

# **Segregated School Contexts, Peer Effects, and Inequalities in Education**

Solveig Topstad Borgen

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Department of Sociology and Human Geography  
Faculty of Social Sciences  
University of Oslo

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## Summary

This thesis assesses the role immigrant school segregation plays for inequalities in education and provides insights into mechanisms that may aid our understanding of social stratification, using primarily Norwegian register data. The main body of the thesis consists of five stand-alone papers.

The first study investigates whether the share of immigrants at school affects the likelihood of completing the academic track in upper secondary school. The paper's findings suggest that a higher proportion of immigrant students reduces the likelihood of completion. However, this negative effect seems *not* to stem from exposure to immigrant peers but rather from other traits typical for schools with many immigrant students. The main contribution of this study is the conceptual and empirical distinction between immigrant peer effects and the effect of attending schools with a high share of immigrant peers. The results warrant a question of whether the education offered to students in immigrant-dense upper secondary schools is of lower quality than the education provided at other schools.

The second study investigates whether the share of immigrants at lower secondary schools affects student outcomes. Similar to the first study, it distinguishes between immigrant peer effects and the effects of attending schools with immigrant peers. The paper's main contribution, however, is investigating whether these effects vary across the outcome distributions. A conceptual takeaway from this paper is that conventional mean estimates may mask different effects across the outcome distribution. The findings suggest that low achievers improve their objectively rated national test scores from having immigrant peers. In contrast, high achievers show no clear sign of improvement on objectively rated national tests, yet teachers award them better grades if they attend schools that host many immigrant peers.

The third study investigates whether estimates of peer effects may be composites of several and potentially contradicting peer influences. The results show that children get lower grades if they have high-achieving peers. This peer effect conceals that the presence of high-achieving peers improves the learning environment but simultaneously harms students' academic self-confidence and work effort. Our findings demonstrate that the total effect of peers on student outcomes consists of several partly contradicting influences and illustrates that only focusing on the total effects of peers may hinder insights into how peers influence one another.

While papers 1 to 3 concern the mechanisms behind peer and school effects and, at large, the consequences of immigrant school segregation for children's life chances, paper 4 examines the *causes* of segregation. Specifically, it assesses whether there is a so-called 'native flight' from neighborhoods motivated by parents' school preferences. The paper's results indicate that native-origin families systematically move away from schools with high shares of students with non-Western immigrant backgrounds. This 'native flight' process likely contributes to increased neighborhood segregation and school segregation.

The fifth and final paper relates to social stratification between children of immigrants and majority children. The paper investigates the surprisingly high educational ambitions among children of immigrants considering their relatively low academic achievements. It documents such 'immigrant optimism' in post-secondary education as well, where immigrant descendants choose more prestigious and better-paying fields of study than their majority counterparts. The paper also assesses whether this 'immigrant optimism' may be explained by immigrant parents being positively selected on education from their origin-country. Parents' pre-migration educational status plays a role in immigrant descendants' academic achievements and upper secondary completion but contributes less to immigrant descendants' tendency of selecting more prestigious and better-paying fields of study in post-secondary education relative to majority children.

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**Paper 1**

**Paper 2**

**Paper 3**

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## List of papers

### Paper 1

Borgen, Solveig T. (2021). It's not all About the Peers: Reintroducing School Context to the School Segregation Literature. SocArXiv <https://osf.io/preprints/socarxiv/yc37h/>. (Status as of February 2022: Under review in *Acta Sociologica*.)

### Paper 2

Borgen, Solveig T. (2021). Masked by the Mean: Immigrants in School and Differential Effects on Student Achievements. (Status as of February 2022: Conditional accept in *European Sociological Review*.)

### Paper 3

Borgen, Nicolai T., Solveig T. Borgen, Gunn E. Birkelund (2021). The counteracting nature of contextual influences: Peer effects and offsetting mechanisms. (Status as of February 2022: A slightly different version of this paper is accepted for publication in *Social Forces*.)

### Paper 4

Rogne, Adrian F., Solveig T. Borgen, Erlend I. Nordrum (2021). School Segregation and Native Flight: Evidence from School Catchment Area Borders. SocArXiv <https://osf.io/preprints/socarxiv/xykdg/>. (Status as of February 2022: Under review in *Social Forces*.)

### Paper 5

Solveig T. Borgen, Are S. Hermansen (2021). Reaching Higher? Horizontal Stratification in the Educational Careers of Immigrant Descendants. SocArXiv <https://osf.io/preprints/socarxiv/h8dtf/>. (Status as of February 2022: R&R in *Demography*.)



## 1. Introduction

European countries have experienced an increasing socio-economic divide over the last decades (Forster, Llana Nozal, and Thévenot, 2017). Simultaneously, there has been a massive increase in migration. Immigrants to European rich, liberal countries tend to lag behind native-borns on educational attainment and income, be more likely to rely on social welfare programs, work in low-wage jobs, and have a weaker labor-market attachment (e.g., Bratsberg, Barth, and Raaum, 2006; Heath and Brinbaum, 2014; Heath, Rothon, and Kilpi, 2008; Van Tubergen, Maas, and Flap, 2004). Thus, the migration flows have introduced new lines of social stratification in receiving countries where the socioeconomic divide coincides with country background and ethnicity (Heath et al., 2008).

Segregation is a salient dimension of social stratification. Ethnic residential segregation patterns could develop partly because of individuals' residential preferences; people tend to settle in areas with residents of whom they have common characteristics (Krysan, Couper, Farley et al., 2009). Additionally, residential segregation may be tightly coupled with the socio-economic divide between the ethnic minority and majority (Musterd, Marcińczak, Van Ham et al., 2017; Reardon and Bischoff, 2011); ethnic minorities have, on average, fewer means to choose residential location and are forced to cluster in low-cost areas, while the majority may be free to choose other areas. Children living in ethnically segregated areas may thus be exposed to systematically different circumstances, regardless of their own ethnicity. One such circumstance is the school context.

There is a long sociological tradition of assuming that schools play a vital role in social stratification (Forster et al., 2017). One trait of the school context that could vary across segregated areas is the characteristics of children's peers. For instance, children in schools with a high share of ethnic minority students will have peers who, on average, have higher educational aspirations and motivation (Heath and Brinbaum, 2014; Jonsson and Rudolphi, 2011; OECD, 2010). However, they will also have peers who, on average, have lower socio-economic status (Heath et al., 2008), lower language proficiency (Espenshade and Fu, 1997), and lower academic achievements (Heath and Brinbaum, 2014). Other dimensions of the school context that may vary include school quality, quality of teaching, teacher attrition, and teaching traditions (Cebolla-Boado and Garrido Medina, 2011; Gandara, Rumberger, Maxwell-Jolly et al., 2003; Jennings, Deming, Jencks et al., 2015; Karsten, Felix, Ledoux et al., 2006; Peske and Haycock, 2006). In so far that children's school context matter for

children's life chances, ethnic segregation in schools may play a role in the persistence of social stratification.

This thesis assesses the role of childhood context – and specifically the role of ethnic segregation across schools – for educational inequalities. It consists of five separate studies. The first paper provides new empirical evidence on the consequences of immigrant school segregation on completion of upper secondary school. The second paper investigates the role of immigrant school segregation for school grades and test scores. It assesses whether the consequences of attending schools with a high share of immigrant peers vary for low- and high-achieving students. The third paper investigates whether school classmates simultaneously influence peers' achievements both negatively and positively. The fourth paper investigates whether native parents move away from schools with high shares of minority students, thereby causing segregation. Finally, the fifth paper assesses the educational careers of children of immigrants relative to majority children, with a key focus on fields of study in post-secondary education.

Before moving on, let me give a few notes on terminology. First, although I refer to both ethnicity and immigrant status when presenting the backdrop and theoretical accounts of the thesis, ethnicity is not directly observed in the thesis' empirical data. The empirical analyses are mainly based on Norwegian register data, which give information on individuals' country of birth and immigrant status, but not their ethnicity. Second, the term segregation needs clarification. Segregation in this thesis does not refer to legal separation by ethnicity or immigration background. Rather, I refer to segregation as the uneven distribution of the immigrant population across schools and neighborhoods. Moreover, some segregation studies measure immigrant school segregation as deviations from an even distribution of immigrants across schools. In contrast, this paper relates to the literature that measures school segregation by the makeup of students and estimates effects of the proportion of immigrant peers (Owens, 2019).

In the following, I start with a brief description of the Norwegian context, including defining features of the Norwegian society and the Norwegian education system, the last decades' immigration history, and immigrants in Norway. I then present different theoretical and empirical accounts of how children's social surroundings – including their family, neighborhood, and school context – may play a role in educational outcomes and prospects. I derive some general research questions from these theoretical and empirical accounts and

present data and empirical strategies used to inform on these questions. After some notes on how I define immigrants and a discussion on the ethical challenges of using immigrants as research subjects, I summarize the contributions of the individual papers and provide some concluding remarks on the thesis as a whole.

## **2. The Norwegian context**

Norway is a relatively small but elongated country situated in the Northern parts of Europe, hosting about 5.4 million residents as of August 2021. It has low levels of income inequality relative to other comparable Western countries and high social mobility (Corak, 2013) but also has comparatively high levels of wealth inequality (Pfeffer and Waitkus, 2021). Norway is typically classified as a social-democratic welfare state and provides free access to education and a generous social safety net (Esping-Andersen, 1990; Friberg and Midtbøen, 2019).

The Norwegian educational system consists of three main levels. The first level is a ten-year compulsory education, of which students attend primary school when aged 6 to 12, and lower secondary school when aged 13 to 16. The second educational level, upper secondary education, has two main tracks. A three-year academic track leads to a University and College Admission Certification, and a four-year vocational track gives a diploma or a certificate of completed apprenticeship. Tertiary education, the third level, consists of both vocational schools and higher education. Vocational schools have a duration between half a year and two years, and are oriented toward specific vocations. Higher education is designed as a two-tier system consisting of three-year bachelor's degrees and two-year master's degrees, in addition to Ph.D. programs.

