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Diversity in the Norwegian teaching population

An exploratory study of differences in attrition rates between demographic groups within the Norwegian teaching population, 2003-2013

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Master's thesis in Sociology

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ABSTRACT

Teachers are responsible for children's educational and social learning outcomes. In this sense, teachers are also a requirement for a knowledge-based society. Despite the important role teachers have for the educational system and society at large, teachers report they feel underappreciated, experience high stress levels and have to cope with educational policies that do not conform to their own professional identities. Previous research have therefore focused on teachers' motivation to leave the occupation. A few recent studies have also considered the importance of teachers' background characteristics in student-teacher matching, as teachers can function as role models and particularly for minority pupils. It is therefore necessary to study diversity in the teaching population. Teacher attrition is, moreover, dependent on teachers' motivation and opportunity to change careers. Hence, differences in attrition between teacher groups with different demographic characteristics might suggest differences in opportunities and inequalities in the labour market. Teacher diversity and teacher attrition are both educationally and sociologically relevant.

Moreover, both nationally and internationally, the literature in this field is rather scarce. Hence, this thesis aims to fill a vital gap in this research field. The thesis examines differences in teacher attrition for different demographic groups, how these differences might be explained and how differences develop over time, with a particular focus on the first five years of their teaching careers. The demographical characteristics are gender, social background and minority background.

According to class theories, children's upbringing and parents' accumulated capitals can affect educational choices and occupational destinations (e.g. Bourdieu, 1984; 1986). And teachers need both the motivation and opportunity to leave. Many of the motivational factors can be placed within Gambetta's (1987) push/pull framework. Differences in attrition are examined with different pushing/pulling factors and differences in credentials, as credentials

promote different opportunities on the labour market. The thesis uses the Oslo Register Data Scheme (ORDC) for teachers' social background.

The analyses show that income can in many cases explain attrition differences. However, the central government regulates teachers' wages, and are dependent on seniority, attained educational level, percentage of full-time employment and job-position. Lower wages are associated with higher risk of leaving. More women and minority teachers (with ties to Norway and another culture) leave teaching, which can be explained by differences in earnings. The results suggest that the most likely explanations to differences in income are due to reduced full-time positions and job-positions, which again could suggest persisting gender-roles and gender-segregated labour market. Teachers from higher economic backgrounds leave more than teachers from economic lower-middle class.

There could also be differences in aspirations and job-values between teacher groups with different demographical characteristics. Higher social strata have higher propensities to leave teaching, and literature suggest this could be due to differences in job-values. GPA was shown to be significant for teachers from higher cultural and professional classes, and income was significant for teachers from higher economic classes. It could be that teachers from higher social strata have different career-paths and never plan a life-long career in teaching. If teachers from higher strata leave teaching due to differences in aspirations, then this could suggest 1) difficulties with teacher retention policies and 2) literature should re-conceptualise teacher attrition as a sign of agency and not only as a lack of resilience.

An interesting result is that immigrant teachers have higher attrition rates than majority Norwegian teachers already by the first year in teaching and increases by the fifth year. None of the control variables can explain the difference in attrition, and attrition differences is explained by unmeasured variables. An unmeasured factor could be immigrant's socio-cultural background, as immigrant teachers might be a heterogeneous group. It is also possible that immigrant teachers respond to factors differently from the majority, and have significantly different career-paths.

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1 INTRODUCTION

“Thank you, teachers, who has Norway’s most important job” (Asheim, 2017)¹

Teachers are responsible for children’s learning outcomes, and is a fundamental requirement for a knowledge-based society (Kunnskapsdepartementet 2013, pp. 13,67; Lindqvist, Nordäng, & Carlsson, 2014, p. 94; NOU 1988: 28, 1988, p. 9; NOU 2014: 7, 2014, pp. 12,124). Not only are teachers accountable for providing quality education and for children’s academic development [utdanning] (Kunnskapsdepartementet, 2009; 2013). They are also important for children’s social and cultural competences and their individual- and personal development [danning] (Kunnskapsdepartementet, 2009, pp. 21,26; 2013, p. 10). Focus on social competencies is a distinctive characteristic of the Nordic education system (Imsen, Blossing, & Moos, 2017). It focuses heavily on the humanistic, social and cultural aspect of learning, and hence also the school’s and teachers’ roles in society in preparing children for their future, professional skills and their social- and societal responsibilities. A teacher’s role is, in other words, invaluable for both children’s academic learning as well as their personal growth and well-being.

Despite the important role of teachers in the educational system and in society at large, teachers report they feel underappreciated (Caspersen, Aamodt, Vibe & Carlsten, 2014) and are met with scepticism about their competences and skills (Skaalvik & Skaalvik, 2010, p. 1061; 2015, p. 186). This scepticism is linked to decline in teachers’ social status and job-satisfaction (Mausethagen, 2013a; 2013b; Skaalvik & Skaalvik, 2010; 2011a; 2015; With, 2016). The literature on teachers’ motivation to leave the occupation is growing and so are concerns about consequences of teacher attrition (e.g. Beck, 2009; Hancock & Scherff, 2010; Hargreaves & Goodson, 2003; Mausethagen, 2013b; Moore, Edwards, Halpin & George, 2010; Skaalvik & Skaalvik, 2011a; Stinebrickner, 2002; Troman & Woods, 2000).

¹ [Own translation]. Asheim was Norway’s Minister for Education in 2017.

Concerns about teacher attrition include reduced education quality and social bonds at the schools, as well as issues with educational policies and financial costs. It is expensive to educate and replace teachers (Borman & Dowling, 2008, p. 370). Regarding education quality, research have found that teachers with higher test-scores have higher propensity to leave teaching (in the US) (Stinebrickner, 2001). Although skilled pedagogues do not necessarily follow acquiring higher test-scores, a higher propensity to quit could demonstrate further issues with educational policies, which focus on recruitment to teaching based on grade-requirements. Furthermore, positions need to be filled and replaced when teachers quit, and some positions are harder to fill (Ingersoll, 2001). Vacancies and difficulties filling positions can result (at least temporarily) in having to be filled by substitute teachers without qualified teacher credentials (Stromquist, 2018: 31). Quality of schooling can also decrease if teachers want to leave but are unable to do so because of limited opportunities, resulting in increasing job dissatisfaction and declining job-engagement (With, 2017: 1739). Moreover, instability and replacement of teachers negatively affect pupils and the collegial-environment because it invokes restlessness that makes it harder to form closer and trusting relationships (Ronfeldt, Loeb & Wyckoff, 2013).

