market entry trajectories more frequently.	+
H3	PwDs will experience inclusionary labor market entry trajectories less frequently.	+

5.2. Clusters of Support Structures for, and Segregation of, PwDs in European Countries

Based on the institutional indicators, four clusters were identified that show differences in the average values of the institutional indicators (Figure 4). Generally, the main categories of support and segregation seem not to be distinctive. Especially the two indicators for segregation seem to be more complementary than consistent.

Cluster 1 ("Reduced Intervention") contains 16 countries with few support structures and low segregation and an average amount of special support for apprenticeships. In Cluster 2 ("Intervention I"), we find the Scandinavian countries and Switzerland. Compared to Cluster 1, the degree of state activity is clearly higher. With respect to segregation and support structures, we find high and low values. The high spending on incapacity and vocational rehabilitation can, however, be interpreted as a focus on compensating labor market disadvantages. Cluster 3 ("Intervention II") is composed of Austria, Germany, France, the Netherlands, and the United Kingdom, where we find the highest amounts of placement and related services and special support for apprenticeship, whereas spending on incapacity and vocational rehabilitation is low. The share of students with SEN in special schools is on an intermediate level. The focus, therefore, seems to be on improving matching processes in the labor market. Finally, the countries of Cluster 4 ("Strong Segregation") have a very high share of students with SEN in special schools, intermediate spending on placement, and the lowest values for incapacity spending, vocational rehabilitation, and special support for apprenticeship. Here improving labor market opportunities PwDs does not seem to be a policy goal.

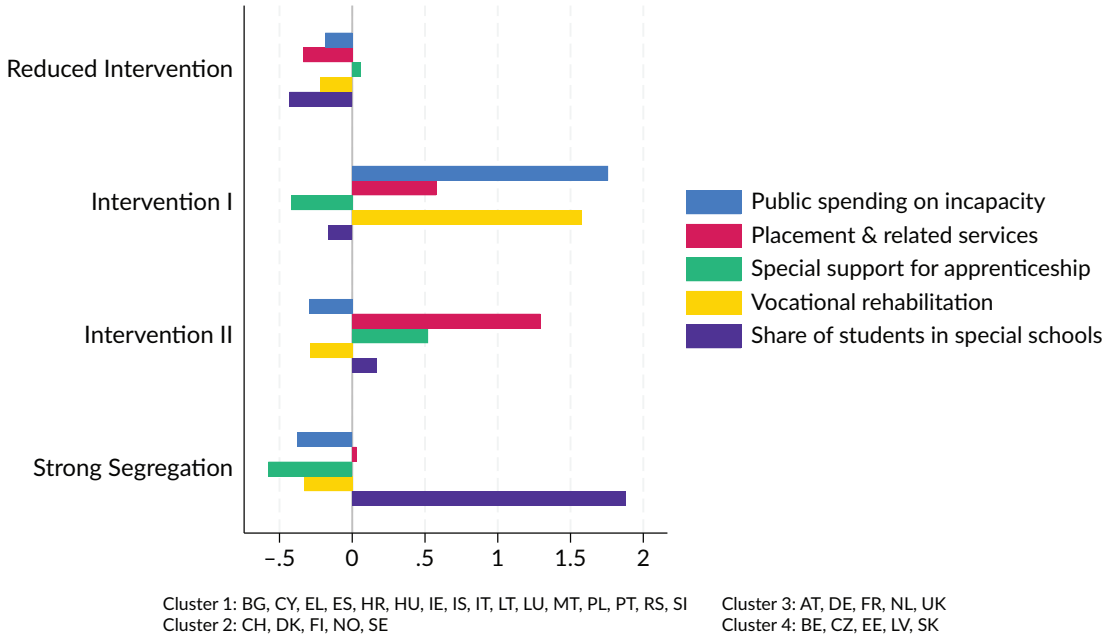
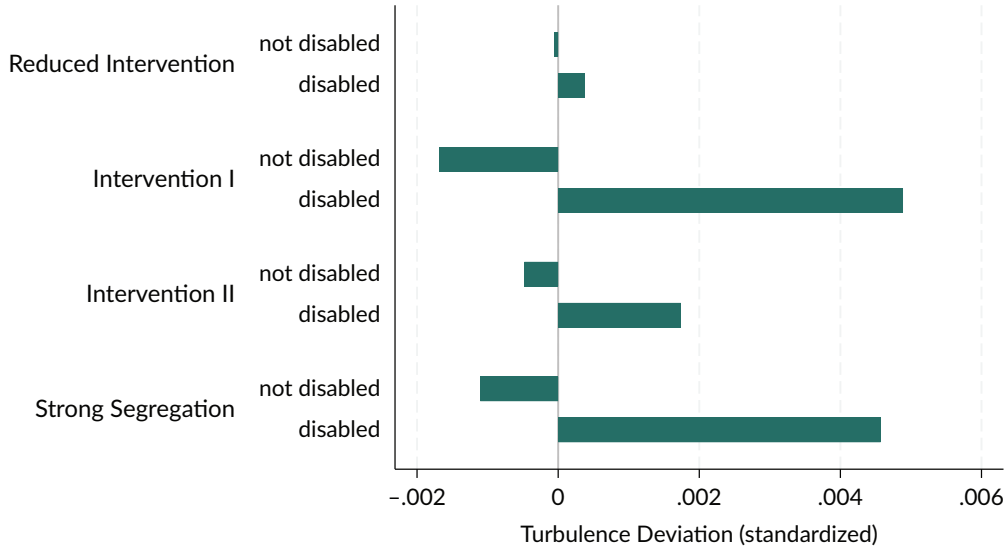


Figure 4. Country clusters based on institutional indicators for support structures for and segregation of PwDs. Source: Authors' calculations based on OECD (2025) and EASNIE (2014, 2016, 2018). Notes: The graph shows the standardized values of the five institutional variables for each of the four country clusters; for country codes see Supplementary File 1, Table A2.

5.3. The Association of Support Structures and Segregation With Labor Market Entry Trajectories of PwDs in European Countries

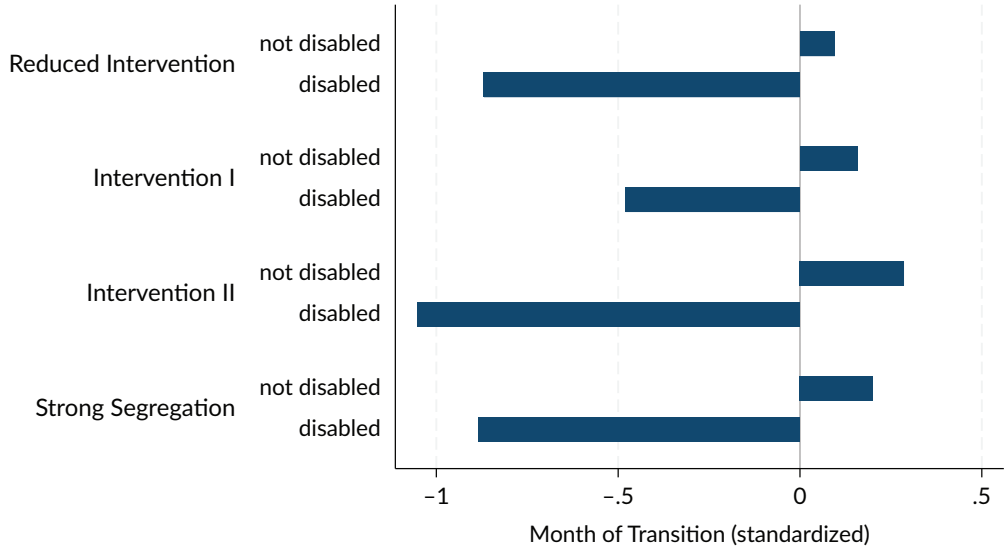
Figure 5 shows the relative differences in the deviation of turbulence from the country mean of PwDs and PwoDs across the country clusters. PwDs are confronted with higher turbulence than PwoDs in all clusters—yet to different extents. The differences in Cluster 1 ("Reduced Intervention") are the smallest, whereas we find the largest differences in Clusters 2 ("Intervention I") and 4 ("Strong Segregation"). These clusters show either high values on the indicator vocational rehabilitation or the share of students in special schools, leading to the conclusion that both kinds of segregation are related to a larger gap between PwDs and PwoDs regarding turbulence.

Analysing how the clusters are related to the speed to first employment underlines the unexpected finding that PwDs seem to experience this transition earlier—across all institutional clusters (Figure 6). Still, the gaps between PwDs and PwoDs vary. A focus on vocational rehabilitation (Intervention I) seems to be related to a smaller gap between PwDs and PwoDs, with PwDs transitioning later into first employment. Reduced intervention seems to lead to earlier transitions, possibly because no safety net exists to compensate for disadvantages or to provide alternatives. Strong segregation may be associated with transitioning or channeling PwDs into specific labor market segments. Compared to these inclusion strategies, matching seems to be the most promising pathway to labor market inclusion. However, the underlying mechanisms of the presented results require further investigation to more fully understand the benefits and risks of specific constellations of policy interventions and programs to facilitate labor market inclusion.