Social democratic ideas of equality and justice have had a fundamental influence on Norwegian school politics (Ofteidal Telhaug, Mediås, and Aasen, 2006). Equal rights to free education – regardless of socioeconomic background or geographic location – are defining features of the Norwegian educational system (Imsen and Volckmar, 2014). One trademark is the large portion of public schools. As of 2020, 94.37 percent of students in the last grade of compulsory education attended public schools.<sup>1</sup> Private schools that offer compulsory education are primarily religious schools, schools that provide education with alternative pedagogical

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<sup>1</sup> Calculated from the StatBank Norway website provided by Statistics Norway (accessed August 4, 2021): <https://www.ssb.no/statbank/table/05232>

approaches, or schools in foreign languages, and are generally not regarded to offer schooling of higher quality than public schools (Lauglo, 2010). The government prescribes centralized basic curricula to all public schools, with some freedom to define subject content and teaching methods (Ofstedal Telhaug et al., 2006), limiting contextual differences between schools.

School enrollment practices and the lack of substantial tuition fees make education available to all. Enrollment in compulsory education is based on local catchment areas, and there is no early tracking system that sorts students until they reach upper secondary school. In upper secondary, children compete for admission to their preferred school and program mainly based on their grade point average (GPA) from lower secondary school. However, they are entitled by law to enrollment in an upper secondary school located in their county of residence regardless of their GPA. As in compulsory education, the vast majority of students attend public upper secondary schools (91.85 percent in 2020).<sup>2</sup> Public upper secondary education is without tuition fees, but students pay for teaching material.

Students with a University and College Admission Certification from upper secondary schools are eligible to apply for higher education and are mainly admitted based on their GPA from upper secondary school. As at lower educational levels, there are relatively few private providers of higher education (Reisel, 2013), and the most prestigious institutions with the highest quality are public (Borgen, 2015). Education at public universities and university colleges is in general free of charge, except for a small tuition fee each semester (e.g., 800 NOK in 2021 at the University of Oslo, Norway's largest educational institution) and expenses for teaching materials. Students are entitled to annual loans and grants from the Norwegian State Educational Loan Fund to cover school expenses as well as living costs (126,357 NOK in 2021), which in essence, make higher education available to all.<sup>3</sup>

The comprehensive share of public schools and the centralized basic curricula may indicate relatively equal educational contexts across schools. However, increased immigration to Norway in the last decades has led to a change in student compositions at schools and potentially a change in students' educational contexts. Below, I present recent immigration trends to Norway, a general picture of educational standing and mobility among immigrants

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<sup>2</sup> Calculated from the StatBank Norway website provided by Statistics Norway (accessed August 2, 2021): <https://www.ssb.no/statbank/table/05326/>

<sup>3</sup> The amount of loans and grants are successively reduced if the student's annual earnings exceed 195 295 NOK.

and their children, and then return to the incorporation of immigrants in school, which have introduced new dimensions in the Norwegian school context.

### *Recent Norwegian immigration history*

Parallel and in response to a massive economic growth from the mid-1960s, Norway has gone from being a relatively homo-ethnic to becoming a relatively multiethnic society (Friberg and Midtbøen, 2019). In 1970, 1.5 percent of the population had immigrant origin (Statistics Norway, 2000). By 2021, the population share with immigrant origins has increased to 18.5 percent (Statistics Norway, 2021).

Immigration to Norway in the last decades may be described in terms of major immigration waves. The first wave began in the late 1960s with labor migrants from Pakistan, Turkey, India, and Morocco. A moratorium in 1975 put brakes on labor-related migration. Still, it introduced a second immigration wave consisting mainly of spouses, children, and parents of first-wave immigrants who were reluctant to return to their origin countries in fear of being refused re-entry to Norway. The third wave of immigration, consisting mainly of refugees, emerged towards the end of the 1970s (Brochmann and Kjeldstadli, 2008). Finally, as Norway is part of an internal market for the free movement of labor, services, goods, and capital in the European Economic Area, the expansions of the EU in 2004 and 2007 spurred a fourth immigration flow consisting of labor migrants from Eastern European countries (Reisel, Hermansen, and Kindt, 2019). Since about 2013, there has been a decline in migration rates.<sup>4</sup> Still, OECD reports in 2020 that Norway compares to other wealthy, European host countries such as Germany in regards to the inflow of migrants and lag not far behind the EU and OECD average (OECD, 2020).

### *Immigrants and education*

Immigrants in Norway differ, on average, from the native origin population on a range of characteristics. Immigrants are highly overrepresented at the bottom of the educational distribution in Norway (Hermansen, 2016). Labor migrants who arrive from low-income countries are increasingly dependent on social welfare support and have lower employment rates over the course of life (Bratsberg, Raaum, and Røed, 2010, 2014). Even among highly educated men, immigrants have considerably lower earnings than the majority, and the gap

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<sup>4</sup> Calculated from the StatBank Norway website provided by Statistics Norway (accessed August 2, 2021): <https://www.ssb.no/statbank/table/10518/>

increases over the work career (Brekke and Mastekaasa, 2008). The socio-economic disadvantages become apparent also in a substantially higher likelihood of childhood poverty among immigrant children with origin from middle and low-income countries (Galloway, Gustafsson, Pedersen et al., 2015).

The egalitarian welfare state mitigates the consequences that early-life deprivation has on children's life chances, compared to countries of higher inequality and weaker welfare institutions (Reisel et al., 2019). Thus, the Norwegian setting facilitates intergenerational educational mobility. Interestingly, upward mobility is stronger in immigrant families than in native families, especially in disadvantaged immigrant families (Hermansen, 2016). Social background matters less for the educational choices of minority youth compared to majority youth (Fekjær, 2006), and the gap in educational attainment between immigrants and natives is smaller for their offspring (Hermansen, 2017).

While the average achievement level of immigrant background students is lower than that of native students, and they have a lower likelihood of completing upper secondary school (Hermansen and Birkelund, 2015), disadvantaged immigrant descendants in Norway are shown to be significantly advantaged when it comes to ambitions. This immigrant advantage is demonstrated in terms of higher educational aspirations and expectations and also in terms of effort. For example, immigrant-origin students spend more time doing homework compared to their native-born counterparts (Friberg, 2019; Lauglo, 1999) and show more positive attitudes towards school (Lauglo, 1999). Accordingly, immigrants have higher enrollment rates in academic upper secondary tracks compared to natives (Hermansen and Birkelund, 2015).

### **3. Childhood contexts**

At the core of this thesis is the role children's social surroundings play in educational outcomes and prospects. Such surroundings include the child's family, neighborhood, and school, and the interconnection between these contexts (Bronfenbrenner, 1979). The role of childhood contexts for children's life chances is central to the sociological literature on social stratification. The family is regarded as a primary source of socialization of children (Bronfenbrenner, 1979). As children grow, their school and peers become children's primary extrafamilial institution and constitute an increasing socialization source (Crosnoe, 2000).



Additionally, the neighborhood's role for children's life chances has been a significant concern for social sciences for decades (Leventhal and Brooks-Gunn, 2000).

The sections below discuss families, schools, and neighborhoods as three childhood contexts that vary across children and may play a role in social stratification. One source of variation is segregation patterns across neighborhoods and schools, implying that different children experience systematically different childhood contexts. Insofar the childhood contexts matter for children's life chances, segregation may be of the essence to understand the existence and persistence of social stratification (Massey, 2016).

### *Different families*

Deeply embedded in the social stratification literature is the role of parental characteristics and intergenerational mobility; much research shows that parental characteristics are associated with educational outcomes (Breen and Jonsson, 2005). There are systematic differences in the parental socioeconomic status of children of immigrant and native origin. Immigrants to European rich, liberal countries tend to lag behind native-borns on educational attainment and income, be more likely to rely on social welfare programs, and work in low-wage jobs (Bratsberg et al., 2006; Heath and Brinbaum, 2014; Heath et al., 2008; Van Tubergen et al., 2004). Immigrants may, for instance, be disadvantaged because of language skills and lack of foreign work experience, because of a disrupting migration process, and because their educational credentials fail to transfer to a new labor market setting (Heath et al., 2008). Thus, given these systematic differences and the fact that parental socioeconomic status affects children's outcomes, children of immigrants and natives would be expected to have different prospects of succeeding in education.

Empirical studies show that children of immigrants lag behind children of natives on educational achievements in most OECD countries. However, this gap is often largely explained by their parents' socio-economic status (Bratsberg, Raaum, and Røed, 2012; Fekjær, 2006; Heath et al., 2008; OECD, 2010; Schleicher, 2006; Widmaier and Dumont, 2011). In fact, there are even tendencies that immigrant descendants do better than native descendants when taking parental education into account. For instance, they often have higher transition rates into academic upper secondary tracks and post-secondary education when compared to majority peers with similar academic achievements and SES (Heath and Brinbaum, 2014). Parental education seems to be less decisive of immigrant descendants' education than for children of natives, and immigrant families exhibit higher upward intergenerational mobility

than native families (Hermansen, 2016). The phenomenon of weak performance but strong determination among immigrant children (Jonsson and Rudolphi, 2011) has caught researchers' attention and been referred to as 'immigrant optimism' (Kao and Tienda, 1995), 'second-generation advantage' (Kasinitz, Mollenkopf, Waters et al., 2008), or an 'immigrant drive' (Portes and Rumbaut, 2001).