Concerns about teacher attrition has been further exacerbated in several countries, including Norway, by projections on teacher supply and demand that suggests an increased risk of teacher shortages. There are already teacher shortages in several countries, including Sweden and the United Kingdom (Stromquist, 2018, p. 29). Statistics Norway predict shortage of about 4000 full-time positions by 2040 (Gunnes & Knudsen, 2015, p. 34). If Norway faces teacher shortages in the nearest future, examining attrition rates is important from an educational policy point-of-view. Studies on attrition can clarify important factors and policies that facilitate teacher retention. Research have focused on factors such as salaries, but the importance of salaries differs between teacher groups such as gender and social background (Falch & Strøm, 2009; Stinebrickner, 2001; Watt & Richardson, 2008). There is thusly a need to study differences between teacher groups and teacher attrition.

Most of this literature, as Smith and Ulvik (2017, p. 928) note, focus on how negative experiences affect teachers personally and professionally, which in turn have affected their resilience to remain in the occupation. Whereas this is a concern, Smith and Ulvik (2017)

report that some teachers quit the profession as a sign of agency. Teachers can be characterised as ‘*competence nomads*’, where teachers utilise their accumulated human capital to leave teaching because they want to and not merely due to discontent (Smith & Ulvik, 2017, p. 931). Some teachers also report using teaching as a ‘stepping-stone’ to other careers (Watt & Richardson, 2008, p. 418). However, career-switching is dependent on labour market conditions and differences in aspirations and accumulated resources which is not evenly distributed (With, 2016). Hence, job-mobility for teachers might vary with background characteristics, which could affect diversity of the teaching force.

1.1 DIVERSITY AMONG TEACHERS

The important role of teachers in society and the education system illustrates the importance of studying teacher attrition. Furthermore, teachers’ role is more than a pedagogic role, and some researchers have argued that diversity is important for education *quality* and *equality*. Diversity in schools have traditionally focused on preparing teachers for a diverse student population, and far less initiatives have been made in assuring a more diverse teaching population (Sleeter & Thao, 2007, p.6). Research on diversity in the teaching population is emerging, but still very limited (Torres, Santos, Peck, & Cortes, 2004, p. 4). A reason to scarcity in research on teacher diversity could be the under-representation of minorities, which gives too small samples for statistical power in quantitative analyses (Murnane, Singer & Willett, 1989; 1988; Sohn, 2009; With, 2016, p. 10).

As a policy principle, having a diverse teaching force is important because the education system should reflect our desired society (Kunnskapsdepartementet, 2013). However, less than seven percent of all compulsory school teachers in 2018 came from immigrant-backgrounds (Perlic & Foss, 2019). The main idea behind having a teacher composition that corresponds to the composition of the national population is that children will have the opportunity to identify themselves with one or more of the teachers (Lindsay, Blom, & Tilsley, 2017; Spernes, 2014, p. 6). And teachers’ background characteristics can affect how they evaluate children, and the children’s ability to identify themselves with their teachers (With, 2018, p. 178). In addition to teacher-student matching, a diverse teaching force also ensures exposure to groups with different demographical characteristics (Figlio, 2017).

Exposure to diversity is important for developing tolerance, social understanding and to counter bias and discrimination (Finseraas, Johnsen, Kotsadam, & Torsvik, 2016).

Teachers can act as role models (Spernes, 2014), and selection of role-models can be understood in terms of social cognitive career theory and the similarity hypothesis (Karunanayake & Nauta, 2004). The theories suggest individuals learn from observing others. By watching others who are similar to themselves, aspirations and their perceived self-efficacy change (Karunanayake & Nauta, 2004, p. 226). Especially for individuals who have experienced prejudice and discrimination, seeking out career role-models similar to themselves becomes important to figure out what fields are possible for them (Karunanayake & Nauta, 2004, p. 226). A diverse teaching population could therefore be even more important for minority group children, and to an increasing extent with the current migration pattern of work-immigrants and refugees (Stromquist, 2018, p. 24).

Research also suggest that teacher-student matching positively affect students' achievement; especially for minority groups (Dee, 2005; Gershenson, Hart, Hyman, Lindsay, & Papageorge, 2018; Holt & Gershenson, 2015; Karunanayake & Nauta, 2004). However, research is conflicting in terms of ethnic representation and student performance. Ehrenberg, Goldhaber & Brewer (1995, p. 559) found that teachers' demographic characteristics were for the most part not significant in how much students learned. In Norway, parents' ethnicity and social background are more significant for children's grades than teachers' characteristics (Bakken, 2009a). Although diversity might not be significant in terms of educational performance, it can still be important for children's social learning and competencies.

The important role of teachers for the educational system and society at large signifies the importance of studying teacher diversity and teacher attrition. Teacher diversity also has the potential to reduce social inequalities by student-teacher matching, functioning as role models for their pupils and develop their social understanding and tolerance. Moreover, teacher attrition can be considered as career-switching and thusly reflect differences in access and accumulation of resources. Differences in attrition between teacher groups with different demographic characteristics might suggest differences in opportunities and inequalities in the

labour market. Hence, studying teacher diversity and attrition have both educational and sociological relevance.

1.2 AIM OF THE THESIS AND OUTLINE OF THE THESIS.

Despite being important for both the academic and social development of pupils, diversity in the teaching population is still a largely unexplored research field both nationally and internationally. The aim of this thesis is to contribute to fill this gap, and the thesis thereby provides an important contribution to the literature on teacher diversity and teacher attrition. This thesis has three aims; 1) examine differences in attrition rates between teacher groups, 2) examine how these differences can be explained and 3) how attrition rates between groups develop over time. The three demographic characteristics examined in this thesis are gender, social background and minority background.