Cluster 1 (Reduced Intervention): BG, CY, EL, ES, HR, HU, IE, IS, IT, LT, LU, MT, PL, PT, RS, SI
Cluster 2 (Intervention I): CH, DK, FI, NO, SE
Cluster 3 (Intervention II): AT, DE, FR, NL, UK
Cluster 4 (Strong Segregation): BE, CZ, EE, LV, SK

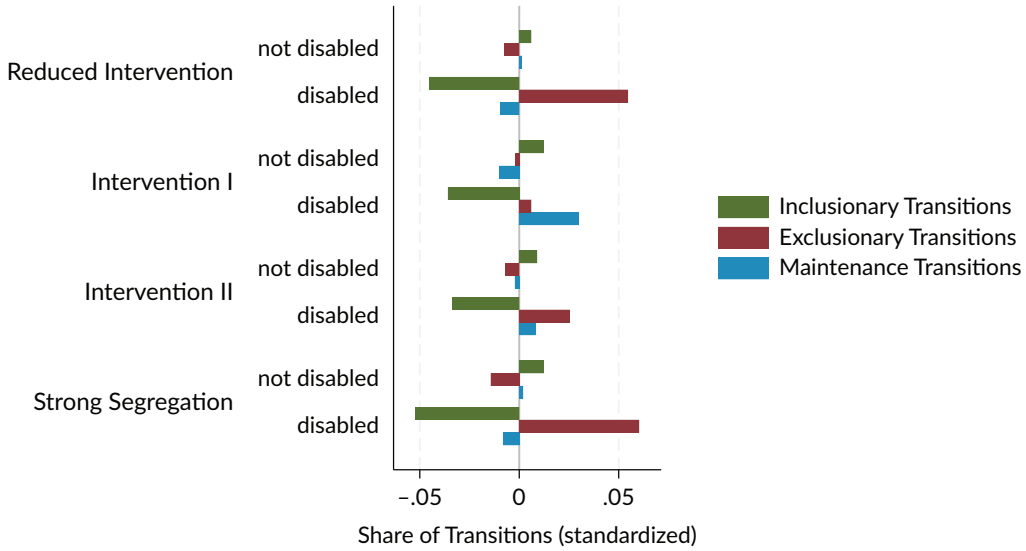
Figure 5. Turbulence deviation of PwDs and PwoDs in different institutional settings. Source: Authors' calculations based on OECD (2025), EASNIE (2014, 2016, 2018), and Eurostat (2022). Notes: The graph shows the deviation of the standardized turbulence measure from its country means for each of the four country clusters, for persons with and without disabilities; for country codes see Supplementary File 1, Table A2.



Cluster 1 (Reduced Intervention): BG, CY, EL, ES, HR, HU, IE, IS, IT, LT, LU, MT, PL, PT, RS, SI
Cluster 2 (Intervention I): CH, DK, FI, NO, SE
Cluster 3 (Intervention II): AT, DE, FR, NL, UK
Cluster 4 (Strong Segregation): BE, CZ, EE, LV, SK

Figure 6. First transition into employment in different institutional settings. Source: Authors' calculations based on OECD (2025), EASNIE (2014, 2016, 2018), and Eurostat (2022). Notes: The graph shows the deviation from the country means of standardized values of the month in which the first transition into employment takes place, for persons with and without disabilities; for country codes see Supplementary File 1, Table A2.

The deviation of inclusionary, exclusionary, and maintenance transitions is very consistent (Figure 7). On average, PwDs have a lower share of inclusionary and a higher share of exclusionary transitions, but—



Cluster 1 (Reduced Intervention): BG, CY, EL, ES, HR, HU, IE, IS, IT, LT, LU, MT, PL, PT, RS, SI
Cluster 2 (Intervention I): CH, DK, FI, NO, SE
Cluster 3 (Intervention II): AT, DE, FR, NL, UK
Cluster 4 (Strong Segregation): BE, CZ, EE, LV, SK

Figure 7. Inclusionary, exclusionary, and maintenance transitions in different institutional settings. Source: Authors' calculations based on OECD (2025), EASNIE (2014, 2016, 2018), and Eurostat (2022). Notes: The graph shows the deviation of the standardized share of inclusionary, maintenance, and exclusionary transitions from the country means in the four country clusters; for country codes see Supplementary File 1, Table A2.

again—the extent of the differences between PwDs and PwoDs varies. The relative disadvantage of PwDs seems to be lowest in countries that belong to Clusters 2 ("Intervention I") and 3 ("Intervention II"), suggesting that both strategies—compensation and labor market matching—help improve the STWT of PwDs.

6. Discussion

In this article, three key research questions were posed addressing STWT processes of PwDs: The first addressed how STWT processes differ across European countries for PwDs and PwoDs. Seven different types of labor market entry trajectories were identified that show notable heterogeneity in the STWT of PwDs across Europe. However, PwDs are slightly more represented in Cluster 2 ("Instability"), composed of many different statuses and transitions between them, and less represented in Cluster 4 ("Employment Bridge"). This cluster contains the largest share of part-time employment, which can be seen as a kind of bridge into full-time employment and the ideal-typical STWT. Looking at specific sequence indicators it also became clear that on average PwDs do not enter the labor market later than PwoDs—contrary to what was expected. Still, they experience more exclusionary and less inclusionary labor market entry trajectories as well as more instability (turbulence) during their STWT.

The second question asked whether specific country clusters can be identified based on indicators related to support structures and segregation of PwDs. Cluster analysis based on indicators provided by the OECD (2025) and the EASNIE (2014, 2016, 2018) for "placement and related services," "special support for apprenticeship," "public spending on incapacity," "vocational rehabilitation" and the national share of students with SEN educated in special schools revealed four different clusters. While Cluster 1 is characterized by low state intervention, Clusters 2 and 3 represent two different approaches to labor market policy interventions—compensation and labor market matching—typical for countries with a strong tradition of state intervention. Cluster 4 represents strong segregation in schooling, which is not designed to facilitate labor market transitions, instead stigmatizing PwDs and leading to continued participation in segregated settings.

Based on this, the third question asked how these country clusters relate to the disadvantage of PwDs compared to PwoDs regarding labor market entry trajectories. Looking at institutional explanations for differences in labor market entry trajectories, the analyses demonstrate that institutional constellations shape the STWT of PwDs and provide particular pathways for inclusion. We find disadvantages for PwDs in all institutional settings, but the extents vary. Regarding turbulence, any kind of segregation seems to be related to a larger gap between PwDs and PwoDs. Turbulence may have positive and negative effects. While it may result in more optimal matching, it may also increase insecurity. A focus on vocational rehabilitation also seems to be related to a smaller gap between PwDs and PwoDs mainly because PwDs transition later into first employment. However, the findings regarding this transition indicator must be further investigated. The disadvantages with respect to inclusionary and exclusionary transitions are largest in institutional systems of reduced intervention (Cluster 1) or where segregated schooling is highly prevalent (Cluster 4) and smaller in those countries where policy interventions (support) are important (Clusters 2 and 3).

The findings are therefore consistent with previous research suggesting that well-resourced systems help alleviate barriers for PwDs by providing necessary accommodations and tailored support during the transition phase (e.g., Halvorsen & Hvinden, 2014; Powell & Pfahl, 2019). Nevertheless, as found in many

areas of education and social policy, the "resource-labelling-dilemma" (Powell, 2016; Stone, 1984) is also relevant to explain STWT of PwDs. Segregated settings are intended to provide additional resources and tailored support. However, the findings underline the double-edged nature of such resources when provided in segregated settings. Strong segregation in the school system is associated with larger gaps between PwDs and PwoDs because of less inclusionary and more exclusionary transitions of PwDs, and systems with strong vocational rehabilitation partly seem to be associated with a smaller gap regarding these indicators between PwDs and PwoDs. However, it seems plausible that this latter finding is also the result of the overall policy orientation regarding compensation in the labor market in these countries.

The study is not without limitations. While EU-SILC longitudinal data is the only internationally comparative dataset allowing comprehensive analysis of labor market entry trajectories of PwDs, it has noteworthy restrictions. First, a more accurate measurement of STWT and particularly labor market entry trajectories of PwDs would require us to distinguish different kinds of status and specifically types of (sheltered or supported) employment, relevant for PwDs (Reims & Schels, 2022). Second, the four-year observation window restricts our ability to capture longer-term labor market trajectories, which are particularly relevant to understand the full impact of institutional factors on PwDs and their life chances. Third, limitations based on the measurement of disability have been discussed in Section 3. Because persons with cognitive impairments are underrepresented in subjective definitions of disabilities, negative associations of disabilities with labor market entry trajectories are potentially underestimated in this study. Additionally, van der Zwan and de Beer (2021, p. 483) point out that people living in collective households and institutions are excluded from EU-SILC, which is particularly relevant in the context of having considerable care needs. Fifth, due to small sample sizes per country, it was not possible to distinguish between PwDs based on the strength of their limitations in activities, although the extent of disability is likely to impact labor market entry trajectories. Information on the type of impairment is also not available in EU-SILC longitudinal data. Fourth, a general concern when investigating associations of disability with employment processes relates to questions of reversed causality, because disability can lead to lower employment chances, while low employment chances can also result in becoming disabled (Parsons & Platt, 2022). This may be particularly important when subjective definitions are applied, because exclusionary transitions may lead to bad health and feeling limited in activities. Unfortunately, we cannot make use of the longitudinal data to check possible reversed causality, because the longest observational period is just four years (48 months), which leads to a hard right censoring, and limitations in activities are only measured on a yearly basis, while we have monthly information on the activity status. Finally, there are restrictions with respect to the institutional indicators used. To measure institutional differences in transition systems of youth with disabilities, we had to rely on rather rough measures, mostly provided by the OECD. The institutional indicators we used are completely quantitative and not well suited to capture effects of institutional configurations or functional equivalents in dozens of country contexts. To adequately measure these crucial institutional features, finer-grained and more specific indicators would be needed. Particularly adequate measures of sheltered employment could potentially further explain differences in labor market entry trajectories. However, to date, no better indicators are available, which also limits provision of robust policy recommendations.