Recent studies have suggested *parental educational selectivity* as one explanation for the 'immigrant optimism' among children of immigrants. The value of immigrant parents' education and what their education proxies in the context it was obtained may be different in the context where their children grow up (Feliciano, 2020). Immigrants may constitute a selected group of their origin population by having relatively high education compared to their peers in their origin country. For the sake of argument, let us say that an individual obtains 14 years of education while the mean years of education in their origin country is 12 years. When moving to a different context, however, the 12-year education may no longer be regarded as relatively high if the mean year of education in the destination country is, for instance, 16 years. In such a scenario, the immigrant would lose educational standing by migrating. Nevertheless, she keeps her own perception of pre-migration status and not the least the underlying characteristics that made her able to obtain a relatively high education in her origin country. Thus, the tendency that immigrant children show higher educational aspirations than native children once considering parental education could result from comparing children of parents with fundamentally different characteristics. Similar arguments could also be stated for other parental socioeconomic indicators, such as labor market participation and income.

Previous research has shown that the explanatory power of parental education depends on the origin country of immigrant descendants; while some do better, others do worse once we account for parental education (Bratsberg et al., 2012; Fekjær, 2006; Heath et al., 2008). Such results strengthen the assumption that parents' contextual educational attainment plays a role in explaining the 'immigrant optimism' (Feliciano and Lanuza, 2017). A recent wave of research has documented positive educational selectivity among immigrants across a broad range of destination countries (Engzell and Ichou, 2020; Feliciano, 2005; Van de Werfhorst and Heath, 2019). Further, it has been shown that parental educational selectivity indeed plays a role in children's educational attainment (Feliciano and Lanuza, 2017; Ichou, 2014), academic achievements (Van de Werfhorst and Heath, 2019), and educational aspirations and attitudes to education (Engzell, 2019; Jacobsen, 2020).

Overall, family is a decisive dimension of the childhood context that may affect children's life chances. Differences in parental socioeconomic status are accordingly highly relevant when aiming to explain social stratification and thus of essence in all papers of this thesis. However, the discussion above shows that traditional measures of parental socioeconomic status, such as years of education, may be unfit to capture the characteristics of the family context for immigrant children. Thus, a new branch of research taking parental selectivity into account has set the course for novel insights on educational gaps between immigrant and native origin students to meet this concern. The fifth paper of this thesis relates to this literature by assessing the role of parental selectivity for the educational trajectories of immigrant descendants.

### *Different schools*

As children grow, their school and peers increasingly constitute a source of socialization. Research on the role of school context for student outcomes was spurred by the seminal Coleman report in the 1960s (Coleman, Campbell, Hobson et al., 1966; Jennings et al., 2015). In particular, the report drew strong and prolonged attention to school segregation (Alexander and Morgan, 2016; Downey and Condrón, 2016). Coleman et al. (1966) argued that school segregation could affect students' educational achievements because of peers' social composition and other contextual settings at segregated schools, such as teacher quality and school resources.

### Peers in school

Characteristics of peers might affect students in both positive and negative manners through a range of mechanisms. While some theoretical models and empirical accounts lead us to expect unfavorable immigrant peer effects, other theories and empirical findings suggest the exact opposite, that immigrant peers have a positive influence on fellow students.

The *normative model* of peer effects argues that students are positively affected by the achievement level of their peers as high-achieving peers make for a learning-oriented peer culture (Goldsmith, 2011; Jencks and Mayer, 1990; Legewie and DiPrete, 2012). In most OECD countries, immigrants have on average lower educational performance compared to natives (OECD, 2010), which would, according to the normative model, lead to adverse immigrant peer effects. Some of the lower educational performance among immigrants seems due to lower parental SES (OECD, 2010; Schleicher, 2006; Widmaier and Dumont, 2011). The socioeconomic disadvantage of immigrants may in itself affect their fellow students, as peers'

socioeconomic backgrounds have been shown to have a substantial impact on educational outcomes (Crowder and South, 2003).

Immigrants may have more behavioral problems than natives owing to experiences of trauma and distress (Caspi, McClay, Moffitt et al., 2002; Hällsten, Szulkin, and Sarnecki, 2013). Behavioral problems may be contagious according to *the epidemic model* (Jencks and Mayer, 1990). Additionally, behavioral problems among peers may also induce so-called *congestion effects* (Lazear, 2001), as teachers are forced to spend more time on discipline and less time on teaching (Coleman et al., 1966; Lavy and Schlosser, 2011).

Relatedly, lower average achievements among immigrants and lower average language proficiency (Espenshade and Fu, 1997) may cause teachers to give more attention to immigrants and deprive other students of teaching (Lazear, 2001), which could consequently affect students' educational achievements (Fletcher, 2010). Teachers could also lower their level of teaching to accommodate more low-achieving students in school, which may aid the performance of low achievers while depriving high achievers of a level of teaching that allows them to excel (Betts and Fairlie, 2003; Lazear, 2001). Additionally, since peers' parents constitute a part of students' networks that provides informal knowledge on how to achieve educational success, the benefit of this parental network may decline when students' network includes many immigrant parents with limited informal knowledge (Conger, 2015).

However, the effect of peers' achievement level is not necessarily unidirectional. *Social contrast theories* advocate a more complex picture of peer influence. Students may evaluate themselves relative to their peer group (Crosnoe, 2009; Jonsson and Mood, 2008). They may respond positively to having peers with relatively lower achievement levels, as these peers make it easier to stand out academically. When surrounded by peers with a high achievement level, on the other hand, students may lose academic self-confidence and educational aspirations (Rosenqvist, 2018). This framework is often referred to as the 'frog pond' perspective (Crosnoe, 2009; Goldsmith, 2011).

Further, teachers' (subjective) assessments of a students' achievements happen in the social and cultural context of the classroom, and this context could induce *teacher grading bias* (Dee, 2005; DiPrete and Jennings, 2012; Lavy and Sand, 2018). In accordance with social contrast theories, teachers might assess a student's achievements harsher when the student group is high-achieving (Crosnoe, 2009). The consequence could be that it is harder to get good grades in a

high-achieving peer group, which subsequently could lower students' academic self-confidence.

Not the least, students may also be positively affected by having immigrant peers as immigrants tend to have higher educational aspirations than their native counterparts (Heath and Brinbaum, 2014; Jonsson and Rudolphi, 2011; OECD, 2010), show more positive attitudes towards school, and spend more time doing homework (Lauglo, 1999). Additionally, many immigrants may have parents who aspire for their educational careers, situating them to perform academically (Kao and Tienda, 1995). A strong community of aspiring parents can reinforce teachers' efforts to make students work hard (Coleman and Hoffer, 1987) and consequently positively influence the educational outcomes of their children's peers. This 'immigrant optimism' may be related to the selectivity of immigrant parents, as discussed above.

The scientific literature on peer effects is extensive (Sacerdote, 2011) and stems back to the 1960s (Duncan, Haller, and Portes, 1968). Early on, the Coleman report found the influence of peers to be a substantial factor in the consequences of school segregation (Coleman et al., 1966). However, recent research has yielded mixed findings. While some studies find peer effects on test scores (Hanushek, Kain, Markman et al., 2003; Hoxby, 2000), others do not (Angrist and Lang, 2004; Burke and Sass, 2013; Imberman, Kugler, and Sacerdote, 2012).

The literature on immigrant peer effects is mixed as well. It includes studies that find negative effects (Ballatore, Fort, and Ichino, 2018; Bossavie, 2017; Contini, 2013; Fletcher, Kim, Nobles et al., 2021; Gould, Lavy, and Paserman, 2009; Schneeweis, 2015; Szulkin and Jonsson, 2007; Veerman, van de Werfhorst, and Dronkers, 2013), zero effects (Bifulco, Fletcher, and Ross, 2011; Brandén, Birkelund, and Szulkin, 2018; Conger, 2015; Geay, McNally, and Telhaj, 2013; Ohinata and Van Ours, 2013; Schwartz and Stiefel, 2011), and positive effects (Silveira, Dufur, Jarvis et al., 2019). However, in a detailed review of the literature, Brunello and De Paola (2017) conclude that while the findings from Europe are mixed, the share of immigrant peers in class or school generally seems to have adverse effects on students, and more so on immigrant than on native students.

According to earlier studies, exposure to immigrant peers in Norwegian schools seems to have moderate or no consequences for children's life chances. Fekjær and Birkelund (2007) found a positive, though weak, relationship between having immigrant peers and the students' education achievements. Hardoy and Schøne (2013) found that an increase in the share of immigrant peers at upper secondary schools decreased the likelihood of completion for native

majority students. They found no effects on school grades. In 2017 however, Hardoy, Mastekaasa, and Schøne (2017) found no such negative immigrant peer effects on neither completing upper secondary education nor on exam grades in upper secondary schools. Finally, Hermansen and Birkelund (2015) found no effect of the share of immigrant peers in lower secondary school on later educational outcomes in upper secondary schools.

The complex theoretical framework of why and how students affect their peers, combined with mixed empirical evidence, indicates that more research is needed to understand the mechanisms and consequences of peer effects. In particular, the discussion above points to two potentially fruitful avenues. First, from the complex theoretical framework, we can expect that peers influence each other in multiple and perhaps contradicting ways. For instance, high-achieving peers may both improve the learning environment and simultaneously hurt their fellow students' academic confidence and motivation. Such conflicting influences may cancel each other out, rendering us with modest or zero causal effects of having high-achieving peers and teaching us nothing about whether and how peers influence each other. Being too narrowly focused on average causal effects may impede our understanding of peer influences, and further insights into peer effects may require a conceptual distinction between various influences of exposure and the corresponding end-product causal effect. This point is highlighted and examined empirically in this thesis' third paper.

A second avenue to additional peer effects insights arises from the theoretical expectations that the effect of peers may be different depending on the characteristics of the child exposed to these peers. As explained above, teachers could lower their level of teaching to accommodate more on average low-achieving immigrants in school, which may aid the performance of low achievers in general, while depriving high achievers of a level of teaching that allows them to excel (Betts and Fairlie, 2003; Lazear, 2001). Previous research typically uses linear regression models to estimate effects on the mean of the outcome, which may mask different effects for low- and high-achieving students. This thesis' second paper examines such differential effects.