Concepts and delimitations frame and affect the scope of this thesis. Firstly, *teachers* in this thesis are beginning teachers with completed teacher education who are/have been employed at a compulsory school (1-10th grade) in the period 2003 to 2013. The three most common ways to get a teaching degree is by completing General Teaching Education, Lector programme² or by obtaining a postgraduate certificate in education (PGCE)³. Secondly, there is a distinction between *teacher attrition* and *teacher turnover*. The latter is an umbrella-term for all mobility of teachers. I focus on *attrition* as it refers to ‘leavers’ who quit the profession (Harris & Adams, 2005; Lindqvist et al., 2014).

The last delimitation concerns *time*. I focus on beginning teachers in the period 2003-2013, primarily during their first five years. The attrition rates are group averages based on years since first registered employment at a school. The main focus is on the initial five years because the risk of leaving is highest during these years (e.g. Ingersoll, 2003; Ingersoll et al., 2014; Lindqvist et al., 2014; Murnane et al., 1988; Stinebrickner, 1998; With, 2017).

Furthermore, although attrition is reported to follow a U-shaped trend, older teachers leave the workforce altogether and younger teachers more often leave for other occupations

² Postgraduate education degree.

³ Also known as Praktisk Pedagogisk Utdanning; a one-year course in pedagogy with additional completed higher educational degree in a specified subject area.

(Aamodt & Næsheim, 2019; Grissmer & Kirby, 1987; Harris & Adams, 2007; Perlic et al., 2019; With, 2017).

Chapter 2 present theories and research teacher attrition for the three demographic groups. The chapter presents motivations for choosing teaching, as reasons for entering teaching can also affect attrition rates. In class-theories, career choices are often considered in terms of accumulation of resources, or capitals, and aspirations. **Chapter 3** presents the data, operationalisation of variables with descriptive statistics and a methodical discussion of Linear Probability Model (LPM) and Mediation analysis. **Chapter 4** presents results from the LPM analyses, as well as, sensitivity tests checking the robustness of the results. **Chapter 5** discusses the results from chapter 4 with literature from chapter 2 and descriptive statistics from chapter 3. Finally, **Chapter 6** summarises main findings with implications and considerations for future studies.

2 LITERATURE: RESEARCH AND THEORIES ON TEACHER ATTRITION FOR DEMOGRAPHIC GROUPS

Attrition rates are the number of teachers who quit the profession and is driven by many different mechanisms. These mechanisms are often understood as structural constraints (structuralism) or as rational or intentional actions (Gambetta, 1987). The main point is that for people to choose an occupation or change from one to another, they must both have the aspiration as well as the opportunity to do so (With, 2017, p. 1725). Aspects of aspiration and opportunity have been investigated by many theorists, and the following chapter presents theories and existing literature that help explain some of the mechanisms and reasons for teachers opting to switch careers.

Choices are part of human behaviour, and theory on push/pull factors gives a pragmatic framework for understanding motivation and attraction for entering or leaving teaching. By example; Gambetta considers push forces to either put direct constraints on the individual (in line with Structuralist view) or limit individuals' awareness where they are incognizant of their possibilities (pushed-from-behind-view) (Gambetta, 1987, p. 61). The pulling factors are mainly intentional and rational choices whereupon individuals plan their life- and career course through evaluating their probability of success.

Similarly, push/pull factors have also been used to investigate individuals' choice to stay or leave teaching either for other jobs (migration-model) (Føinum, Hansen, Lilletvedt, & Moltubakk, 2009) or for retirement (McGonagle, Fisher, Barnes-Farrell, & Grosch, 2015). In this literature, push factors usually constitute negative ones that deter people from wanting to stay on and make people escape teaching. In other words, they are pushed out. As mentioned, Norwegian researchers (Gjefsen & Gunnes, 2015; Mausesthaugen, 2013a; 2013b; 2013c; Skaalvik & Skaalvik, 2010; 2015; 2016; 2018), have focused on mainly push factors such as

increased stress levels, accountability policies, self-efficacy and job satisfaction. Pull factors, on the other hand, are factors that attract and make retirement or opportunities elsewhere more tempting.

Most of the following literature can in many ways be placed within the push/pull factor framework displayed in Figure 2.1. The pushing and pulling factors are not equal for individuals as the next chapter will examine. The intersection in the Venn diagram indicate processes teachers experience and evaluate before making quit-decisions which can be affected by both motivations to enter teaching as well as motivation to leave. Some teachers might be more pushed into teaching due to different values and motivation, which can affect adaptability of the transition from education to work, job-satisfaction and so on. Other teachers might feel more pushed out than others due to discontent etc. Some teachers might have, or feel they have more, opportunities than others, which also place career-choices within societal structures. Pulling factors are dependent on reactions to experiences in teaching, personal agency and perceived risks by changing careers. At the bottom, Figure 2.1 also display that some teachers might move through pushing/pulling factors relatively unaffected as they have determined from the outset to only try out teaching (Watt & Richardson, 2008).