Despite these limitations, our analyses produced new insights into the STWT and specifically labor market entry trajectories of PwDs. Future research should aim to expand the temporal scope of analysis wherever possible—and to explore how transitions evolve beyond the initial STWT phase. Moreover, comparative

longitudinal qualitative studies can provide deeper insights into the lived experiences of individuals as they navigate these pathways and underlying mechanisms, particularly in relation to the resource-labelling-dilemma. More in-depth comparative case studies of countries with varying institutional frameworks and labor market conditions promise to provide further policy lessons to address the challenges faced by PwDs during STWT (on Luxembourg and Switzerland see Powell et al., 2024). The results of this large-*n* study also underscore the need for individual countries to re-evaluate their disability policies, particularly in terms of balancing support with inclusion, as they have committed to doing by ratifying the UN CRPD and setting their sights on reaching the UN Sustainable Development Goals. Thus, policymakers should consider reducing reliance on segregated settings and instead focus on providing targeted, flexible support within regular labor market placements. This may include expanding access to inclusive settings at all stages of the labor market entry trajectory, offering specialized support within regular apprenticeship programs, and enhancing incentives for employers to hire PwDs.

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Conflict of Interests

The authors declare no conflict of interests.

Data availability

This article is based on data from Eurostat: EU Statistics on Income and Living Conditions Microdata 2004–2021, version 1, release 2 (November 30, 2022; https://doi.org/10.2907/EUSILC2004-2021V.1). The responsibility for all conclusions drawn from the data lies entirely with the authors. OECD indicators on labor market programs can be accessed at https://data-explorer.oecd.org.

Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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ARTICLE

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Unemployment Scarring in the Early Career: Do Skills and Labour Demand Matter?

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Abstract

Rocky school-to-work transition processes, characterized by spells of unemployment and education–job mismatch, can have long-lasting scarring effects on young people and often lead to a loss of income and occupational status. However, the mechanisms that either foster or prevent unemployment scarring are underinvestigated. Our article thus asks whether vocational education and training (VET) diploma holders' unemployment duration and the probability of status loss at labour market re-entry are affected by the interplay between occupation-specific labour demand and young workers' skill sets acquired in VET. Our theoretical approach combines job search, human capital, and signalling theory with arguments from structural segmentation approaches. Our analyses use complete national register data on VET diploma holders who became unemployed during their early careers. We combine national register data on unemployment spells with register data on education trajectories in Switzerland and occupation-specific labour demand data. Results from event-history analyses indicate that unemployment episodes are associated with lower employment chances and higher risk of status loss of VET diploma holders. These general patterns are attenuated by occupation-specific labour demand and the skills taught in vocational training programmes. Re-employment chances are higher and the risk of status loss lower when occupation-specific labour demand is high and few of the accessible job opportunities offer lower status than the job before unemployment. Additionally, we find that workers who trained in occupations imparting large proportions of occupation-specific skills have a higher re-employment probability but also face a higher risk of status loss than those who trained in occupations imparting larger proportions of general skills. Our findings indicate a trade-off between occupation-specific skills and general skills.

Keywords
downward mobility; labour demand; occupational status; skills; unemployment duration; vocational education and training

1. Introduction

Rocky school-to-work transition processes, characterized by spells of unemployment and education–job mismatch, can have long-lasting scarring effects on the career of young people (Bühlmann et al., 2023; Kriesi & Schweri, 2020). Such effects include long-term loss of income, repeated unemployment episodes, occupational status loss at re-entry, and generally worse employment chances (Brand, 2015; Buchs et al., 2017; Gangl, 2006; Kopycka, 2023; Sacchi & Samuel, 2024; Shi & Wang, 2022). Income and status loss due to unemployment early in their career are problematic because they are difficult to recoup. Moreover, unemployment spells may lead to lower self-efficacy and motivation, which in turn impacts young people's job search behaviour negatively (Helbling & Sacchi, 2014). Unemployment early in a career path thus increases the risk of long-term disadvantages in the labour market (Buchs et al., 2015; Helbling & Sacchi, 2014) and in other life domains, including poorer health and higher divorce rates (Brandt & Hank, 2014).

Research has shown that young people's risk of becoming unemployed after completing education is linked to a country's educational system and labour market structure. Youth unemployment is generally lower in countries such as Switzerland and Germany, which maintain a strong company-based dual vocational education and training (VET) sector that is linked to an occupationally segmented labour market (Blommaert et al., 2020; Bolli et al., 2021; Kriesi et al., 2024). This is partly because dual VET combines vocational school with practical training in a firm. It imparts many practical occupation-specific skills that are sought by employers and thus facilitates VET diploma holders' transition into jobs that match the vocational training (Gangl, 2003; Kriesi et al., 2024; Shi & Wang, 2022; Zimmermann et al., 2013). However, despite low youth unemployment rates in such countries, some VET graduates experience unemployment at labour market entry and in their early careers. Our article focusses on this group, which is affected by lower employment chances and wages after labour market re-entry and a higher risk of occupational status loss and downward mobility due to their prior unemployment (Buchs et al., 2017; Helbling & Sacchi, 2014).

Studies have found that unemployment duration and the extent of unemployment scarring depend on meso-level contextual factors, such as the local labour demand and the type and transferability of skills. Unemployment episodes last longer at times of low local labour demand (Morris, 2023). Furthermore, Buchs et al. (2017) show that in the Swiss labour market, which is occupationally segmented, the risk of downward mobility after unemployment depends on the status composition of the jobs available and is lower when matching job vacancies are abundant.

The literature on the relationship between skills and unemployment outcomes is mainly concerned with wage scarring. A few studies investigate the role of skill mismatch between pre- and post-unemployment jobs and show that workers who manage to find a new job that requires similar skills to the job before unemployment suffer less from wage scarring than workers who are not able to transfer their skills to the new job (Martins-Neto et al., 2023; Nawakitphaitoon & Ormiston, 2015; Neffke et al., 2024; Ormiston, 2014). Rinawi and Backes-Gellner (2021) find that workers with highly occupation-specific skills, which are

difficult to transfer between occupations, are less affected by wage scarring upon labour market re-entry. Eggenberger and Backes-Gellner (2023) show that generic ICT skills reduce the probability of wage scarring for workers with highly specific skill bundles. Work is very scarce on other outcomes than wages, such as employment chances, unemployment duration, and downward mobility. Shi and Di Stasio (2022) use the level of education as a measure of skills to show that unemployment spells have a stronger detrimental effect on VET diploma holders' later employment chances than on tertiary graduates'. Some evidence indicates that unemployed VET diploma holders with highly specific skills suffer from longer spells of unemployment (Rinawi & Backes-Gellner, 2021). On occupational status loss, the only study of which we are aware is the one by Rose and Stier (2019), which shows that unemployed workers with high levels of education have a higher risk of occupational status loss at labour market re-entry than workers with low levels of education.

In summary, research has documented the relevance of labour demand to the duration of unemployment and provided evidence that wage scarring due to unemployment is related to skill endowment. However, to the best of our knowledge, hardly any research has investigated the relationship between skill endowment and other aspects of unemployment scarring, such as unemployment duration and status loss. Furthermore, whether the relationship between skills and scarring may be moderated by labour demand remains unknown. The aim of our article is thus to shed light on these two research gaps:

Firstly, we investigate the hitherto neglected potential impact of skill endowment and ask whether the proportion of occupation-specific and general skills imparted in Swiss upper-secondary VET programmes are related to unemployed diploma holders' unemployment duration and status loss at labour market re-entry. Secondly, we are interested in the moderating role of labour demand. We thus analyse whether the relationship between unemployment duration, status loss and the skills workers were taught in VET depends on the occupation-specific demand for labour.

We investigate these two questions with complete national register data on unemployed Swiss VET diploma holders who graduated between 2011 and 2018. VET is suited to investigate our research question for several reasons. Firstly, VET curricula are the only curricula in Switzerland that are nationally standardized and allow reliable comparisons between programmes. Secondly, VET is by far the most prevalent type of upper-secondary education. It is chosen by approximately two-thirds of all compulsory school leavers, thus allowing us to include a sizeable proportion of all upper-secondary graduates in our analyses. Thirdly, the proportion and type of skills imparted differ considerably between the numerous programmes (Grønning et al., 2020b). Fourthly, we avoid confounding the effects of level and type of skills.

2. Theory and Hypotheses

To formulate hypotheses, we combine theoretical arguments from job search and human capital theory (Becker, 1975a; Halaby, 1988) with arguments from structural segmentation approaches that take the structure of national labour markets and educational systems into account (e.g., Bol et al., 2019; Cheng & Park, 2020; Kalleberg & Mouw, 2018). We begin by introducing the characteristics of Swiss VET (2.1), discuss the basic mechanisms of job search in occupationally segmented labour markets (2.2), and theorize the role of skills in re-employment and downward mobility (2.3) and the interaction between skill endowment and labour demand (2.4).

2.1. Significance and Characteristics of Swiss Upper-Secondary VET

In Switzerland, two-thirds of compulsory school leavers enrol in mostly dual VET in one of approximately 250 different training occupations at the upper secondary level. During the observed period of 2011–2019, a stable proportion of about two-thirds of all upper-secondary diplomas awarded were earned after completing an occupation-specific VET programme (Dionisius et al., 2023).

The majority of VET diploma holders entered the labour market within six months of graduating, although there are some differences between occupational fields (Rudin et al., 2018). Average youth unemployment levels over the studied period fluctuated only slightly and at a low level, between approximately 2.4% and 3.4%, and were comparable between young VET diploma holders and university graduates (Rudin et al., 2018; SECO, 2019). Furthermore, most VET diploma holders manage to find first jobs within the occupational fields for which they trained (Buchs & Helbling, 2016; Müller & Schweri, 2015; Rudin et al., 2018), and VET diplomas offer employment chances that are similar to those of higher education degrees (Aepli et al., 2021).