### School traits

There is a long sociological tradition of assuming that schools play a vital role in social stratification, as they can both promote social mobility and reproduce and reinforce social inequality (Forster et al., 2017). Central questions are whether there are quality differences between schools with different student compositions and whether these differences matter for student outcomes.

Some research has shown a relationship between the schools' share of minority students and school quality. Examples include inferior schooling in terms of curriculum, facilities, and teacher feedback (Gandara et al., 2003), differences in teaching traditions (Cebolla-Boado and Garrido Medina, 2011), lower teacher effectiveness (Peske and Haycock, 2006), and higher risk of offering lower-quality teaching (Karsten et al., 2006; OECD, 2010). However, a range of policy initiatives across OECD countries ensures extra resources to schools with high shares of immigrants (OECD, 2010). Such initiatives could counter the negative relationships between ethnic composition and school quality.

In Norway, schools with high shares of immigrant peers receive financial resources to aid immigrants needing language support (Hægeland, Raaum, and Salvanes, 2005). Further, strategic plans to strengthen multicultural and inclusive teaching, supplementary education for bilingual teachers, and programs to involve, assist, and upskill immigrant parents (OECD, 2010; Taguma, Shewbridge, Huttova et al., 2009) may improve the educational context at schools with high immigrant shares. However, there are also some indications that students in schools with high immigrant shares risk lower teacher quality as teachers in Norway seem to prefer teaching at schools with native students (Bonesrønning, Falch, and Strøm, 2005). Teachers show higher tendencies to leave schools with high shares of minority students (Bonesrønning et al., 2005). Nevertheless, increasing minority shares within schools do not prompt teachers to leave, according to new evidence from a master thesis (Mikalsen, 2021).

There is, as discussed above, a vast empirical literature on how peers in general (Sacerdote, 2011) and immigrant peers in particular (Brunello and De Paola, 2017) affect children's life chances. Similarly, there is extensive literature on the effects of schools on children's life chances (Forster et al., 2017). These studies do indeed provide valuable insights into the specific effects of peers and schools, and – as argued above – there is a need for even more detailed insights into the underlying mechanisms. However, in addition to *zooming in* on specific influences and mechanisms, it may be fruitful also to *zoom out* on the total effect of immigrant school segregation for children's life chances. Attending schools with a high share of immigrants may affect students through both interactions with immigrant peers *and* via school characteristics correlated with immigrant proportion, such as teacher quality, curriculum, and facilities (Reardon and Owens, 2014). Research on the consequences of school segregation, considering *both* peer effects and contextual differences between schools, is scarce (Raitano and Vona, 2010; Reardon and Owens, 2014). The first and second papers of this thesis

contribute to this literature by examining the joint impact of peer and contextual differences, as well as isolating the peer effects.

### *Different neighborhoods*

Social sciences have for decades been concerned with the neighborhood's role for children's life chances (Leventhal and Brooks-Gunn, 2000; Mayer and Jencks, 1989; Sampson, Morenoff, and Gannon-Rowley, 2002; Sharkey and Faber, 2014). Neighborhood effects arise for several reasons, including environmental stressors (e.g., exposure to violence), characteristics of the physical environment (e.g., exposure to toxins), peer influences, and institutional mechanisms, such as school quality (Sharkey and Faber, 2014). Of these various mechanisms, schools appear to play an important part. For example, recent research from Canada suggests that 50-70% of the benefits of moving to a better area are explained by access to better schools (Laliberté, 2021). Hermansen, Borgen, and Mastekaasa (2020) draw similar conclusions in Norway; most of the modest neighborhood effects on long-term socioeconomic outcomes run through the impact of schools.

While ethnic residential segregation in itself has been shown to affect educational attainment (Bygren and Szulkin, 2010), exploring the consequences of neighborhood segregation for children's life chances is not at the core of this thesis. Nevertheless, the close connection between neighborhood segregation and school segregation is relevant, especially regarding the fourth paper, which investigates the causes of segregation. Neighborhood segregation leads to school segregation, especially in cases where residential location determines school enrollment. However, this relationship may also be reciprocal if the schools' student composition affects who lives in the schools' neighborhoods.

Traditional explanations suggest that residential segregation arises because people show different preferences for different kinds of neighborhoods (Charles, 2003) and because people have unequal access to information about various neighborhoods' characteristics, their standing, and the consequences of living in them (Crowder and Krysan, 2016). For many, schools are a central characteristic of the neighborhood. The schools, and their student compositions, may thus be a decisive factor in families' residential choices.

A range of studies has documented preferences for own-group majority schools, but without showing that such preferences translate into actual school choices or flight from schools without an own-group majority (Bielamowicz, 2019; Billingham and Hunt, 2016; Hailey,



2020). Further, several studies have documented associations between school characteristics and native (or White) flight (Betts and Fairlie, 2003; Fairlie and Resch, 2002; Renzulli and Evans, 2005), but, to my knowledge, only one previous study has documented a causal relationship between student composition at the local school and parents' out-mobility (Bjerre-Nielsen and Gandil, 2020). Thus, we have a limited understanding of the mechanisms that give rise to segregation patterns (Böhlmark et al., 2016). Paper 4 contributes to filling this gap in the segregation literature by exploiting a regression discontinuity design to study 'native flight'.

This section has presented theoretical and empirical accounts of how systematic differences in family, school, and neighborhood childhood contexts may play a decisive role in the existence and persistence of social stratification. The papers in this thesis study specific targets of inference – or *theoretical estimands* – derived from this theoretical and empirical backdrop. In the next section, I present such theoretical estimands. These estimands are not constrained or colored by data availability, computational power, or available methods (Lundberg, Johnson, and Stewart, 2021). The presentation of theoretical estimands is followed by a section on data and a section on the underlying assumptions about the causal relationships implied by the theoretical estimands. Then, I present statistical models – or *estimators* – that are suited to make credible causal inferences about the estimands of interest.<sup>5</sup>

#### 4. Theoretical estimands

Paper 1 is about consequences of school segregation and infers on two main theoretical estimands. The first concerns immigrant peer effects and may be framed as *how immigrant peers in school affect children's life chances*. A central argument of paper 1 is that immigrant school segregation might influence children's life chances in more ways than merely through exposure to immigrant peers. Suppose schools with a high share of immigrant students also have systematically different teacher quality, teaching traditions, or financial resources. In that case, the consequences of immigrant school segregation on children's life chances comprise more than merely the consequences that stem from peer exposure. Thus, the second theoretical

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<sup>5</sup> The use of the terms estimands and estimators are motivated by the methodological framework of Lundberg et al. (2021). They advocate that one should derive a theoretical estimand from existing theory and empirical evidence and not constrain it by data availability, computational power, or available methods. Then, by using for instance Directed Acyclic Graphs (DAGs), the theoretical estimand should be linked to an empirical estimand through clear the assumptions about the causal relationship involved. Finally, one choses an estimator to learn about this empirical estimand.

estimand is *how attending schools with a high share of immigrant peers affects children's life chances*. This estimand calls for research on the joint effect of peer and other contextual differences between schools, which is scarcely investigated (Raitano and Vona, 2010; Reardon and Owens, 2014).

Both the abovementioned theoretical estimands are relevant for paper 2 as well, which study the role of immigrant school segregation for school grades and test scores. However, a central argument of paper 2 is that attending schools with a high share of immigrant peers may affect different students in different ways. In particular, it may affect low- and high-achieving students differently. Thus, paper 2 operates with two *sets* of theoretical estimands; 1) *how peers in school affect low- and high-achieving children's life chances*, and 2) *how attending an immigrant-dense school affects low- and high-achieving children's life chances*.

The theoretical estimand in paper 3 concerns whether the causal effect of peers consists of several and potential contradicting peer influences. Paper 3 aims at disentangling the mechanisms of how peers affect students. In particular, it draws upon contradicting theoretical expectations that high-achieving peers may be both an advantage and a disadvantage for student outcomes, as they may facilitate a good learning environment in the classroom and simultaneously harm individuals' academic self-confidence. The theoretical estimand in paper 3 could be framed as *whether peers in school have differential influences on student outcomes*. This estimand is distinctly different from the estimands in paper 2. While the estimands in paper 2 call for research on whether high- and low-achieving students are affected in different ways by their peers, the estimand of paper 3 concerns the different and contradicting types of influence peers may have on a student.

Paper 4 assesses whether immigrant school segregation has consequences for residential segregation. It concerns native families' mobility responses to immigrant school segregation. The theoretical estimand may be framed as *whether schools with high shares of immigrant students make native families with pre-school children more likely to move*.

Papers 1 and 2 concern whether attending schools with immigrant peers is different from attending schools with native peers, partly motivated by assumptions that immigrants have systematically different characteristics than natives. The last paper, paper 5, explores these differences between immigrants and natives. In particular, it is concerned with the native-immigrant gap in educational achievements, attainment, and ambitions and the role parents' educational selectivity plays for the native-immigrant gap. The theoretical estimand is *the role*

*parental educational selectivity plays in explaining the gaps in educational outcomes and choices between immigrant descendants and majority children.*

The theoretical estimands are not constrained by data availability, computational power, or available methods; they simply state what the papers are aimed to inform on (Lundberg et al., 2021). However, to inform on these estimands, I need to link them to empirical data. The next section provides an account of the data used in the five papers.

## **5. Data**

The papers in this thesis mainly draw on Norwegian registry data. I have access to these data through the project *Ethnic segregation in schools and neighbourhoods: Consequences and dynamics*, funded by the Research Council of Norway (grant number 236793). The project's principal investigator is Professor Gunn Elisabeth Birkelund at the Department of Sociology and Human Geography, University of Oslo. Analyses in paper 4 are conducted on the same registry data made available through the project *Long-term effects of school-wide interventions and school environment using longitudinal register data* led by principal investigator Dr. Oddbjørn Raaum at The Ragnar Frisch Centre for Economic Research, also funded by the Research Council of Norway (grant number 238050).