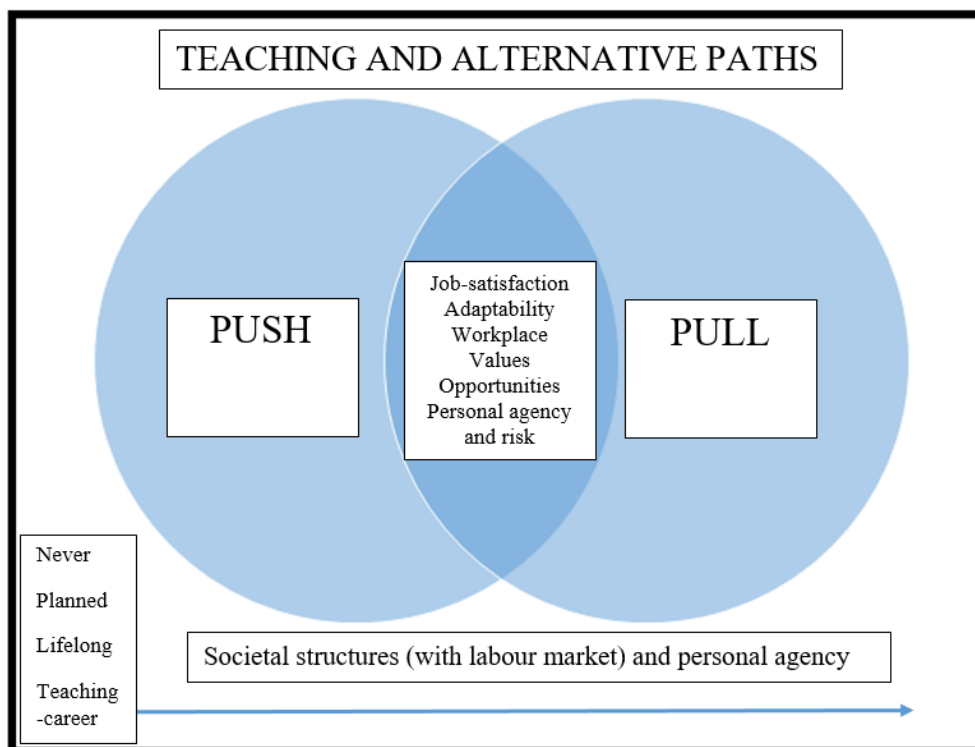


Figure 2.1: Career paths to and from teaching.

2.1 GENDER

Previous studies on teacher attrition have found different attrition rates between genders. Norwegian literature indicates a higher propensity to quit for men (Falch & Strøm, 2005, p. 623; With, 2017, p. 1730). Of the working population with school-oriented teaching degrees, 17.2% of women and 25.1% of men work outside the education sector (Perlic et al., 2019). Additionally, more women either find their way or stay in teaching than their male counterparts (Perlic et al., 2019). For almost all age groups, women were over-represented (Gunnes, Ekren & Steffensen, 2018). There seems to be disparities between men and women where more women enter and remain in teaching.

However, international literature point to higher attrition for women than for men (e.g. Borman & Dowling, 2008; Lindqvist et al., 2014; Murnane & Olsen, 1990; Murnane et al., 1988; Singer & Willett, 2003; Stinebrickner, 2002). Indeed, a meta-analysis on teacher demographics and attrition rates by Borman and Dowling (2008) found that the odds for women leaving were 1.3 times higher than for men. Research has found shortest teaching spells for young women (Murnane et al., 1988). Whereas international literature is not always comparable to the Norwegian context, and a lot of the American research consist of smaller (often State-wide) samples, the trend is still interesting for the intention and purposes of my thesis. Moreover, international research can help supplement the relatively sparse existing Norwegian literature.

2.1.1 Temporary attrition and return rates

Not only have women highest attrition rates they also have the highest return rates (Aamodt & Næsheim, 2019; Murnane et al., 1989). Many women, therefore, experience what has been coined as temporary attrition (Harris & Adams, 2007; R. M. Ingersoll, 2001; Lindqvist et al., 2014). Among teachers in North Carolina, the return rate to teaching was almost twice as high for women: 32% for women and 18% for men (Murnane et al., 1989, p. 342).

Stinebrickner (2002) only focus on female teachers and find 67% left teaching and the work-force altogether, but within five years after exiting teaching 33% had returned again. In Norway, the return rate after ten years for women (16%) is also higher than men's (10%) (Aamodt & Næsheim, 2019). Although return-trend might indicate that the gravity of teacher

shortages is not as severe as first assumed, there is still a need to fill these positions (if only temporarily). Temporary attrition ('revolving door'), moreover, disrupts the stability of staffing and the work-place environment (Ingersoll, 2001, p. 514).

2.1.2 Gender roles, societal expectations and associations

A reason for returning teachers (predominantly female) to come back is, according to some researchers, because women intentionally choose teaching due to gender roles and family-reasons. From a historical societal perspective; teaching was acceptable temporary line of work for women, because it was closely connected to a woman's "real career" of child rearing (Ingersoll, 2003, p. 18). Furthermore, today, the teaching-profession allows teachers to pursue child-rearing activities (Murnane et al., 1988; 1989; Watt & Richardson, 2008; With, 2016), because career-breaks or part-time employment do not penalise teachers with loss in status or reduced relative wages (With 2016, p. 42). In the US, changes in teachers' family situations and child-rearing activities are directly related to teacher attrition (Stinebrickner, 2002). In Australia, teachers with English speaking backgrounds, young and least likely to have children were most motivated to switch careers from teaching (Watt & Richardson, 2008). Family-reasons can explain both some of the temporary attrition rates and gendered selection into teaching. When multiple teaching spells are not considered, as in the case of this thesis, temporary attrition rates are not accounted for and family-rearing reasons can affect overall attrition rates. If teaching is especially appropriate for people who want to start a family; then the occupation might attract and retain some groups of people more than others.

Family-reasons are related to gendered occupational stereotypes, which also reflect society's perceptions of skills. An important aspect of teaching is the inter-personal bond with other people. The ability of establishing close relations between individuals are imperative to teachers, and is often referred to as 'soft skills' (DeArmond, Campbell, & Hill, 2018; R. Hong, 2016). However, according to Hong (2016), soft skills are normatively gendered to be feminine, which in turn, can partly explain why the occupation is female dominated. When comparing boys' and girls' career aspirations, gendered differences in occupational pathways were found to be affected by perceived occupational self-efficacy (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001). The soft-skills trait with the teaching profession with feminine

association might therefore somewhat restrict, constrain or steer perceptions of possibilities. The extent these structural constraints limits individuals have been contested, but it might still affect people (Gambetta, 1987, p. 13).