Swiss VET is characterized by its mostly dual form, by large between-programme heterogeneity in imparted skills and high within-programme standardization. All dual VET programmes combine practical training with some theoretical education. Apprentices typically spend three to four days in their companies and one or two days in vocational schools. Swiss VET thus imparts both occupation-specific skills and various types of general knowledge and skills. However, the programmes differ in the proportion of occupation-specific and general skills taught. Whereas some programmes teach a minimum of general skills, others include a broader range of general skills that are transferable across all labour market segments. Furthermore, all VET programmes are standardized so that all apprentices within a particular occupation follow the same curriculum. They lead to nationwide-recognized federal diplomas that have a high signalling power to employers and provide reliable indicators of young diploma holders' basic skill endowment (Gangl, 2003; Grønning et al., 2020a).

2.2. Basic Mechanisms of Job Search in Occupationally Segmented Labour Markets

Leaving unemployment depends chiefly on the probability that job seekers receive job offers that are acceptable to them. According to job search theory, receiving a job offer depends both on job seekers' search efforts and on employers' willingness to make such an offer (Gebel, 2009). Job seekers aim to find a job where they can use all their skills and abilities to maximize their earnings (Halaby, 1988). Young VET diploma holders ideally find a job in their training occupation. They stop their search if they are offered a job whose benefits (i.e., wages, status) exceed the value of remaining unemployed and searching for a better job (Gebel, 2009).

The pressure of accepting a new job is alleviated by unemployment benefits, which increase the reservation wage. Unemployment benefits may be received up to a maximum of 24 months after becoming unemployed, although the majority of Swiss labour market entrants are entitled to only 18 months (Cottier et al., 2020). Unemployment benefits lower the opportunity costs of being unemployed (Lopes, 2022; Mortensen, 1977). However, skills and abilities depreciate with increasing duration of unemployment (Becker, 1975b; Gangl, 2004; Schmelzer, 2011). Furthermore, prolonged unemployment episodes might be interpreted as negative signals of low productivity and motivation by employers (Becker, 1975b; Gangl, 2004; Schmelzer, 2011). This holds particularly for the Swiss labour market, which has generally low unemployment rates and where

longer unemployment spells bear a strong stigma and are associated with individual deficiencies, such as a lack of motivation, social skills, or reliability (Sacchi & Samuel, 2024). Difficulties in finding a suitable job will increase the probability that workers lower their reservation wage and expected gains (Gebel, 2009; Groot, 1990) and accept a job that does not fully match their training. This probability will increase shortly before unemployment benefits run out (Buchs et al., 2017). Consequently, our first basic hypotheses are that the re-employment probability of job seekers decreases (H1a) and that the probability for downward mobility at re-entry increases with increasing unemployment duration (H1b).

Relying on job search and human capital theory, we argue that job seekers' search efforts and employers' willingness to make a job offer depend on the interplay between VET diploma holders' skills acquired in their VET programme and employers' occupation-specific demand for labour, both of which shape unemployed workers' accessible job opportunities and thus their risk of downward mobility. To theorize this interrelation, we take into account that the Swiss labour market is occupationally segmented and tightly linked with the educational system, including the Swiss VET system. As described above, Swiss VET imparts occupation-specific and some general skills that differ between VET programs. Only a small and dwindling proportion of jobs are accessible solely with compulsory schooling. Most jobs belong to occupational subsegments that require specific educational credentials. Whereas a few occupational subsegments are fully closed off to workers who do not hold particular credentials (e.g., jobs for medical doctors or electricians), the vast majority accept several related credentials. Some of these permeable subsegments are linked and enable vertical status mobility if the occupational status of the subsegments differs (Sacchi et al., 2016). Consequently, individual employment opportunities depend on the labour demand within the occupational subsegments to which workers have access due to their occupation-specific credentials (Kriesi et al., 2010). Furthermore, the probability of downward (or upward) mobility depends on the status composition of the accessible job opportunities. The risk of downward mobility increases with an increasing proportion of accessible job opportunities with lower status than the job before becoming unemployed.

Due to structural changes to the economy and fluctuating business cycles, labour demand differs both between occupational subsegments and across time. In growing occupation-specific segments, employers seek more skilled workers than are available. Furthermore, labour demand is generally lower during economic downswings, although these do not affect labour demand uniformly across labour market segments (Foote & Ryan, 2015; Mortensen & Pissarides, 1994). The prospects of finding a new job that matches one's skills thus depend on the labour demand within the occupational subsegments for which an unemployed worker has suitable skills at the time of the job search (Devereux, 2002; Neffke et al., 2024). When the occupation-specific labour demand is high, many job options are available to job seekers, which makes finding a job easier for unemployed individuals (Gangl, 2004). When labour demand is low, fewer jobs are available, and more people are looking for a jobs. Thus, low occupation-specific labour demand makes finding a job more difficult for unemployed individuals (Pissarides, 2000) and might oblige workers to accept jobs offering lower status and income than the last job. Consequently, we assume that the probability of re-employment is higher at times of high labour demand within a worker's occupational subsegment (H2a). Furthermore, the probability of status loss and downward mobility at re-employment increases if a large proportion of jobs have lower status than the job before unemployment (H2b).

2.3. The Role of Training Skills in Re-Employment Prospects

Within occupationally segmented labour markets, unemployed workers ideally find re-employment in an occupation that matches the skills acquired in education and subsequent work experience. A mismatch between workers' skills and the skill requirements of new jobs increases the probability of income and status loss (e.g., Kambourov & Manovskii, 2009; Neffke et al., 2024; Rose & Stier, 2019; Wolbers, 2003). In dual VET, practical training endows learners with occupation-specific skills. Vocational school teaches occupation-specific and general knowledge, the latter including language skills and subjects such as history, economics, and civics. Furthermore, all learning sites teach general transferable skills, such as ICT literacy, communication, and teamwork skills (Eggenberger & Backes-Gellner, 2023; Scharnhorst & Kaiser, 2018). However, between-programme heterogeneity is substantial. Some training occupations teach predominantly occupation-specific skills and only a minimum of general skills whereas others teach larger proportions of general skills. We argue that these differences in skill bundles have implications for unemployed workers' job search strategies and employers' willingness to make matching job offers, which in turn impact unemployed workers' re-employment prospects and the risk of downward mobility at labour market re-entry.

High proportions of occupation-specific skills increase workers' immediate productivity and lower training costs for employers at the start of a new job in the training occupation (Gangl, 2004; Rose & Stier, 2019). At the beginning of an unemployment spell and before skill depreciation has begun, occupation-specific skills may increase employers' willingness to make a matching job offer and thus lower the initial probability of downward mobility. However, occupation-specific skills are of limited transferability to other occupational fields and have thus been found to reduce occupational mobility (e.g., Lamo et al., 2011; Martins-Neto et al., 2023; Rinawi & Backes-Gellner, 2021). Furthermore, occupation-specific skills depreciate faster than general skills due to rapid technological advances, changing work routines, and new regulations and require constant use and updating to secure employability (Schultheiss & Backes-Gellner, 2023). Unemployed workers with a high proportion of occupation-specific skills thus have to decide how quickly they are willing to accept a job of lower quality where some of their skills are obsolete rather than wait for a job that offers matching status and wage benefits. Against this background, we hypothesize that large proportions of occupation-specific skills facilitate labour market re-entry (H3a) and decrease the risk of downward mobility in the early phase of unemployment while increasing the risk of downward mobility with increasing unemployment duration (H3b).

Large proportions of general skills signal lower productivity at the start of a new job because they may not immediately align with job-specific tasks. Therefore, they require workers to adapt to job-specific contexts and acquire specific skills. This may hamper fast re-employment. However, general skills are also transferable and retain their usefulness when workers change occupation (Becker, 1975b; Wasmer, 2006). Furthermore, general skills have lower depreciation rates than occupation-specific skills (Cohen et al., 2023; Gangl, 2004). They are associated with high trainability, how easily and quickly a worker learns new skills (Korpi et al., 2003), and with more successful job search strategies. For example, McQuaid (2006) shows that unemployed individuals with high verbal skills are more successful in finding a new job. Results from Korpi et al. (2003) imply that general education facilitates unemployment exits. Evidence is growing that generic ICT skills have become important for labour market outcomes and are associated with higher employment rates of Swiss VET graduates (Kiener et al., 2022) and higher wages after involuntary job separations (Eggenberger & Backes-Gellner, 2023). We thus hypothesize that high proportions of general skills may hamper fast re-entry (H4a) but protect unemployed workers from downward mobility (H4b).

2.4. The Moderating Role of Labour Demand

Human capital considerations suggest that labour market outcomes depend on an interplay between skills and labour demand. For example, Lamo et al. (2011) show that countries in which a large proportion of workers have specific skills have more difficulties in adapting to macro-economic turbulence and have thus higher unemployment rates than countries in which general skills are dominant. Adopting a micro-level perspective, Eggenberger et al. (2022) find that wages of workers with highly specific skill sets depend more strongly on labour demand than those of workers with less specific skill sets. The former experience larger earning losses when demand decreases but larger earning gains when demand increases. These findings imply that the usefulness of occupation-specific skills is more sensitive to labour demand than that of general skills. At times of high occupation-specific labour demand, finding a matching new job should be comparatively easy. When the occupation-specific labour demand is low, job seekers are forced to look for jobs beyond their occupational field. However, occupational mobility is hampered by high proportions of occupation-specific skills but facilitated by transferable general skills, which are also useful in many different jobs (Gangl, 2004; Rinawi & Backes-Gellner, 2021). Consequently, workers with a lot of occupation-specific skills are likely to have more difficulties in finding a new job than those with more general skills and are more at risk of experiencing downward mobility at labour market re-entry when labour demand is low "due to [their] inability to locate employment in more prospering sectors of the economy" (Gangl, 2004, p. 190). This leads to the fifth hypothesis, which postulates a moderating effect of labour demand on the relation between skills and re-employment prospects: When the occupation-specific labour demand is low, more general skills increase the probability of re-employment (H5a) and decrease the probability of status loss (H5b).