The data consist of a vast set of registers collected for multiple purposes. These registers are generated and processed through well-documented and standardized procedures by Statistics Norway and are generally of high quality and highly reliable (Hovde Lyngstad and Skardhamar, 2011; Røed and Raaum, 2003). The data come in various formats and require substantial recoding and processing. Statistics Norway has provided unique anonymized identification codes for each individual and each institution, which allows for combining information from each registry. Most data is available at the individual level and provides information on the entire Norwegian population born since 1960, including information on their siblings, parents, and grandparents. Individuals are also linked to their parents and siblings, making it possible to obtain vast information on family characteristics. Additionally, the registers include geocoded data on place of residence on a 100x100 meter grid.

Three of the papers make use of data from additional sources. Paper 3 uses data from the Annual National Pupil Surveys, which was conducted among all 10<sup>th</sup>-graders in Norway from 2007 and onwards (>90% response rate) and administrated by the Norwegian Directorate for

Education and Training. The surveys are anonymous and can only be matched with register data on the school-cohort level. The survey data gives us valuable information on several indicators related to the learning environment and students' motivation for school – information not found in register data.

Paper 4 uses data from the municipal Education Agency in Oslo on local school catchment areas of children who start elementary school. These data consisted of lists of addresses, which were geocoded to 100x100 meter grids using publically available geocodes and then linked to the registers. Linking individuals to grid cells and grid cells to school catchment areas allows us to identify which school catchment area residents belong to. In this process, we exploited the existing geocodes in the registers and geocodes for the addresses provided by the municipal Education Agency in Oslo. To ensure that identifiable information was not linked to the addresses, linking catchment areas to geocodes was conducted separately from the registers. We further ensured the anonymity of the schools by assigning pseudonyms to each of the schools before we linked them to the registers.

In paper 5, the Norwegian registers are coupled with data from the Barro-Lee Educational Attainment Dataset (Barro and Lee, 2013), which contains information on educational distributions in 146 countries. Thus, information on education level among peers in origin country is coupled with information on immigrants' education in the destination country, which facilitates for creating a measure of immigrants' education relative to origin country (Ichou, 2014). Consequently, combining these data sources gives us information on whether immigrants constitute a selective group from their origin country when it comes to education.

There are several ethical concerns when using register data. In particular, we utilize highly sensitive data without obtaining informed consent from the research subjects. Permissions to use these data despite lack of informed consent were granted by the Norwegian Data Protection Agency, the National Research Ethical Committee, and the Data Protection Official. These permissions rested on the potential value of the research, including the value of uncovering the societal impact of segregation and the potential gains of our findings for the research subjects and political decision-making at large. The permissions were also dependent on a range of measures to ensure privacy and confidentiality. Even though subjects are de-identified in the registers, it would be possible to combine information from several registers to identify specific individuals. Each researcher is required to sign a Non-Disclosure Agreement, pledging not to

attempt such identification. Further, all data are stored on encrypted servers where only approved individuals are granted access.

All the theoretical estimands stated in the previous section concern some kind of causal relationship between a treatment and an outcome. Using the data presented above, the aim is – bluntly put – to claim whether a given treatment *causes* a given outcome. However, the fundamental problem of causal inference is the impossibility of *observing* the effect of a treatment on the outcome (Holland, 1986). Because observation of an effect is impossible, causal inference depends on the truth of the assumptions on which the inference rests (Holland, 1986). In the next section, I present the counterfactual model of causality, which is the foundation of the causal inference in this thesis.

## 6. Causal inference

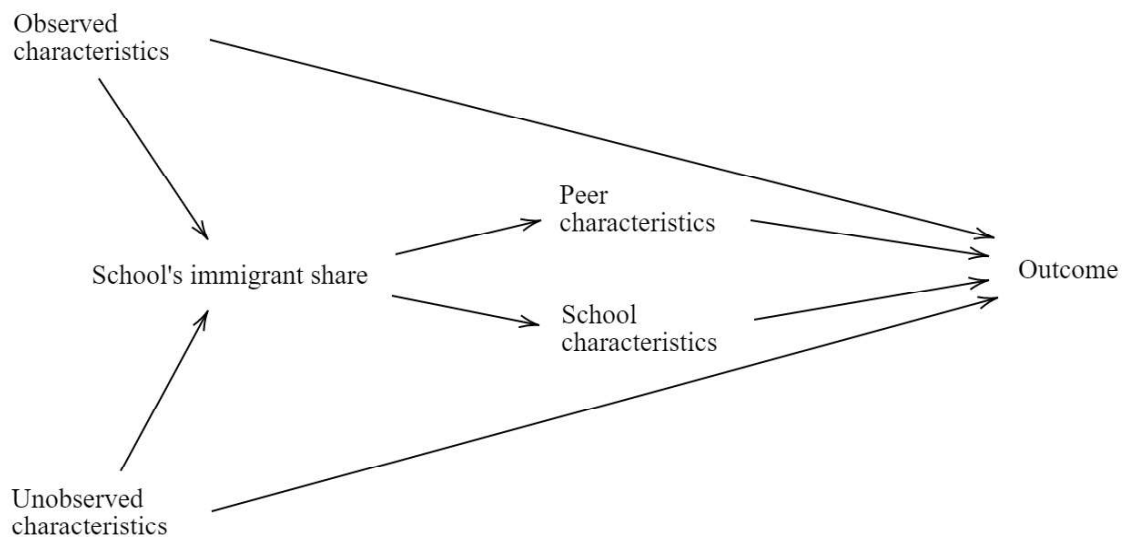
The simple core of the counterfactual model of causality involves asking what-if questions; what the outcome would have been if the individual were exposed to one state of the treatment compared to another state of the treatment (Morgan and Winship, 2015). The key – untestable – assumption that causal inference rests upon is that each individual has a *potential outcome* under each value of the treatment, despite the fact that the individual in reality is only exposed to one value of the treatment (Holland, 1986; Morgan and Winship, 2015). To translate it into a relevant example, suppose the treatment variable of interest is being exposed to immigrant peers or not and that the outcome is GPA. The *individual-level* causal effect is then the difference in GPA when exposed to immigrant peers and the counterfactual scenario where the individual is not exposed to immigrant peers.

As noted above, one cannot observe individuals and their GPA in different treatment states, which means that this simple difference-calculation can never be made on the individual level (Holland, 1986; Morgan and Winship, 2015). As a solution to this problem, one shifts attention to aggregated causal effects as opposed to individual-level causal effects. While the individual-level causal effect is the what-if difference in GPA that could have been calculated if we were able to expose the individual to different states of the treatment, the *average treatment effect* (ATE) is the average value among all students in the population of such what-if differences in GPA (Morgan and Winship, 2015).

To estimate ATEs, we compare individuals who are exposed to different treatments. Suppose individuals are randomized to treatment states. In that case, we can compare treated and untreated directly and draw conclusions on cause and effect. In cases without randomization, a concern when estimating causal effects from such comparisons is that those in different treatment states differ on other characteristics apart from the treatment. Suppose the individuals differ systematically in line with the treatment in ways that affect the outcome. In that case, this will bias the treatment estimate since a third variable, a confounder, determines both the treatment and the outcome (Morgan and Winship, 2015). For example, students with characteristics that situate them to perform well academically may also systematically select into schools with low proportions of immigrant peers. The theoretical estimands presented above are causal inquires that all require handling such selection biases. Below, I present a set of estimation strategies used in this thesis to handle such selection bias.

## **7. Empirical strategies and estimators**

The research questions in papers 1 to 4 concern the causal relationship between the composition of peers in schools and students' educational outcomes (papers 1-3) or family residential out-mobility (paper 4). A main source of bias is selection into schools or neighborhoods with a certain peer composition. Figure 1 shows a simplified causal relationship between peer composition in schools and the outcome. It shows an assumption that the peer composition could affect the outcome through the peers and through other characteristics of schools related to the peer composition. Further, figure 1 illustrates that individuals may sort into school contexts with different peer compositions based on observed and unobserved characteristics that also affect the outcome. Such sorting processes could bias the causal relationship between the peer composition and the outcome of interest.



**Figure 1:** An analytical model of the causal effect of peer composition on an outcome.

The papers in this thesis make use of a range of strategies to handle confounding. The choice of strategy depends on the theoretical estimand of interest, the underlying assumptions about the causal relationships, and the available data. Before going into the details of these strategies, I present the regression approaches that make up the backbone of the analyses.

### *Regression approaches*

The working horse of the analyses in this thesis is the ordinary least square (OLS) regression model. The standard OLS model is used to estimate the ATE, that is, to estimate changes in the average outcome caused by the treatment. Paper 2 calls for strategies that allow for studying whether the treatment has different effects across the outcome distribution as well. For instance, whether the peer composition in school has different effects at the top and bottom of the grade distribution. To illustrate the value of going beyond ATE, suppose there is a strong positive effect for low achievers and an equally strong negative effect for high achievers. In that case, the average effect across students would remain zero because effects for different students work in opposite directions and cancel each other out. An estimate of the average effect on students could conceal, or ‘mask’, differential effects across the outcome distribution. Paper 2 makes use of the quantile regressions to estimate whether the treatment effects of attending immigrant-dense schools vary across the unconditional outcome distribution (so-called quantile treatment effects). This allows me to examine whether the effect of the peer composition in school is

different for low achievers (bottom of the outcome distribution) compared to high achievers (top of the outcome distribution).

### *Control variable method*

A conventional strategy to handle confounding in regression analyses is to control for observed confounding variables. However, observing all relevant confounders may be difficult, as children may select into schools based on unobserved confounding variables, as visualized by Figure 1. Thus, while the strategy of including controls for observed variables is used throughout most analyses in this thesis, the estimators are supplemented with other strategies to handle confounding.