Moreover, men who choose teaching might also be more selected. The probability of men entering health/social care fields are much lower than for women (With, 2018, p. 172). Societal expectations, gender-segregation on the labour market with stereotypical occupations can thusly make men who choose teaching more selective. An Israeli-study argue that when men choose teaching they go against a sex-typical occupation, and when they leave teaching they move to male-dominated occupations (Addi-Raccah, 2005, p. 749). Individuals who go against expectations and prejudices, might be more motivated and have a stronger dedication to teach (Stinebrickner, 1998, p.131). The results are not unique for Israel (Addi-Raccah, 2005, p. 748). The public debate in Norway the past few decades have focused on equality between genders with increased female labour participation. However, the labour market can be regarded as being divided into gender-specific labour (Halrynjo & Teigen, 2016, p. 302). Thus, although Norway has been considered as being relatively equal between genders in terms of job participation, there is still a sex-segregated labour market where more women go into soft-skill professions such as social and health care (Teigen, 2006; With, 2016, p. 16). This segregation is also visible among the teachers who leave the profession. Excluding the 'leavers' who go to public administration, far more women go to professions that involves working with or for children (where soft-skills are required), whereas very few of their male counterparts follow this direction (Aamodt and Næsheim, 2019).

There are a few societal differences which must be considered between the international and Norwegian contexts. In Norway, both mothers and fathers have the right for subsidised parental leave. The leave is also flexible, where parents can choose whether they want a shorter leave with full compensation or a longer leave with reduced compensation (Mjaaland, 2018, p. 27). Furthermore, there is a trend in Norway to place children in nursery schools from the age of one (Bjørkli, 2018). In other words, the parental-leave system in Norway is quite generous, which can affect men and women's quit decision (Falch and Strøm, 2005, p. 623). Hence, the temporary attrition rate and the gendered selection into teaching might not be as pronounced in Norway as e.g. in the US. Consequently, teachers in Norway due to more

flexible opportunities, might be less likely to temporarily quit teaching to start a family, although they may have several teaching spells for other reasons. Significance of parental leave was also found in Sweden. Men had higher attrition rate, but once parental leave was taken into account, there was no longer any statistically significant differences between genders (Lindqvist et al., 2014)

Although the parental-leave system and the welfare state are important for women and equality on the labour market, there is also a need to focus on the labour market and economic conditions (Ellingsæter, 2016, p. 50). The view of female labour participation has changed, but there still exists some conflict for the female worker who has to juggle career and child-rearing (Ellingsæter, 2016, p. 49). Women, to a greater extent than men, feel obligated to balance the family's need which results in reduced full-time positions and more part-time work (Egeland and Drange, 2016, pp. 128,135). Hence, gender and gender roles are still factors for women's labour-participation. Gender roles and expectations as well as economic- and labour market conditions could place constraints on available and accessible opportunities for men and women, which in turn could affect attrition rates from teaching.

2.1.3 Career opportunities

Norway has experienced an increase in female labour participation the last decades from 45.6% in 1975 to 64.8% in 2018, which can affect attrition patterns (Statistics Norway/SSB, 2019a). Proportionally, the gap between working men and women in working-ages have decreased from 30.4% (1975) to 5.2% (2018), and hence today the proportion of working men and women in the work force are about the same (Hamre et al., 2018; SSB, 2019a). With (2018) finds a decline in social selectivity in teacher recruits that was more pronounced for women, and suggests that increased female labour participation and expansion of education open up for more women seeking and follow similar career patterns as men. Women might thusly seek other occupations either from the beginning due to ambitions (change in recruitment to teaching), or later on due to expanded opportunities (change in career paths from teaching).

Expansion of education can lead to more equality with an increased importance of human capital; credentials and performance (Goldthorpe, 2016). According to this theory, women

will have increasingly better opportunities on the labour market if they want to switch from teaching. On average, girls score significantly higher grade point averages (GPA) than boys (SSB, 2019b). Furthermore, the proportion of women attending university or university colleges are higher than the proportion of men, although this varies with higher educational level (Hamre et al., 2018). When only considering post-graduate degrees the proportion of men was slightly higher than for women. It is unclear what to expect. GPA has been considered a proxy for transferable skills and accumulated human capital (Borgen, 2010), and can be desirable traits for outside-of-teaching-professions. Women can therefore have an advantage on the labour market. Furthermore, higher grades are associated with higher attrition rates (Mastekaasa, 2011; Murnane et al., 1989; Murnane & Olsen, 1990).

On the other hand, post-graduate degrees signify higher cultural- and human capital and are also more sought after by other occupations in the labour market (Harris & Adams, 2007; With, 2017). Research show lower attrition patterns for general teacher education than teachers with PGCE, and lower attrition for bachelor's than master's graduates (Murnane et al., 1988; Harris & Adams, 2007; With, 2017).

There might also exist a difference in educational fields. The expansion of education is considered to have caused an inflation in credentials, and new distinctions of high-status education was formed based on educational fields (Askvik, 2015; Goldthorpe, 2016, p. 102; Helland, 2006; Helland & Wiborg, 2019; Strømme & Hansen, 2017; With, 2016). Bandura et al. (2001, pp. 194-196) finds more boys feel proficient and go into educational fields such as science and technology than girls. Teachers with science background are also shown to have the highest attrition rates (Murnane et al., 1988; Murnane et al, 1989). This might indicate that men can have a higher attrition rate than women. They might have higher transferable skills and therefore have higher alternative costs outside teaching.

Changing careers are dependent on opportunities, and not only a desire for switching to more male-dominated occupations and positions. Opportunities and opportunity costs might differ between genders. Changing occupation is not as easy, because it leads to changes to the status quo and individuals have limited ex-ante information about quality and alternative costs outside the one they are familiar with (Huizen & Alessie, 2016). Research has found that

more men will quit teaching, because they can expect higher returns, such as higher wages, in occupations outside teaching than women can (Falch & Strøm, 2005, p.623). Reversely women with a lower opportunity costs (lower expected return) might therefore face a greater risk by changing career paths. If the expected return is lower, then it might seem safer to stay in teaching. Opportunity risks can therefore reveal how some individuals are more or less inclined to risk job-switching. This is partly seen when society experience economic downturn, causes instability on the labour market and extrinsic values such as job-security becomes more important (Falch & Strøm, 2009; With, 2017).