3. Data and Measures

3.1. Data and Sample

We combine national register data on unemployment spells from the information system for public employment services (PLASTA/AVAM) with register data on education trajectories in Switzerland (LABB) from the Swiss Statistical Office, including precise information on an individual's training occupation and his/her formal education pathway during the early career. The analyses are based on complete national register data on Swiss workers who earned a federal upper-secondary VET diploma from a three- or four-year programme between 2011 and 2018 (N = 516,425) and were registered as unemployed at least once after the completion of their VET training. We restrict our sample to unemployed Swiss residents without further formal education after the completion of VET. We measure the duration of unemployment in days from the date of registering as unemployed until deregistration from unemployment services or the date of finding a job. We follow individuals' trajectories for a maximum of 24 months, the maximum period of unemployment benefits in Switzerland. Only the first unemployment spell per person is considered in the sample. We exclude individuals registering with the employment service without becoming unemployed, for instance, because they found a job before their previous job ended (3% of the sample). The resulting sample consists of 107,911 unemployed VET graduates, which indicates that approximately a fifth of all VET graduates became unemployed during the first years of their career. About a third of the sample registered as unemployed within the first three months after graduation. On average, individuals had 16 months of work experience and were 22 years old when registering as unemployed. They received their

diplomas for 158 training occupations. Most graduates worked in their training occupation at the time of unemployment (76%). About 10% worked in a job of lower status than their training occupation before becoming unemployed.

We combine this register data with occupation-level measures of skills derived from occupation-specific training ordinances and curricula in force when the individuals in our sample trained. The documents contain detailed information on the time spent in the various training locations and the skills provided during VET (for an overview of the collected data see Grønning et al., 2018). This data allows comparison of training characteristics across all three- and four-year VET programmes leading to a VET diploma in Switzerland. We linked the individual-level register data with occupation-level data on the institutional characteristics of training occupations, including skills and time spent in training locations using the 6-digit statistical code used by the Federal Statistical Office.

3.2. Measures

3.2.1. Dependent Variables

Our dependent variables are *time until re-employment* and *status loss at re-employment*. We measure the time until re-employment by counting the number of days from registering with employment services to finding a job. Individuals who do not find a job are right-censored, because they lost their unemployment benefits, are considered as not looking for a job by employment services (see above), deregistered from employment services without finding a job, or did not find a job during the first 24 months of being unemployed. Status loss at re-employment captures vertical job mismatch and thus a quality aspect of the job found at re-employment. Status loss is measured by comparing the status of the occupational groups of the pre- and post-unemployment jobs in the four-digit international standard classification of occupations (ISCO). We consider a post-unemployment job to be lower in status if it is more than 10% lower than the pre-unemployment job on Ganzeboom's occupational status scale (Ganzeboom et al., 1992). With individuals who became unemployed immediately after graduation, we compare the occupational status of the training occupation with the job after unemployment. The unemployment services did not record the exact jobs found after unemployment for some individuals, and we dropped these cases from the analyses on status loss.

3.2.2. Training Skills

We measure the type of training skills at the occupation level by analysing the content of occupation-specific training ordinances and curricula. VET is standardized across Switzerland, and apprentices within a particular occupation follow the same curriculum, which leads to a nationally recognized federal diploma of VET. Despite this high within-occupation standardization, heterogeneity between training occupations is broad (see Figure 1). We exploit this heterogeneity to measure differences in the proportion of occupation-specific and general skills taught between occupations and distinguish several skill indicators.

Practical *workplace training* captures the proportion of time VET learners spend in occupation-specific training in the training firm and intercompany courses (Grønning et al., 2020b). *General knowledge* assesses the proportion of general education in vocational school to the overall work and school time per week.

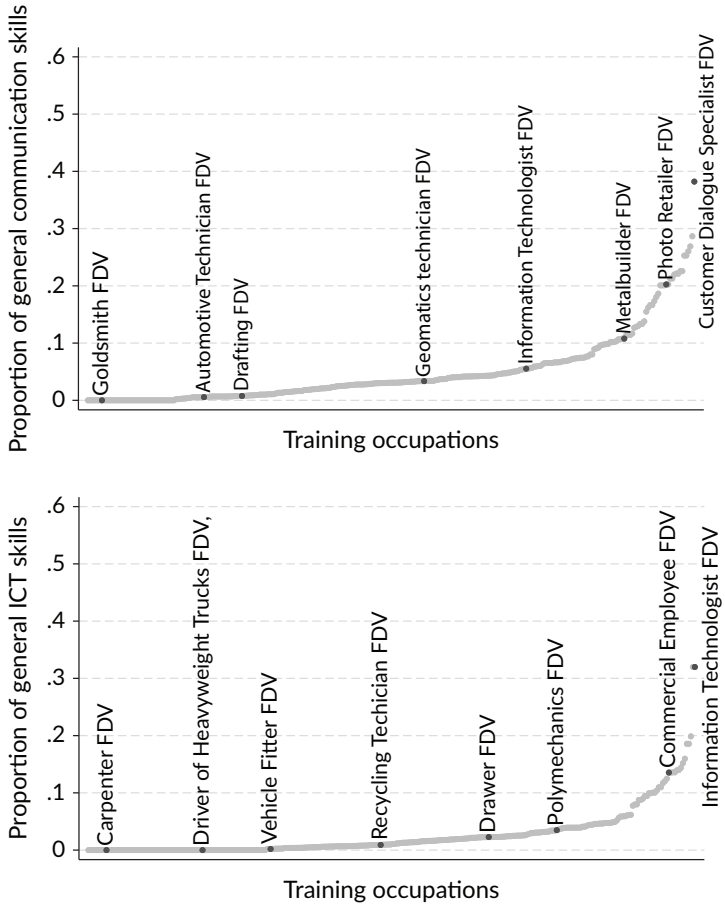

Figure 1. Heterogeneity of ICT skills (top) and communication skills (bottom) across training occupations (n = 303, occupations sorted by skill proportion). The occupations specified here are examples.

To measure *general communication* and *ICT skills*, we calculated the proportion of learning objectives covering these two skills in each occupation-specific curriculum using automatic content analyses of 425 current and repealed curricula in force at the time of training (for details, see Grønning et al., 2018). We matched the skill measures with our individual-level unemployment data using the VET ordinance that was in force at the time of an individual's VET training. To illustrate the heterogeneity of skills provided in Swiss VET between occupations, Figure 1 depicts differences between training occupations in the proportion of learning objectives referring to general ICT skills (bottom) and general communication skills (top).

3.2.3. Labour Demand

To assess occupation-specific labour demand, we use information about occupation-specific job opportunities. We measure *occupation-specific labour demand* with three indicators using representative yearly job advertisement data from the Swiss job market monitor (Buchmann et al., 2022): the total number of vacancies per occupational field and year (in 1000 jobs, using the 3-digit level of the Swiss standard classification of occupations (SCO); see Federal Statistical Office FSO, 2019), the number of job vacancies with more than 10% lower ISEI scores, and the number of job vacancies with equal (≈10%) or higher (>10%) ISEI scores compared to the job held before unemployment (in 1000 jobs, using the 3-digit level of the Swiss SCO). The number of advertised positions was weighted in each case by the probability that a "worker with

occupation *x* was able to access jobs in other occupations" (see Grønning & Kriesi, 2022). For all variables, we use a two-months lag and match the labour demand variables to the individuals half-yearly depending on the month they registered as unemployed.

3.2.4. Control Variables

At the individual level, we controlled for age, gender, citizenship, work experience in months since graduation, and pre-unemployment horizontal job match using a comparison of the two-digit level of the Swiss SCO of the VET occupation and the pre-unemployment occupation (Federal Statistical Office FSO, 2019). At the occupation level, we controlled for the occupation group of the job held prior to unemployment (two-digit level of the Swiss SCO), for the occupation-specific unemployment rate, and for the intellectual requirement profile of the VET occupation (Stalder, 2011). At the macro level, we controlled for general economic trends by including the total number of job vacancies per year in 1000 (Buchmann et al., 2022) and for the geographic region of residence at time of unemployment (NUTS-2 regions). Table A1 in the Supplementary File presents a descriptive overview of all the variables used in this article.

3.3. Analytical Strategy

We first look at the employment status of young VET graduates descriptively. In a second step, we run piecewise constant exponential models to explicitly model the time-varying effect of our skills variables. We use three-monthly time splits but control for the robustness of the results with various time intervals (see Supplementary File, Tables A4 and A5). Piecewise constant exponential models with period-specific effects of covariates are particularly well suited to model events such as re-employment when it is likely that the roles of predictors change as the spell continues (cf. Blossfeld et al., 2019, p. 134). We calculate the hazard of exiting via re-employment and status loss with time in months treated as continuous. We specify the events of interest, re-employment and status loss, as *failure* (1), with all other states coded as *censored* (0). Our model is therefore similar to a competing risk model but treats exits to status-equivalent jobs as right-censored without explicitly modelling them (for a similar approach see Buchs et al., 2017). We estimate frailty models to account for unobserved heterogeneity between occupations.