### *Fixed effects models*

One such strategy is the use of various fixed effects models. Suppose students who sort into schools with different shares of immigrant peers are initially different in ways that affect their educational outcomes. In that case, one could include *school fixed effects* (i.e., school dummies) to handle selection effects (Hoxby, 2000). By including school fixed effects, one assumes to hold constant the individual characteristics of children who select into the specific school, thereby blocking the causal pathways that run through unobserved and observed individual characteristics. Additionally, one holds all time-invariant school characteristics constant as the school fixed effects estimator utilizes only idiosyncratic variation in immigrant proportion over time within schools. When keeping schools constant, the only causal effect from the proportion of immigrant peers to the outcome runs through peer effects (see Figure 1). Thus, school fixed effects make up a credible strategy for estimating peer effects.

Papers 1, 2, and 3 all estimate peer effects using school fixed effects. However, a major conceptual issue raised in papers 1 and 2 is the relevance of the effect of attending schools with high shares of immigrant peers, stemming not only from peer effects but also from other features of the school context. Thus, using school fixed effects to rid of selection effects is not feasible when the relevant estimand is the effect that runs through both peers and school characteristics. A suitable estimator will allow estimation of the causal effect of attending immigrant-dense schools, consisting of both the effect of immigrant peers *and* the effect of school characteristics typical for schools with high shares of immigrant peers while blocking selection effects from observed and unobserved individual characteristics. In paper 1, I develop



and employ an *application fixed effects* approach, which allows for comparing students who attend different schools *and* handle confounding stemming from student selection into schools.

The application fixed effects model groups together students who rank the same school and school program at the top of their centralized application scheme to upper secondary education and includes these groups as a set of dummies. The strategy resembles the self-revelation model in the seminal study of Dale and Krueger (2002). The underlying assumption is that students reveal some of their otherwise unobserved characteristics, such as academic ambition, through their school applications. While a school fixed effects strategy compares students *attending* the same school and program combination, the application fixed effects strategy compares students who *prefer* to attend the same combination. Application fixed effects may take account of selection bias just as well as school-by program fixed effects; if students self-select into schools and programs on unobserved characteristics, it seems plausible that students' school preferences will take account of bias caused by self-selection in the same manner as students' actual school attendance. Notably, I combine the application fixed effects with controls for other observed individual characteristics such as grade point average.<sup>6</sup>

#### *Value-added models (VAMs)*

Another strategy that captures the causal effect that runs through both peers and school characteristics while still handling selection bias, resembles a value-added approach. Such approaches are widely used to separate the contributions of educational inputs on student achievements (Koedel, Mihaly, and Rockoff, 2015). The value-added approach involves adjusting for the outcome variable measured *pre-treatment*, assuming that whatever observed and unobserved characteristics affecting the outcome – apart from the treatment itself – are already realized – and thus adjusted for – in the pre-treatment measure. This way, one can take into account potential confounding that stems from unobserved characteristics, assuming they affect the pre-treatment measure of the outcome.

#### *Gender as proxy*

In paper 3, we use gender composition as a proxy for peer characteristics to overcome bias. This paper concerns the counteracting influences of peers and seeks to disentangle what might

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<sup>6</sup> The studies in this thesis use a range of other fixed effects as well, in the sense that sets of dummies for categorical variables are included as control variables. Examples include cohort fixed effects, aimed at handling confounding from time trends across birth cohorts, and origin country fixed effects, aimed at handling country-specific effects.

be offsetting mechanisms that lie behind peer effects. We use an idiosyncratic variation in peer composition within schools – the share of girls – to estimate peer effects in general (Angrist, 2014; Hoxby, 2000). Girls differ from boys in essential and measurable ways, such as academic ability, motivation, and behavior (Spinath, Eckert, and Steinmayr, 2014). Simultaneously, they are equal to boys in other aspects, such as socioeconomic origin. This makes the share of girls in the classroom a valid indicator of peer characteristics. Further, the variation in the share of girls is random across cohorts within mixed-gender schools, and a student’s share of girl peers is consequently not caused by systematic selection. Thus, using a school fixed effects model to study gender peer effects allows for a credible estimation of peer effects in general.

### *Geographical regression discontinuity design*

The native flight paper (paper 4) uses a geographical regression discontinuity (GRD) design to handle confounding. This paper investigates whether the immigrant share among students at local schools affects the propensity of native families to move out of the school catchment area. We worry that the peer composition at schools might be correlated with neighborhood characteristics such as socioeconomic composition, crime rates, pollution, dwelling types, etc., which may bias the effect of student composition at school on the likelihood of moving. Further, we worry that people who initially select into a given neighborhood are systematically different from those living in other neighborhoods and that this geographical self-selection may bias the estimates. To handle both the neighborhood confounding and confounding stemming from selection into neighborhoods, we employ a GRD approach, which in essence compares similar families that reside in the same neighborhood, but in different school catchment areas. We compare the out-mobility of families residing on either side of a school catchment border and study how families’ out-mobility relates to the student composition of their local school.

The papers in this thesis use different combinations of the strategies mentioned above, depending on the estimand of interest. It also employs sensitivity tests with other strategies not accounted for here.

## **8. Defining immigrants**

Papers 1, 2, and 4 concern the consequences of the immigrant share in schools for a given outcome. All these papers use a broad definition of immigrants, where the term ‘immigrant’

refers to those born abroad or born by two parents born abroad. Notably, children born in Norway by immigrant parents are not themselves immigrants, and the term is in that sense clearly misleading. However, Statistics Norway operates with the same definition and frequently builds official statistics on the immigrant population based on this definition.

The immigrant population can hardly be seen as a uniform group. Paper 5 shows clear differences in educational attainment between immigrants of different origins and differences between their offspring in regards to educational outcomes and ambitions. The main analyses of papers 1 and 2 group together immigrants regardless of country of origin, while paper 4 groups together immigrants from non-Western origins. While I make some attempts to differentiate between effects of peers from different immigrant origins (non-OECD immigrants in paper 2 and immigrants from six different geographical regions in paper 1), the thesis is rather agnostic about these differences.

There are pros and cons to this wide definition of immigrants. On the upside, the arguments of papers 1, 2, and 4 benefit from a clear-cut and simple definition. These papers are concerned with the consequences of the schools' immigrant share in general, making the estimates informative even though they fail to differentiate from whom the effects stem. Paper 2, in particular, aims to differentiate between different mechanisms leading to the effect of attending schools with immigrant peers, and these mechanisms would be increasingly complex to sort out and disseminate if the effects also were to be broken down according to specific immigrant groups.

On the downside, I expect that between-group variation in how different groups of immigrants shape school contexts leads to noisy and perhaps downwardly biased estimates due to differential effects of different groups regressing to the mean. In this regard, one is likely to obtain conservative estimates of the effect of peers and school contexts when using a wide definition of immigrants.

Analyses on future data including more cohorts and thus larger sample sizes might render more precise estimates of the effects of separate immigrant groups. However, specific ethical considerations would be of increasing importance when assessing more differentiated origin groups, as discussed in the next section.

## 9. Vulnerable research subjects

Nearly all research must, to some degree, weigh society's need for knowledge against ethical considerations, which is particularly important when the research concerns vulnerable individuals. Immigrants and their children could definitely be considered a vulnerable group in Norway; they are systematically disadvantaged (Bratsberg et al., 2010, 2014; Galloway et al., 2015), face discrimination (Larsen and Di Stasio, 2021; Midtbøen, 2016), and are at the core of sensitive political debates (Hagelund, 2005). According to the Guidelines for Research Ethics in the Social Sciences, Humanities, Law and Theology (the NESH guidelines), “[r]esearchers have a special responsibility to respect the interests of vulnerable groups throughout the entire research process” (NESH, 2019).

Ethical considerations regarding vulnerable subjects are especially relevant in papers 1 and 2, which concern the consequences of immigrant composition in schools for children's educational outcomes. An ethical challenge in these papers, and in the immigrant peer effects literature at large, is that immigrants are conveyed as a distinct group with potential consequences for the life chances of children exposed to them. Merely singling out immigrants and theorizing about the consequences of immigrants in schools could be in direct conflict with the obligation to protect vulnerable groups. Differentiating between the effects of specific immigrant groups, as discussed above, would only add to this concern.

However, these ethical concerns should be considered in light of the potential benefit of the research output. Papers 1 and 2 assess the consequences of immigrant school segregation for children's academic learning, grades, and likelihood of school dropout. They investigate whether schools with a high share of immigrant students – which typically serve socioeconomically disadvantaged students – provide an educational context where students are more or less likely to succeed. The ripple effects of poor education and school dropout are detrimental for individuals' life chances and lead to large public and social costs (Belfield and Levin, 2007; OECD, 2012). Insights into what determines students' educational outcomes could provide valuable policy guidance to decrease social stratification and its societal consequences.

Nevertheless, reporting and publishing findings of negative immigrant peer effects could be stigmatizing for immigrants. NESH states that researchers must “... show respect for human dignity in their choice of topic, in relation to the research subjects, and when reporting and publishing research results” (NESH, 2019). However, NESH also states that one has an

obligation to publish results and not withhold research (NESH, 2019). Thus, there are potentially conflicting obligations between publishing controversial results on the one hand and avoiding potential inconveniences for immigrants on the other. The NESH guidelines propose an avenue of navigating these conflicting considerations by also stating that researchers bear parts of the responsibility for how research is interpreted and applied in political, cultural, social, and economic contexts (NESH, 2019).

Researchers should ensure that the research is framed and discussed in ways that avoid stigmatization of vulnerable groups. Still, the findings in this thesis alleviate the challenges of increased stigmatization. The overall takeaway from the findings is that having immigrant peers is either inconsequential or positive for children's life chances (paper 2). These findings are thus not inconvenient for immigrants as a group. Among the less favorable results are negative consequences of immigrant school segregation for completing upper secondary school. However, these effects seem not to stem from immigrant peers per se, but rather from other school characteristics that correlate with immigrant density (paper 1); it appears that students in schools with high shares of immigrant students are offered an inferior school setting. Thus, this research, and its findings, are important in understanding how inequality in education comes about.