2.1.4 Valuation of different job-values

Literature depicts a somewhat ambiguous picture of how genders value different forms of job-values. Occupational values are often categorised as extrinsic (e.g. job-security, prestige, income), intrinsic (value of importance of the work itself) or altruistic (e.g. help others, contribute to society) (Marini, Fan, Finley, & Beutel, 1996, p. 50). On the one hand, extrinsic values have been shown to mean more to men (Stinebrickner, 2001; Falch & Strøm, 2009). On the other; with educational expansion, women might be more interested in leader positions and care more about extrinsic rewards, such as wages (With, 2016, p.42). Lower wages might then increasingly affect women, and values among men and women can become more similar over time (Marini et al., 1996; Tolbert & Moen, 1998).

However, there seems to be a greater difference in valuation of intrinsic job-values between genders. Intrinsic values are more important to young women, than to young men when choosing occupations (Marini et al., 1996). Moreover, intrinsic values are the main reason for teachers to persist and continue in teaching (Watt & Richardson, 2008, p.423). Hence, if women value intrinsic and altruistic aspects of work, then this would affect both recruitment and attrition from teaching. There has further been differentiated different rewards for intrinsic work-values, and social rewards are shown to mean more to women than to men (Marini et al., 1996, pp. 50-51). Peer support (from colleagues, administration, parents and local community) and co-operation with induction and mentoring programmes mean more to female teachers, who overall feel less self-efficacy than men (Hancock & Scherff, 2010; Caspersen et al., 2014, Falch & Strøm, 2005).

Self-efficacy is also related to coping strategies and mechanisms. Differences in emotional coping strategies and self-efficacy is correlated with teachers' experiences and job-satisfaction (Jakhelln, 2011; Lee & van Vlack, 2018). Furthermore, coping-strategies and emotion-management are gendered (Olson et al., 2019). Women are found to embrace and use their emotions to connect with their students. Although they were more likely to care more for their students and invest more in their teacher identity, they also experienced greater distress and emotional exhaustion (Olson et al., 2019, p. 128,133). Male teacher were more able to emotionally distance themselves from students and issues at work, and use surface-acting strategies (Olson et al., 2019, p. 139). Emotional experiences and exhaustion affect teachers' motivation to leave teaching (Skaalvik & Skaalvik, 2011a, 2011b), and hence gendered coping-mechanisms can affect attrition for male and female teachers differently.

2.2 SOCIAL BACKGROUND

Educational choices and career-destination is often considered in class-theories to be affected by social origins (e.g. Borgen & Mastekaasa, 2018; Bourdieu, 1984; 1986; Breen & Goldthorpe, 1997; Hansen, 2005; Hansen & Mastekaasa, 2006; Helland, 2006; Helland & Wiborg, 2019; Lareau, 2002, 2003; Lareau & Weininger, 2003). According to class-theories, social background can influence and affect accumulation and the ability of accumulate different resources, or capitals. Briefly explained, economic capital is economic resources that can be invested for different expected returns, cultural capital is cultural resources (often regarded in terms of its institutionalised form of educational attainment and performance)⁴ and social capital is generated through social relations and creates different forms of network (Bourdieu, 1986, pp. 243-247). Economists have used human capital to describe accumulation of knowledge, skills and other traits that enable individuals to perform their labour efficiently (Becker, 1993). Accumulation of resources affect opportunities and aspirations on the labour market. Research have found higher attrition for teachers with more accumulated resources (e.g. Murnane et al., 1989; Ingersoll, 2001; With, 2017; Addi-Racah, Watt & Richardson, 2008). Moreover, some teachers never planned to stay in teaching their entire career, and used teaching as a stepping-stone for alternative careers with higher

⁴ Cultural capital is divided into three different forms; embodied, objectified and institutionalised. See the works of Bourdieu for more information.

expected returns (Addi-Raccah, 2005; Watt & Richardson, 2008). Teachers need both the motivation and the opportunity to switch careers (With, 2017, p.1726), and there might thusly be differences in attrition for teachers with different social backgrounds.

2.2.1 Sorting into teaching: attraction and retention

Some people might be more attracted to teaching which can result in a stricter form of sorting into the profession by means of self-selection and self-recruitment to teaching. According to class theories of relative risk aversion, people often choose an occupation that is either equal to their parents' or higher in socio-economic status to prevent downward mobility (Boudon, 1974; Breen & Goldthorpe, 1997). Research find people tend to follow in their parents' footsteps by occupational- or task following (Chen, Gordanier, & Ozturk, 2017; Laband & Lentz, 1983) or educational field-following (Helland & Wiborg, 2019; 2014). From a "pushed-from-behind-view" (Gambetta, 1987, p. 11), self-selection and occupational following can be understood as alternatives being delimited, and individuals might feel more inclined choosing a profession they are familiar with. From an economic stand-point, it is more cost-efficient choosing a familiar occupation (Chen et al., 2017, p. 2). Hence, children of teachers or from the cultural middle-classes might feel more inclined and comfortable choosing teaching than people from other backgrounds. Teacher recruits in Norway whose parents had higher educational levels were over-represented in the period 1975-2010 (With, 2018, p. 171).

Choosing teaching might be more cost-efficient if one or both parents have worked as teachers, because task following can be understood as the ability of acquiring occupation specific human capital from their parents (Chen et al., 2017, p. 16). This means that during upbringing, children of teachers are able to gain more insight and information about the teaching profession. From information, they might develop skills that enable them to be more prepared for the challenges that comes with being a teacher. Novice teachers often face a shock to the demands associated with the teaching profession and to the different school cultures (how the school is organised, collegial environment) (Hancock and Scherff, 2010; Hong, 2012; Caspersen et al., 2014). Acquiring occupation-specific human capital from parents might therefore enable individuals to better steer their way through occupational

challenges, and the initial shock of teaching might be lessened. In turn, this can strengthen their sense of self-efficacy and help them create a realistic professional teacher identity.