4. Results

4.1. Descriptive Results

Table 1 illustrates that 85% of all unemployed VET graduates successfully found a job within the observation period, 50% with status-equivalent and 19% with lower-status re-employment.

Table 1. Employment status of unemployed VET graduates during the observation period.

Employment status	
Lower-status re-employment	17,120 (19%)
Status-equivalent re-employment	45,161 (50%)
Re-employment, unknown status	14,955 (17%)
No re-employment	13,330 (15%)

The probability (i.e., hazard) of exiting unemployment and of status loss varies over time, as Figure 2 indicates. The probability of re-employment is highest directly after registering with unemployment services. Roughly 60% find a new job within the first three months. After approximately three months of unemployment, the probability of re-employment sharply and steadily declines with increasing unemployment duration in line with H1a (left panel in Figure 2). The probability of exiting unemployment increases again shortly before unemployment benefits expire. The likely reason is that the impending end of unemployment benefits lowers the reservation wage and pushes job seekers to accept jobs of lower quality or jobs that do not fit their skills profile well (Akın & Platt, 2012). If we further analyse the quality of the job found at re-employment, we see that the hazard of status loss increases over time in comparison to the probability of matching status re-employment. The increase is particularly pronounced after approximately 19 months of unemployment and thus towards the end of the period of entitlement to unemployment benefits. In line with H1b, unemployed workers are thus more likely to accept a job of lower status with increasing unemployment duration (right panel in Figure 2). These descriptive results are derived from regressions without control variables and monthly time splits but are generally in line with the multivariate results provided in Table A2 in the Supplementary File.

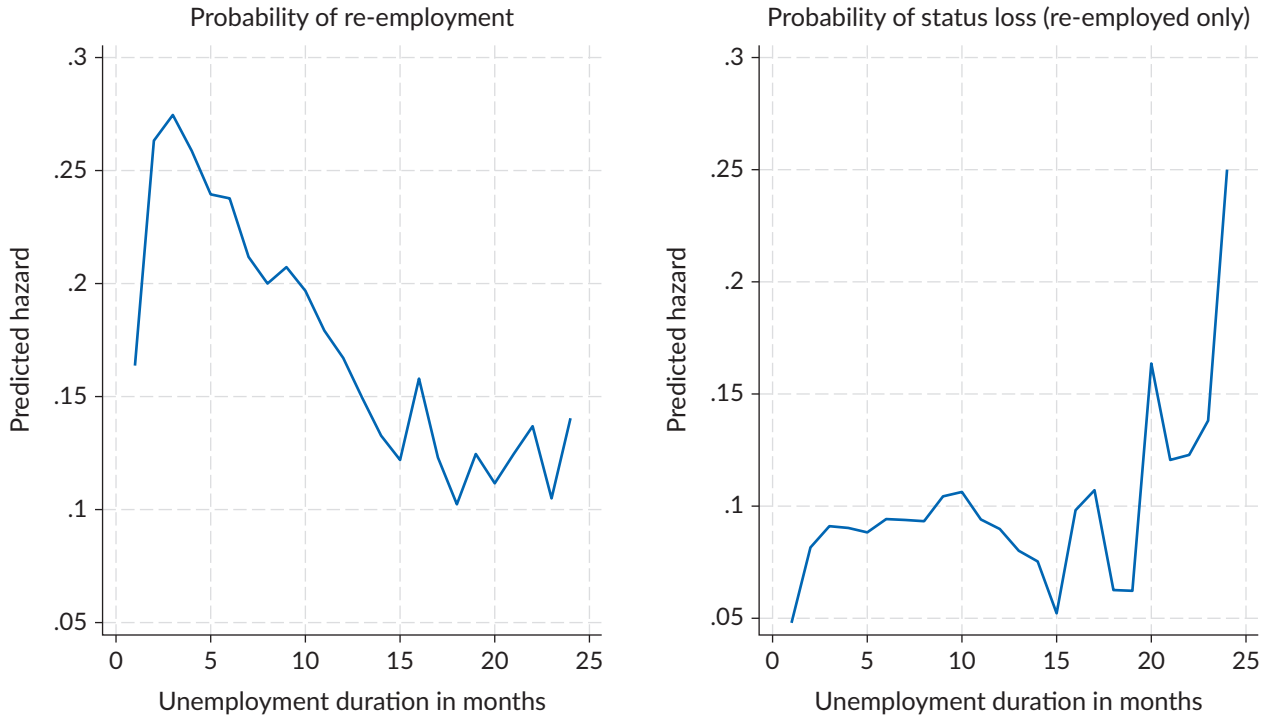

Figure 2. Predicted probability (i.e., hazard) of re-employment and status loss. Notes: Results derived from a piecewise constant exponential model with monthly intervals and no control variables; the survival function, which is the inverse of the hazard function, is provided in the Supplementary File, Figures A1 and A2.

4.2. Multivariate Results

Our main multivariate results are provided in Table 2. In line with H2a and H2b, model 1 firstly shows that the probability of re-employment increases when occupation-specific labour demand is higher. Secondly, the risk of status loss at re-employment rises if many of the accessible jobs are of lower status than the job before unemployment. In substantive terms and based on the predicted median time, the predicted unemployment duration between occupations with low and high labour demand at a given time differs by about half a

month. Furthermore, the risk of status loss is approximately four times higher in occupations offering many lower-status vacancies at a given time than in occupations offering few lower-status vacancies.

Models 2–5 reveal opposing relations between the skills taught during training and the probability of re-employment and status loss at re-entry. Supporting H3a, we find that large proportions of workplace training increase the probability of re-employment. To illustrate the role of workplace training for re-employment, Figure 3 (left panel) plots the survival function for three levels of workplace training (minimum, mean, maximum), depicting the probability that re-employment (i.e., failure) has occurred by time *t*. The predictions in Figure 3 clearly show that individuals who trained in occupations providing more workplace training (green, short-dashed line) exit unemployment faster than those who trained in occupations providing less workplace training (blue, solid line). This difference holds particularly during the first six to nine months after becoming unemployed, as also the results in Table 2 illustrate. After longer periods of unemployment, the quantity of workplace training has no consistently significant influence on the probability of re-employment. The model predicts a median unemployment time of less than two months for individuals who trained in occupations with large proportions of workplace training and a median unemployment duration of almost three months for individuals with low proportions of workplace training. By contrast, and partly in line with H3b, unemployed VET diploma holders who trained in occupations imparting larger proportions of workplace training have a higher risk of status loss at re-entry from the start of the unemployment phase (right panel). This is also supported by Figure 3 (right panel), which shows that individuals who trained in occupations imparting the largest proportions of workplace training consistently have the highest probability of exiting into status loss. In line with H3b and clearly depicted by the increasing difference between the slopes of the predictions in Figure 3, this effect becomes stronger with ongoing unemployment duration. Large proportions of workplace training thus disadvantage job seekers compared to counterparts whose training programmes included comparatively smaller proportions of

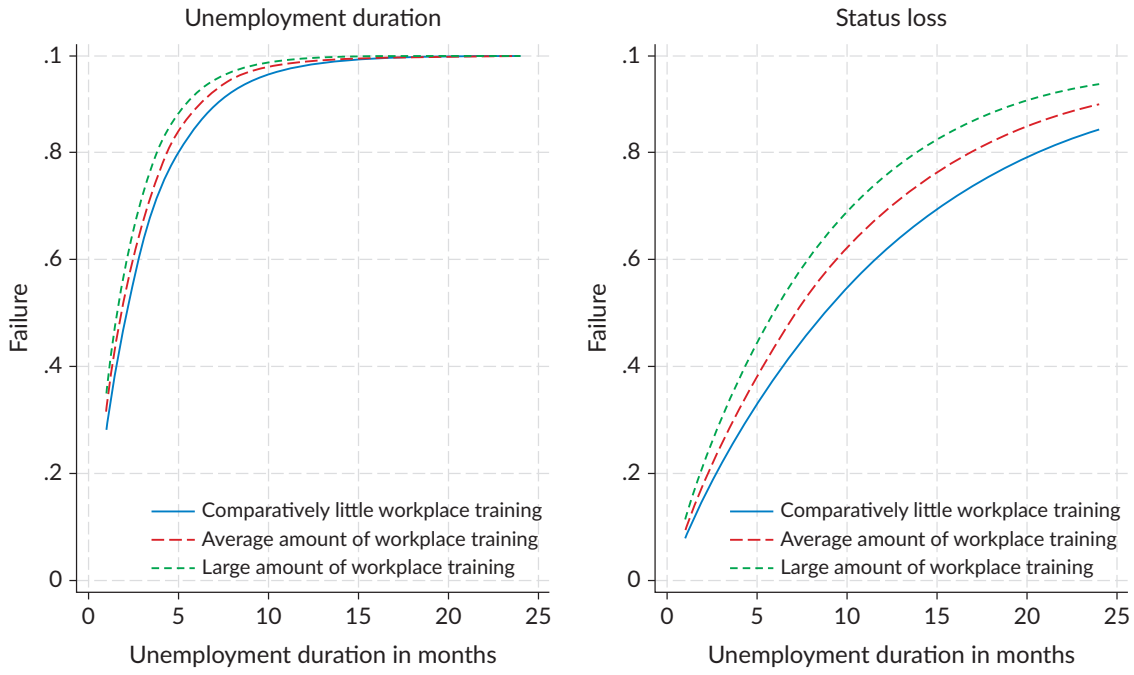

Figure 3. Predicted failure function of unemployment and status loss by levels of workplace training (minimum, mean, maximum).

workplace training and more general knowledge. For example, the predicted median time until a job seeker accepts a job of lower status is about four months earlier in occupations with large proportions of workplace training than in occupations with comparatively low proportions of workplace training.