## **10. Summary of the papers**

### *Paper 1: It's not all About the Peers: Reintroducing School Context to the School Segregation Literature*

The first paper concerns the relationship between ethnic school segregation and social stratification, and more precisely, whether attending schools with immigrant peers has consequences for children's life chances. The paper's main argument is that immigrant school segregation could influence students' educational achievements because of the composition of the peer group *and* the contextual settings at segregated schools, such as teacher quality and school resources (Coleman et al., 1966). Thus, this paper has two estimands of interest: the isolated immigrant peer effect and the total effect of attending schools with immigrant peers. Although extensive literature has provided sound evidence on how peers affect student outcomes (Sacerdote, 2011), the evidence on the impact of the contextual difference between segregated schools is considerably more limited (Reardon and Owens, 2014).

To begin, I use school fixed effects to estimate immigrant peer effects, which has become the workhorse in the peer effect literature. This school fixed effects approach eliminates the impact of (time-invariant) school characteristics, which cleverly isolates the peer effects from other school characteristics. However, by eliminating the effect of other school characteristics, the school fixed effects approach is clearly unsuited to estimate the total effect of attending immigrant-dense schools. To estimate the effect of attending schools with a high share of immigrant peers, I use an application fixed effects model, which handles selection bias by comparing students who apply for the same school but are admitted to different schools. Notably, both the school fixed effects and the application fixed effects estimators are value-added models in the sense that they adjust for pre-treatment academic achievements (i.e., GPA from lower secondary schools), which further alleviates concerns of selection bias.

The findings demonstrate that the share of immigrant peers in upper secondary schools in Norway negatively affects students' completion of academic tracks. Using the application fixed effects model that compares students who attend different schools, the paper finds that a 20 percentage point increase in immigrant peers decreases students' likelihood of completion by 1.46 percentage points. Relative to a baseline dropout rate of 17.5 percent in the study's sample, this amounts to a 8.3 percent increase in the dropout rate. The school fixed effects model indicates that exposure to immigrant peers per se is not causing these adverse effects; the idiosyncratic variations in immigrant share within schools over time have no measurable impact on the likelihood of completing. Hence, attending immigrant-dense schools seems to affect students in other ways than through mere peer exposure. Overall, the paper suggests that immigrant school segregation could play a role in persisting stratification patterns and that students in immigrant-dense schools might be offered an inferior school setting that hampers their likelihood of completion.

*Paper 2: Masked by the Mean: Immigrants in School and Differential Effects on Student Achievements*

This paper's point of departure is, similarly to paper 1, the need to expand the literature on immigrant peer effects. Despite the strong intuition that peers matter for student outcomes, a comprehensive literature finds nil or moderate immigrant peer effects (Brunello and De Paola, 2017; Van Ewijk and Slegers, 2010). This study explores three possible reasons for this

mismatch. First, similar to paper 1, it explores not only the effect of immigrant peers but also the total effect of attending schools with immigrant peers. Second, and perhaps the most defining feature of the paper, it investigates whether estimates on the average of the outcome could mask differential effects across the outcome distribution. Third, it assesses whether a ‘teacher grading bias’ could attenuate or conceal how the share of immigrant peers affects students’ learning. Since immigrants have on average lower academic achievements (OECD, 2010), more immigrant peers could make the best students appear better in the eyes of their teachers, regardless of their actual and objective academic achievements (Jonsson and Mood, 2008), which could make it *easier* to obtain good grades in schools with many immigrant peers.

This paper’s results demonstrate that the effect the schools’ immigrant density has on the mean outcome could mask differential effects across the outcome distribution. While the share of immigrant peers in Norwegian lower secondary schools has a slight positive influence on students’ mean GPA (although not significant at the 5% level), this average impact is a composite of negative (but statistically insignificant) influences among low-achievers and positive influences among high-achievers, as shown by the paper’s quantile regression results. For example, a 20 percentage point increase in immigrant share increases the 90<sup>th</sup> quantile in the GPA distribution by about 3 percent of a standard deviation. Even though the best students get better grades from their teachers, there are no signs of improvement at the top of the national test score distribution. It seems that a ‘teacher grading bias’ makes it easier for the best students to get good grades in schools with higher shares of immigrant peers. Notably, this bias is likely explained by the general academic and SES composition of the student body.

Other mechanisms seem to be at work for the low-achieving students. These students show improved national test scores by attending schools with higher shares of immigrant peers, which is not explained by peers’ general academic and SES composition. Additionally, analyses including school fixed effects show that such benefits also result from variations in immigrant share within schools over time. For instance, having 20 percentage points more immigrant peers is estimated to increase national test scores by almost 5.8 percent of a standard deviation at the 20<sup>th</sup> quantile of the national test score distribution. Thus, the academic improvement of low achievers seems to stem from immigrant peer effects.

*Paper 3: The counteracting nature of contextual influences: Peer effects and offsetting mechanisms*

Paper 3 is also motivated by the mismatch between the strong intuition that peers influence student outcomes and the empirical evidence suggesting small or negligible peer effects. The main contribution of this paper is to highlight that peer effects may operate via several mechanisms (i.e., social influences) that could (partly) cancel each other out when comparing counterfactual outcomes (i.e., causal effects). We use the idiosyncratic variation in gender composition across cohorts within schools to estimate peer effects in general. Since girls differ from boys in essential and measurable ways, such as academic ability, motivation, and behavior (Spinath et al., 2014), and are equal to boys in other aspects, such as socioeconomic origin, the share of girls in the classroom serves as a valid indicator of peer characteristics. Thus, using a school fixed effects model to study gender peer effects allows for a credible estimation of peer effects in general.

We study the effect of girl peers on teacher-assigned grades, exam grades, and objective test scores not graded by the teacher. Further, we study the impact of girl peers on students' educational aspirations, their self-reports on the learning environment, motivation for school, and whether they do their homework, as well as effects on students' school behavior and criminal charges. The results show that peer exposure may *simultaneously* affect students in both positive and negative ways. Specifically, more girl peers improve the learning environment and simultaneously reduce the students' motivation for schoolwork. We find no consistent support for stricter teacher grading practices when the peer group has higher achievement levels.

Moreover, in supplementary analyses, we examine empirically whether the effects of girl peers are related mainly to girls' achievement level. The gender gap in student achievements varies across subjects, with boys outperforming girls in some subjects and girls beating boys in others. Using this variation, we study whether the size and direction of the effects of the share of girls (i.e., peer effects) vary systematically with how well girls do compared to boys in each subject (i.e., gender gap). These analyses support the assumption that the estimated gender peer effects are mainly related to the achievement level of peers.

An important implication of our results is that the lack of an overall causal peer effect does not necessarily mean that students do not influence each other; if contradicting influences exist, they could outweigh each other and produce net-zero effects, and limit our understanding of



how peers affect one another. From a theoretical point of view, it suggests that being narrowly focused on average causal effects may impede our understanding of contextual influences.

*Paper 4: School Segregation and Native Flight: Evidence from School Catchment Area Borders.*

While papers 1 to 3 concern the mechanisms behind the effects of peers and schools and, at large, the consequences of immigrant school segregation for children's life chances, paper 4 concerns the *causes* of segregation. Immigrant segregation patterns in schools and neighborhoods are persistent in most Western major cities and have long been heavily theorized by social scientists. However, it has proven difficult to determine the exact mechanisms behind these segregation patterns. In this paper, we investigate one of the potential causes of segregation; so-called 'native flight' motivated by parents' school preferences.

To investigate whether 'native flight' is causally linked to school characteristics, we use highly detailed administrative register data linked to geographical coordinates for the place of residence for the entire population of Oslo. School enrollment is determined primarily by geographic proximity to schools, and preferences may prompt native parents to move away from schools with high shares of immigrant students, thus contributing to both residential and school segregation. We exploit discontinuous changes in the schools' student compositions at the school catchment area border, using a Geographic Regression Discontinuity (GRD) design. By comparing families residing in the same neighborhood but within different school catchment areas, we study the effect of school characteristics, including student composition, on native out-mobility while accounting for neighborhood characteristics.

The results suggest that native origin families systematically move away from schools with high shares of students with non-Western immigrant backgrounds. Specifically, we find that belonging to a school with (on average) 35 percentage points higher concentration of non-Western immigrant background students increases yearly out-mobility among native families by around seven percentage points. This process likely contributes to increased residential and school segregation.

*Paper 5: Reaching Higher? Horizontal Stratification in the Educational Careers of Immigrant Descendants.*

This last paper assesses the educational careers of children of immigrants relative to majority children, with a key focus on the choice of field of study in post-secondary education. Compared to majority children, children of immigrants tend to have weak academic achievements yet a strong determination to progress in education (Jonsson and Rudolphi, 2011) – a paradoxical pattern often referred to as an ‘immigrant optimism’ (Kao and Tienda, 1995). Many of these children are coming of age in societal contexts where an educational expansion has increased the importance of post-secondary fields of study for future life chances (Borgen and Mastekaasa, 2018). Yet, little is known about whether the ‘immigrant optimism’ translates into not only higher enrollment rates in post-secondary educations but also higher ambitions in their choice of field.

We find an immigrant penalty in grade point average and in completion rates in upper-secondary school, but nevertheless, an ‘immigrant optimism’ further down their educational trajectories in terms of higher enrollment rates to post-secondary education. Additionally, our analyses show that children of immigrants are more likely to choose more prestigious and better paying educational fields than children of non-migrant parents.