Professional identity and teaching identity is attributed to expectations of teachers' role, and will hence be dependent upon conceptions of teachers from the past often formed from narratives on their societal role (Dahl, 2016, p. 43). Narratives of teacher role will hence differ in terms of the individuals' social network. Having a parent who have been a teacher can help the novice teacher create a more realistic image of what it is to be a teacher. Hence, having a realistic image of what it is to be a teacher can thusly increase and improve self-efficacy (Watt et al., 2012), and guidance from experienced teachers can help with this (Hong, 2012). Self-efficacy refers to perceived ability of mastering the challenges, demands and expectations of an occupation (Bandura, 1986 in Caspersen et al., 2014, p.127), and higher sense of self-efficacy reduce risk of teacher attrition (Hong, 2012; Watt & Richardson, 2008).

Parents can also transfer taste, aspirations, preferences and values onto their children during upbringing. Economic literature refer to this as "intergenerational correlation of preferences" (Chen et al., 2014, p.3), and sociological literature consider this in terms of transfer of embodied cultural capital (Barone, 2006; Bourdieu, 1984; 1986). These preferences, ambitions and values can affect career-paths. Hence, teachers with teacher-parents could find intrinsic and altruistic values (such as working with children) more valuable than climbing a career ladder with higher economic rewards and social status. This can suggest a stronger sorting into teaching based on intrinsic values (formed during childhood), which again can affect attrition rates. Intrinsic and altruistic values are significant motivations for entering and remaining in teaching (Dahl et al, 2016; Watt & Richardson, 2008; Watt et al., 2012).

Appreciation for extrinsic values (such as status, income and security) have been shown to vary with socio-economic background. Historically, teaching has been used as a means for social mobility where men from lower social classes or women from higher social strata were more often recruited to teaching (With, 2018, p.165). More recent research find that job-security and income mean more to the working-classes and people from lower socio-economic-status (SES) backgrounds (Watt & Richardson, 2008, p.425; With, 2018, p.167).

Sorting and self-selection into teaching that can affect attrition rates due to transfer of knowledge, skills and values. These factors can be considered as push factors into teaching and affect individuals' adaptiveness and responses to the challenges they face as novice teachers. In accordance with this, With (2018) found an over-representation of teachers from cultural middle-classes in her sample of teacher recruits. If theories on cultural capital and task/occupational following hold true, then we would expect lower attrition rate for this group (teachers of teacher parents and can be placed in cultural middle-class).

2.2.2 Labour market prospects and structural constraints: significance of credentials

Job-security seems to be an important pushing factor for entering teaching, which is seen as attraction to teaching seem to increase with economic instability and downturn. Indeed, changes in labour market opportunities are found to affect attrition rates more than changes in intrinsic values and rewards (With, 2017, p.1738; Falch & Strøm, 2009). This can raise a concern in terms of social equality because with instability on the labour market competition among applicants increases. According to Bourdieu (1984) people from higher social strata position themselves more advantageously due to higher levels of cultural capital. Cultural capital can facilitate more information about educational returns in the labour market; which enable them to steer their career path and secure the "most attractive positions at any time" (With, 2018, p.176). Furthermore, individuals from families with more cultural capital score higher GPA which is beneficial for competitive entry requirements (Bakken, 2009b, pp. 9-10; With, 2018, p. 176). Teachers who opt to change careers with higher accumulated cultural capital will thusly have more advantages on the labour market. And it is more often teachers with in-demand educational qualifications and higher grades that leave teaching (Borman & Dowling, 2008; Murnane et al., 1989).

Considered through the lenses of a Structuralist view, people's actions are a result of what is possible for them due to external constraints, and not a result of choice which results in "people grabbing what they can" (Gambetta, 1987, p.8) and not picking what they want. Alone, this is view is insufficient because it ignores people's reasons for action and consider people have little to no choices (Gambetta, 1987, p.2). However, it still explains how external constraints can limit people's actions. Labour market conditions can put constraints on

occupational opportunities that exist for teachers who consider switching career path, and to varying degrees dependent on their accumulated resources. This would mean that we would see a difference in attrition rates based on educational attainment level and educational field (Borman & Dowling, 2008; Ingersoll, 2001; Murnane et al., 1989; With, 2016a).

With the expansion of education, credentials have become increasingly more important (Borgen, 2010; Bourdieu, 1996; Goldthorpe, 2016). Bourdieu (1996) argues that social inequality and social reproduction have remained relatively stable, but have changed from a family-oriented social reproduction to a reproduction based on education. This means that the differences between classes might be relatively stable, but that the effect of social background has changed from having a direct effect to having an increased indirect effect on destination (mediated through education) (Borgen, 2010, p. 18; Goldthorpe, 2016, p. 101). Moreover, expansion of education has created a shift of perceived educational prestige from higher educational level to new prestige-distinctions in educational fields. Educational inequality can therefore be reproduced with educational following (Helland, 2006; Helland & Wiborg, 2019; 2014). Certain educational fields and credentials will be more in-demand than others. Attrition rates among Norwegian teachers are shown to be higher among master graduates, and among teachers with PGCE (With, 2017). Murnane et al. (1988) found evidence of this back in the late 1980s in the US, where teachers pursued other occupations if they could expect greater financial rewards in their subject-specialty outside teaching. Chemistry, physics and biology teachers have been found to have the shortest teaching spell and least likely to return (Murnane et al., 1988; 1989).

Reproduction of educational inequality are also seen in terms of differences in grade point averages between classes (Bakken, 2009b). Children from families with higher cultural capital are found to get higher grade point averages than children from families with less cultural capital (mostly in the form of educational attainment) (Bourdieu, 1996; Bakken, 2009b). Higher grades can signal higher cognitive abilities, which again can give them advantages in the labour market (Borgen, 2010). This is consistent with findings that high-ability teachers with better qualifications are more likely to leave the profession (Stromquist, 2018; Murnane et al., 1989). Furthermore, career aspirations can be affected by perceived self-efficacy and academic performance (Bandura et al., 2001). Hence, career aspirations can

indirectly be affected by social origin via educational performance. Educational inequalities are also considered in terms of disposition theories, where abilities and aspirations are consequences of different forms of socialisation. Lower educational achievements of children from lower classes might be due to different valuation of education and higher education might not be considered as an option (With, 2016, p.35).