In line with H4a, comparatively large proportions of general skills lower the probability of re-employment, particularly during the first six to 12 months of the job search. This holds for general knowledge, general ICT skills, and general communication skills, all of which reduce the likelihood of exiting unemployment quickly (see Table 2, models 3–5). Figure 4 (left panel) shows the survival function at three levels of general ICT skills (minimum, mean, maximum). The results indicate that unemployed workers who trained in occupations imparting comparatively large quantities of general ICT skills have a lower probability of exiting unemployment and need longer to find a job than individuals who trained in occupations imparting an average or low amount of general ICT skills. For instance, more general ICT skills increase the median unemployment time at the beginning of an unemployment spell from approximately 2.8 months to 4.5 months. However, as postulated in H4b, the proportion of general skills becomes beneficial when we examine the quality of the job after unemployment: Large proportions of general skills reduce the likelihood of status loss at re-entry (see Table 2, models 3–5), albeit the effect of general knowledge is only significant in some time-intervals. Unemployed VET diploma holders who trained in programmes with higher proportions of general knowledge, communication, and general ICT skills have lower risks of status loss at re-employment than unemployed who trained in occupations that provided fewer of these skills (H4b). This is also illustrated by the predicted survival functions in Figure 4 (right panel) at different levels of general ICT skills, which show that individuals who trained in occupations teaching comparatively large proportions of general ICT skills have a much lower probability of status loss than individuals who trained in occupations providing fewer of such skills.

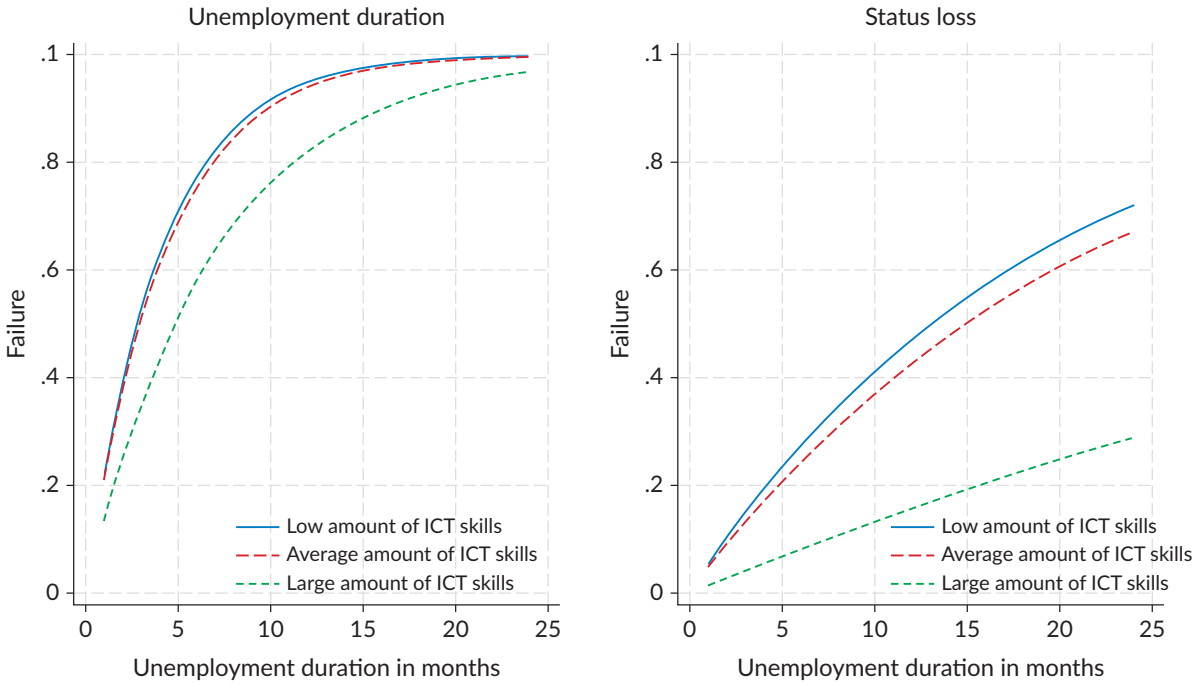

Figure 4. Predicted failure function of unemployment and status loss by levels of ICT skills (minimum, mean, maximum).

Table 2. Probabilities of re-employment and status loss at re-employment, piecewise constant exponential model.

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Re-employment	Status Loss at re-entry	Re-employment	Status Loss at re-entry	Re-employment	Status Loss at re-entry	Re-employment	Status Loss at re-entry	Re-employment	Status Loss at re-entry
T1	−1.52*** (0.10)	−3.23*** (0.23)	−2.90*** (0.36)	−5.35*** (1.23)	−1.37*** (0.10)	−3.14*** (0.24)	−1.53*** (0.10)	−3.27*** (0.23)	−1.49*** (0.10)	−3.20*** (0.23)
T2	−1.37*** (0.10)	−3.04*** (0.23)	−2.27*** (0.38)	−5.38*** (1.25)	−1.30*** (0.10)	−2.97*** (0.24)	−1.40*** (0.10)	−3.08*** (0.23)	−1.37*** (0.10)	−2.99*** (0.23)
T3	−1.51*** (0.10)	−3.12*** (0.23)	−2.25*** (0.41)	−6.10*** (1.30)	−1.47*** (0.10)	−2.93*** (0.25)	−1.56*** (0.10)	−3.17*** (0.23)	−1.51*** (0.10)	−2.97*** (0.24)
T4	−1.57*** (0.10)	−3.24*** (0.23)	−2.36*** (0.50)	−6.36*** (1.44)	−1.53*** (0.11)	−2.90*** (0.26)	−1.63*** (0.10)	−3.35*** (0.24)	−1.62*** (0.10)	−3.11*** (0.25)
T5	−1.84*** (0.11)	−3.57*** (0.25)	−2.94*** (0.78)	−7.74*** (1.97)	−1.81*** (0.13)	−3.15*** (0.32)	−1.89*** (0.11)	−3.68*** (0.26)	−1.76*** (0.12)	−3.19*** (0.29)
T6	−1.81*** (0.11)	−3.34*** (0.26)	−3.45*** (1.04)	−6.55** (2.28)	−1.77*** (0.16)	−3.23*** (0.37)	−1.87*** (0.12)	−3.41*** (0.28)	−1.77*** (0.14)	−3.15*** (0.32)
T7	−1.93*** (0.13)	−3.57*** (0.29)	−5.56*** (1.50)	−11.3*** (3.19)	−1.78*** (0.21)	−2.89*** (0.45)	−1.89*** (0.15)	−3.48*** (0.33)	−1.73*** (0.18)	−3.08*** (0.40)
T8	−1.81*** (0.16)	−3.67*** (0.36)	−2.39 (2.20)	−9.70+ (4.98)	−1.63*** (0.29)	−3.54*** (0.70)	−1.93*** (0.19)	−3.73*** (0.45)	−1.98*** (0.26)	−3.43*** (0.59)
Total occupation-specific labour demand	0.03** (0.01)		0.04*** (0.01)		0.03*** (0.01)		0.03** (0.01)		0.03*** (0.01)	
Occ.-specific labour demand of at least equal status		0.02 (0.03)		0.01 (0.03)		0.01 (0.03)		0.01 (0.03)		0.01 (0.03)
Occupation-specific labour demand of lower status		0.72*** (0.06)		0.71*** (0.06)		0.72*** (0.06)		0.71*** (0.06)		0.72*** (0.06)

Table 2. (Cont.) Probabilities of re-employment and status loss at re-employment, piecewise constant exponential model.

Type of skill			Workplace Training		General Knowledge		General ICT skills		General communication skills	
Coefficient of skill at t1			1.65***	2.47+	−2.43***	−1.93	−1.43***	−3.46**	−0.69***	−1.34*
			(0.42)	(1.43)	(0.38)	(1.40)	(0.37)	(1.10)	(0.21)	(0.65)
Coefficient of skill at t2			1.04*	2.76+	−1.74***	−1.80	−0.83*	−3.61**	−0.43+	−1.45*
			(0.43)	(1.45)	(0.39)	(1.41)	(0.39)	(1.13)	(0.22)	(0.68)
Coefficient of skill at t3			0.83+	3.60*	−1.47***	−2.57+	−0.21	−3.38**	−0.35	−2.25**
			(0.49)	(1.53)	(0.42)	(1.44)	(0.45)	(1.23)	(0.26)	(0.74)
Coefficient of skill at t4			0.90	3.79*	−1.56**	−3.66*	0.080	−1.94	0.037	−2.11*
			(0.61)	(1.73)	(0.50)	(1.55)	(0.57)	(1.44)	(0.34)	(0.90)
Coefficient of skill at t5			1.31	5.16*	−1.44+	−4.26*	−0.053	−1.92	−1.12+	−4.22**
			(0.98)	(2.46)	(0.74)	(1.95)	(0.96)	(2.22)	(0.58)	(1.44)
Coefficient of skill at t6			2.01	3.90	−1.52	−2.05	0.068	−2.70	−0.74	−2.53
			(1.33)	(2.90)	(0.97)	(2.21)	(1.28)	(2.77)	(0.79)	(1.73)
Coefficient of skill at t7			4.58*	9.75*	−2.42+	−6.29*	−2.55	−7.46	−2.13+	−5.26*
			(1.92)	(4.06)	(1.39)	(2.99)	(2.23)	(5.16)	(1.16)	(2.61)
Coefficient of skill at t8			0.63	7.57	−2.60	−2.18	1.98	−3.12	1.05	−3.06
			(2.85)	(6.41)	(2.02)	(4.44)	(2.67)	(7.45)	(1.60)	(4.10)
Region included	x	x	x	x	x	x	x	x	x	x
Occupation-specific controls	x	x	x	x	x	x	x	x	x	x
Individual level controls	x	x	x	x	x	x	x	x	x	x
N	135459	112894	135459	112894	135459	112894	135459	112894	135459	112894
Log likelihood	−101541.4	−38847.2	−101525.0	−38840.3	−101504.5	−38839.2	−101521.6	−38840.7	−101529.0	−38837.8
LnTheta	−4.10***	−1.40***	−4.18***	−1.42***	−4.43***	−1.40***	−4.13***	−1.46***	−4.15***	−1.41***
	(0.17)	(0.13)	(0.17)	(0.13)	(0.19)	(0.13)	(0.17)	(0.14)	(0.17)	(0.13)

Notes: + $p < 0.10$; * $p < 0.05$; ** $p < 0.01$ ***; $p < 0.001$. Coefficients refer to log hazards. Models control for age, gender, citizenship, horizontal job match before unemployment, work experience, intellectual requirement profile of training occupation, NUTS-2 regions, occupation group, and occupation-specific unemployment rates. For the full model see Table A2 in the appendix.