In recent studies, positive selection of immigrant parents in terms of their relative educational rank compared to non-migrants in their country of origin has been proposed as a key explanation of immigrant students’ high aspirations and educational advancement compared to majority children (Engzell, 2019; Feliciano, 2020; Feliciano and Lanuza, 2017; Ichou, 2014). Consistent with this explanation, we find that immigrant parents’ educational rank in the origin country plays a role for immigrant children’s achievements and for completion of upper secondary school even after adjusting for prior achievements. However, parental selectivity provides little insight into immigrant children’s high ambitions later in their educational careers, neither with regards to enrolling in post-secondary educations nor with regards to their ambitious choices of educational fields.

The findings of this paper have several implications that are relevant for this thesis at large. First, the paper documents an ‘immigrant optimism’ among immigrant children that may help explain positive immigrant peer effects in lower secondary schools. Second, it shows that the educational attainment of immigrant parents may be an insufficient proxy of immigrant children’s socioeconomic status and that we should consider parents’ pre-migration status

when assessing the educational careers of immigrant children. Finally, it gives a pointer to future social differences; immigrant children's tendencies of choosing high-return post-secondary educations compared to the majority may be predictive of decreasing social stratification along ethnic lines.

## 11. Concluding remarks

Families, peers, schools, and neighborhoods constitute social arenas that play a role in shaping children's life chances (Breen and Jonsson, 2005; Crosnoe, 2000; Leventhal and Brooks-Gunn, 2000; Sacerdote, 2011). One source of systematic variation in these social circumstances occurs when children with different characteristics are segregated across social arenas, such as schools.

In cases of immigrant school segregation, children are exposed to peers with systematically different characteristics because students with immigrant origins often have, on average, different characteristics compared to native students (Heath et al., 2008). One major aim of this thesis is to assess the mechanisms behind such peer effects. The thesis *zooms in* on estimated average peer effects and assesses whether the moderate or zero effects on the mean grades and test scores among students may mask that low-achieving students and high-achieving students are affected differently by their peers (paper 2). It also *zooms in* on the influences behind peer effects, arguing that peers may influence each other in contradicting ways that the total causal peer effect fails to uncover (paper 3). Picking apart causal effects in this way provides insights into the mechanisms behind peer effects.

Another major aim of this thesis is to *zoom out* from the immigrant peer effects. Insofar as students are affected by their peers, school segregation may cause inequalities in education. However, immigrant school segregation not only implies different peer exposure. Suppose immigrant students systematically attend schools with certain characteristics (e.g., schools with lower/higher teacher quality), and schools partly change in response to the students who typically attend them (e.g., they get more resources or experience higher teacher turnover). In that case, school segregation may play a role in social stratification beyond the effects of exposure to immigrant peers. Thus, zooming out from mere peer effects and looking at the total causal effect of attending schools with a high share of immigrant peers may provide additional insights into the consequences of school segregation (Papers 1 and 2). The sections below bring

together insights from the five stand-alone papers of this thesis to draw a few main conclusions.

### *Positive immigrant peer effects*

This thesis suggests that exposure to immigrant peers in school does not lead to educational inequality (Papers 1 and 2), which is in line with previous research of the Norwegian context (Fekjær and Birkelund, 2007; Hardoy et al., 2017; Hermansen and Birkelund, 2015). Immigrant peers seem to improve test scores of low-achieving students (paper 2), while the likelihood of completing an academic upper secondary track seems unaffected by exposure to immigrant school peers (paper 1). Thus, the effect of exposure to immigrant peers seems to be, if anything, positive. If they play a role in social stratification, it seems that they would decrease rather than increase inequalities.

The thesis advocates several plausible explanations for why low achievers benefit from having immigrant peers. First, it could be that an ‘immigrant optimism’ spills over on low achievers and increase their school motivation and achievements. Paper 5 documents such ‘immigrant optimism’ by showing that immigrant descendants have a higher likelihood of enrolling in post-secondary education when compared to majority children with similar academic achievements and parental educational attainment, and also make more ambitious choices of educational fields in post-secondary education. Paper 5 also shows that immigrant parents’ pre-migration educational status plays a role for immigrant children’s academic achievements and completion rates in upper-secondary school. Future research could assess whether the positive immigrant peer effects stem from an ‘immigrant optimism’ by adjusting for the pre-migration educational status of immigrant peers’ parents.

A second explanation for the positive immigrant peer effects could be that teachers lower the level of teaching to accommodate low achievers when the share of immigrants is high. It is worth noting that high achievers seem resilient to these potential teaching adjustments; such adjustments seem not to deprive high achievers of the teaching they need to excel (Paper 2). A third explanation may be that benefits from extra resources to school cohorts with immigrant students spill over on low achievers in particular. A final possible explanation is related to the achievement level of immigrant peers. Immigrant peers are, on average, less likely to be high-achieving peers (papers 1, 2, and 5), and having high-achieving peers is overall negative for students’ grades and test scores (paper 3). Thus, having immigrant peers may boost children’s academic self-confidence and situate them to perform better.

### *Consequences of immigrant school segregation*

This thesis also shows that immigrant school segregation may play a role in the persistence of social stratification even if immigrant peer effects are non-existing. While immigrant peers seem to have no average causal influence on the likelihood of completing an academic upper secondary track, there is nevertheless a negative influence of attending an upper secondary school with a high share of immigrant peers (paper 1). The analyses indicate that these effects stem from other school characteristics of immigrant-dense schools and not from exposure to immigrant peers. Students who complete an academic track in upper secondary school earn a University and College Admissions Certification that makes them eligible to advance to higher education. Thus, dropping out may have detrimental consequences for the long-term socio-economic outcomes of the individuals.

Interestingly, when assessing *lower* secondary schools, there is a different and more optimistic pattern (paper 2). Attending schools with a high share of immigrant peers seems to positively affect the mean GPA, the mean of teacher-assigned grades, and the mean of objectively rated, anonymous national test scores, though only the effect on teacher-assigned grades is significant at conventional levels. The positive effect on the mean teacher-assigned grades is largely explained by a general lower academic level and lower socioeconomic status among the students.

### *Differential effects of immigrant school segregation*

A third main conclusion is that school segregation may play a role in social stratification by lifting the chances of educational success for students at some achievement levels and not others. Findings from paper 2 indicate that it is easier to obtain better grades for high achievers when in schools with high shares of immigrant peers. This seems to be because the teachers assess students relative to their peers, who – in immigrant-dense schools – have on average lower academic and SES levels. Low achievers, on the other hand, seem to improve their academic abilities from having immigrant peers, and this positive effect seems to stem from exposure to immigrant peers. The improvement in test scores only for low achievers points to an interesting dimension of school segregation, where school segregation plays a role not only for stratification between groups who attend such schools but also for stratification within these groups.

### *A reciprocal relationship between school segregation and neighborhood segregation*

The fourth conclusion from this thesis is that school segregation affects neighborhood segregation via ‘native flight’. While there is a strong and obvious effect of residential segregation on school segregation whenever school enrollment relies on local catchment areas, this relationship seems to go both ways; native families with pre-school children tend to opt out of catchment areas where the local school has a high share of students with non-Western immigrant origin (paper 4). Thus, it seems to be a reciprocal and mutually reinforcing relationship between school- and neighborhood segregation.

These findings indicate that some native parents are willing to take drastic steps to avoid enrolling their children in immigrant-dense schools. Yet, this ‘native flight’ is somewhat paradoxical, as empirical evidence suggests that attending immigrant-dense schools has *positive*, if any, consequences for students’ academic outcomes, at least in compulsory education. The reciprocal and mutually reinforcing relationship between residential segregation and school segregation may be of interest to policymakers who aim to reduce either of these segregation patterns. Perhaps better dissemination of empirical evidence on consequences of school segregation would counter the ‘native flight’ and, in time, reduce both residential and school segregation.

### *School segregation and decreasing social stratification?*

A final rather surprising implication of this thesis is that persisting immigrant school segregation in Norwegian lower secondary schools could decrease social stratification. The thesis is quite consistent in showing that low achievers benefit academically from having immigrant peers. Having immigrant peers could accordingly ‘level the fields’ for succeeding in education between high- and low-achieving students. Relatedly, the teacher grading bias may have a similar ‘leveling’ effect. Students in schools with high shares of immigrant peers have on average lower socioeconomic backgrounds compared to other students, which gives them a disadvantage in school. The teacher grading bias that makes it easier for high achievers to get good grades in schools with high shares of immigrant peers might be advantageous when competing with high achievers from other schools for admission to their preferred upper secondary school.

Notably, the abovementioned effects of immigrant school segregation need to spill over on later educational careers and on labor market outcomes if they are to moderate social

stratification. One potential caveat for this process is that students are more likely to drop out if they attend upper secondary academic tracks with high shares of immigrant peers. Thus, the advantages of attending immigrant-dense lower secondary schools may be reversed if enrolled in immigrant-dense upper secondary schools. From the insights provided by this thesis, one can only speculate about the reason for contradicting findings on lower and upper secondary schools. A fruitful avenue for future research might be to investigate the role of resource allocation and how allocation practices differ between lower and upper secondary schools.

A potential caveat for decreased social stratification is what resembles the so-called ‘optimism trap’ (Birkelund, 2020; Dollmann and Weißmann, 2020; Tjaden and Hunkler, 2017). Since it is easier for high achievers in immigrant-dense lower secondary schools to get good grades (paper 2), their academic abilities might not match their GPA. Consequently, they may lack the academic abilities required to succeed in upper secondary schools and tracks with high academic demands, despite having GPA that makes them eligible for enrollment. Further, children of immigrants are more ambitious in their choice of post-secondary educational fields when compared to majority children with similar grades (paper 5). While such high ambitions among immigrant children is indeed an optimistic sign of decreasing social stratification along ethnic lines, ambitious immigrant youth with comparatively low school grades may face higher risks of non-completion after entering into ambitious post-secondary fields. This thesis provides no evidence for whether immigrant children complete the ambitious post-secondary educations, which is a fruitful avenue for further insights into the persistence of social stratification along ethnic lines.





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