In sum, we find that the proportion of general skills and workplace training imparted during training are related differently to the re-employment prospects of unemployed VET graduates in the early phase of their careers. While more workplace training increases the probability of exiting unemployment quickly, it also increases the risk of status loss at re-employment. By contrast, general skills reduce the likelihood of rapid re-employment but also reduce the risk of status loss at re-entry. Our main results are robust to various time splits in the piecewise constant exponential models (see Supplementary File, Tables A4 and A5).

H5a and 5b assume that VET diploma holders' probabilities of re-entry and status loss depend on an interplay between skills imparted during VET and labour demand. We tested these hypotheses by interacting skill variables with labour demand variables and calculating average marginal effects for all skill variables (see Supplementary File, Figures A3–A10). In the interaction models, we opted for six-monthly time splits rather than three-monthly splits to increase the number of observations within each combination of the variables and enable the calculation of standard errors. As Table A3 and Figures A3–A10 indicate, we find no evidence that the relationships between skills and re-entry or status loss are moderated by labour demand. Our analyses neither reveal any significant interactions between labour demand and skills on the overall probability of re-employment nor on status loss, as indicated by mostly flat curves and/or large confidence intervals.

5. Discussion and Conclusion

Our article investigated whether unemployment duration and the probability of status loss at labour market re-entry depend on the interplay between occupation-specific labour demand and the skillsets imparted by workers' training occupations. We analysed these questions with complete national register data on Swiss VET diploma holders who completed their training in 158 training occupations between 2011 and 2018 and registered as unemployed during the first years after graduation at least once. The high within-programme standardization of taught skills and heterogeneity between programmes captured by curriculum data offer ideal conditions for analysing our research question. However, this approach based on a comparison of VET occupation curricula also implies that we are not able to generalize our conclusions to other types of education.

The results are largely in line with our hypotheses. They confirm that unemployment episodes have scarring effects on recent VET diploma holders by decreasing their employment chances and increasing the risk of status loss. The fact that the re-employment probability declines sharply for unemployed workers who do not find a new job within three months supports the assumption that in labour markets with generally low unemployment rates, unemployment spells are interpreted by employers as signals of low productivity and motivation (see also Sacchi & Samuel, 2024). However, we cannot fully discount the possibility that self-selection mechanisms are at work and that a part of the decline in re-employment is voluntary. Unemployment also generally increases the probability of status loss because workers are likely to feel pressure to accept jobs of lower quality.

Furthermore, the findings show that these general patterns may be attenuated or intensified by occupation-specific labour demand and the skills taught in vocational training programmes. Unsurprisingly, re-employment chances and the risk of downward mobility are tied to the number and the quality of jobs that workers have potential access to with their VET diploma. Finding a new job is easier at times of high occupation-specific labour demand, when employers experience greater difficulty in filling their job

vacancies and are more willing to hire unemployed candidates despite the negative signal sent by their unemployment status. The findings also indicate that the risk of status loss is related to the status composition of accessible job opportunities and increases when large numbers of accessible job opportunities offer lower status than the job before unemployment. These findings underline that the risk of unemployment scarring is tied to macrolevel factors, such as the number and quality of job opportunities, which are independent of individuals' agency but tied to their upper-secondary VET programme.

The importance of the VET programme is also manifest in the findings for skills, which indicate that the proportions of occupation-specific and general skills taught in upper-secondary VET influence unemployment scarring. Large proportions of occupation-specific skills seem to be a mixed blessing. Workers who trained in occupations teaching large proportions of occupation-specific skills have a higher probability of re-employment. However, they also face a higher risk of status loss. This holds from the beginning of the unemployment spell and rises with increasing unemployment duration. A likely reason for the higher re-employment probability is that occupation-specific skills boost workers' immediate productivity and thus employability. Unemployed workers who trained in occupations that imparted large proportions of occupation-specific skills are thus more attractive job candidates than unemployed workers who trained in occupations teaching lower proportions of occupation-specific skills. The predominant explanation for the growing risk of status loss with increasing unemployment duration is that occupation-specific skills are subject both to rapid depreciation when unused during unemployment and to limited transferability. Consequently, workers are more often forced to accept jobs of lower status in which they cannot use all the skills acquired during training and in any foregoing job episodes. However, the depreciation argument does not explain why workers who trained in occupations imparting large proportions of occupation-specific skills face a higher risk of status loss from the very beginning of the unemployment spell. Possible reasons are that these workers either have less effective job search strategies or that they are more willing to accept a job of lower status immediately after becoming unemployed because they anticipate difficulties in finding a matching job due to stigmatization or low skill transferability.

Unemployed VET diploma holders who were taught larger proportions of general skills face more difficulties in finding new jobs. A likely reason is that large proportions of general skills in workers' skillsets signal lower productivity when beginning new jobs because workers need more on-the-job training to acquire job-specific skills. This renders unemployed workers less attractive to employers despite the higher trainability ascribed to this group. However, unemployed VET diploma holders from training occupations that imparted comparatively large proportions of general skills also manage to find jobs of equivalent status more often. This finding is in line with the view that general skills support successful job search strategies and adaptation to challenging situations.

We found no evidence of an interaction between skills and labour demand. Therefore, our assumption that the usefulness of occupation-specific skills is more sensitive to labour demand than general skills cannot be confirmed for the Swiss labour market. This is in line with results from Sacchi and Samuel (2024), who used a factorial survey experiment to show that unemployment episodes in occupational labour markets lowered the hiring chances of young workers irrespective of general unemployment levels. Taken together, these findings support Sacchi and Samuel's (2024) interpretation that in labour markets with generally low levels of unemployment, unemployment scarring is the result of stigmatization and the ascription of low motivation, social skills, and reliability rather than demand and supply mechanisms. It is plausible to assume

that demand and supply factors play a more important role in labour markets characterized by high unemployment, where the re-employment chances of young unemployed workers are likely to depend on the interplay between skills and labour demand.

In summary and from a theoretical perspective, the findings highlight that in occupationally segmented labour markets, such characteristics of training occupations as the proportion of occupation-specific versus general skills taught in upper-secondary VET matter for unemployment scarring and are thus drivers of social inequality that have hitherto been rarely considered in sociological research. Training occupations offer different skill mixes, which not only affect wage levels and occupational mobility in the early career, as previous research has shown (Grønning et al., 2020a; Grønning & Kriesi, 2022), but also affect workers' re-employment chances and the risk of downward mobility after becoming unemployed within the first few years after completion of VET training. Our findings further support the assumption of a trade-off between occupation-specific and general skills. Occupation-specific skills increase young people's re-employment chances and help to shorten spells of unemployment. However, they also increase the risk of downward mobility for those young people who experience spells of unemployment. Conversely, large proportions of general skills hamper the speed of re-employment but prevent occupational downward mobility. Educational policy thus needs to strike a well-considered balance between skill types in VET.

Lastly, a few words on limitations are in order. As mentioned above, our results are limited to young workers with upper-secondary VET diplomas. Whether our findings also hold for workers with tertiary-level education is an open question. Given that fields of study also differ considerably in their proportions of general and occupation-specific skills, it is likely that similar mechanisms are at play. However, the data currently available do not allow this assumption to be corroborated.

Moreover, the disadvantage of using national register data on all VET diploma holders with registered unemployment spells during the observation period is the lack of individual-level data on skills, competences, and motivation. Although we controlled for the average intellectual requirement level of each training occupation and use frailty models to account for unobserved heterogeneity between occupations, we cannot fully discount the possibility that our results are partly driven by selection effects. Furthermore, we lack information at the job level. We are thus unable to control for the potentially confounding effects of job characteristics that may correlate with the skill variables at the occupational level. However, we are not aware of any individual-level data on unemployment episodes that would include information on individual skills and job characteristics. Ideally, further research will focus on collecting more comprehensive and longitudinal data that will allow both more in-depth analyses of the drivers of unemployment scarring for workers with all types of education and cohort comparisons.

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Conflict of Interests

The authors declare no conflict of interests.

Data Availability

Due to data protection legislation, the authors do not have the right to make their data available. However, the data used for this article is available on request at the Swiss Statistical Office (see Längsschnittanalysen im Bildungsbereich [LABB]) and the State Secretariat for Economic Affairs (information on data processing). Data linkage is done exclusively by the Swiss Statistical Office.

Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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