Structural constraints on the labour market can position individuals with different prospects, which can also vary with social backgrounds. Whether considering pushing factors or pulling factors that motivate teachers to leave, these factors will to varying degrees be influenced by the demands in the labour market and economic conditions in society. Moreover, as social background can affect educational choices and performance, some individuals will be able to position themselves more advantageously.

2.2.3 Aspiration and disposition theories: Motivation and aspiration as predictor for retention and attrition

Attractions to other occupations can be considered as a pulled-from-the-front view (Gambetta, 1987, p.16). Moreover, Gambetta (1987) argue that individuals sometimes plan their career course, which can result in career switches. Similarly, Watt and Richardson (2008) finds that the groups called “highly engaged switchers” and “lower engaged persisters” have from the outset planned to try out teaching, but do not think of it as a life-long career. Individuals in these groups are motivated to try out new and different things, and sometimes think they will outgrow the profession for interest in new challenges (Watt & Richardson, 2008, p.418). Hence, teachers are not only passive in their career paths where they are forced out due to external pressures. Some teachers take control of their careers and actively choose a different occupation (Smith & Ulvik, 2017). Similar to Watt and Richardson, Smith and Ulvik (2017) find in their qualitative research that the teachers enjoyed teaching and were considered as successful and respected. However, teaching was not enough and could not fulfil all of their needs. They had to seek new challenges, opting to leave their secure job (Smith & Ulvik, 2017, p.941). For some individuals climbing the career ladder offer different and meaningful professional challenges than teaching can offer. Teaching can be considered as a flat profession with no career ladder to climb, other than leadership-positions as principals or head of departments (Smith & Ulvik, 2017). Hence, for

people seeking to climb a career ladder teaching cannot provide this, and these people need to seek this possibility elsewhere.

Transfer of values can affect teacher groups from different social background differently. It was proposed earlier that parents could transfer valuation of different job-values, aspirations, ambitions and preferences onto their children (Barone, 2006; Bourdieu & Passeron, 1990; Gambetta, 1987; Chen et al., 2017). This can be understood in terms of disposition theories, where differences in skills and aspirations are consequences of different socialisation processes (With, 2016, p.35). Teachers who were more likely to consider teaching as a life-long career and intended to a larger extent to spend their entire working-life as a teacher, more often came from lower SES backgrounds and scored highest in terms of intrinsic values (Watt & Richardson, 2008, p.425).

On the other hand, extrinsic values such as income, social status and climbing a career ladder might be more important for teachers coming from more affluent backgrounds (Watt & Richardson, 2008, p.425). These individuals might more often use teaching as a fall-back career or a stepping stone by accumulating human capital for more financially rewarding occupations (Addi-Raccah, 2005; Watt & Richardson, 2008; With, 2016). Albeit crossing professional disciplines from their parents, teachers from families with higher economic capital might value extrinsic values such as higher social status and income more than others and feel more pulled out of the profession. It may be unrealistic to expect teachers to remain in teaching their entire career (Watt & Richardson, 2008) and teaching can be considered as an exploratory profession (Rinke 2008 in Smith & Ulvik, 2017, p.941).

Teacher attrition have been understood as a sign of teachers' lack of resilience (Smith & Ulvik, 2017). Hence, teacher attrition is not only caused by teachers being pushed out of the occupation, but they are also active agents who choose and plan their career paths (Gambetta, 1987; Smith & Ulvik, 2017; Watt & Richardson, 2008). Moreover, some individuals might be more pulled in a different career-direction which can either have been the plan from the outset or as a result of disaffection to teaching (Watt & Richardson, 2008). In the same way people from the cultural middle-classes might transfer altruistic and intrinsic values that increase their likelihood to stay in teaching, people from professional and economic classes

might be more pulled to a different career path using teaching as a springboard or stepping stone for entering more rewarding occupations (Addi-Raccah, 2005; Watt & Richardson, 2008; Smith & Ulvik, 2017). Teachers from families that posit more professional and economic capital might therefore have higher attrition rates.

2.2.4 Risk aversion and opportunity costs

Different forms of capitals can, as mentioned, promote advantages in the labour market which creates different opportunity costs. In turn, this might influence choices for staying/leaving teaching. Opportunity cost is the cost of the best alternative that an individual did not choose (Greenberg & Spiller, 2015). Individuals will often weigh the alternative they took against the best option they did not take (Greenberg & Spiller, 2016), and from this make as best of an informed decision as possible. And as Huizen and Alessie (2016) argue, changing occupations will always be risky because information about other occupations differ in terms of resources and access to information. Opportunity risks will vary with access and accumulation of resources, as well as expected return in opportunity costs.

Previously, it was proposed that cultural capital can affect career choices and enable individuals to make more informed choices. They are more familiar with educational returns and can therefore steer themselves more advantageously in the labour market. Information and credentials can facilitate a smoother process in planning career-paths, and therefore decrease the risk associated with job mobility. Risk averse people are less likely to change jobs (Huizen & Alessie, 2016), but information about other occupations and being more confident in own abilities might alter perceived risk.

Additionally, they are more likely to acquire more coveted traits, such as higher grades and desired educational fields (e.g. With, 2017; 2018; Bourdieu, 1984). Watt and Richardson suggest that holding higher levels of qualifications can make people more aware of “the opportunities [that are] available to them in other fields” (2008, p.412). In Norway, educational attainment level in combination with higher GPA increase the risk of leaving teaching (With, 2017, p.1734). Educational level and performance have been discussed as being desirable traits on the labour market. Hence, opportunity costs and risks are dependent on labour market conditions and the extent teacher-specific human capital is transferable to

other types of employment (Harris & Adams, 2007). Having a PGCE might offer more transferable human capital to other professions, and teachers with general teacher education are least likely to leave (With, 2017). Krejsler calls highly educated teachers for ‘competence nomads’ (Smith & Ulvik, 2017, p. 931). Teachers can use their class-room experiences and are suitable leaders (Smith & Ulvik, 2017). Perlic et al. (2019) found that among leavers, most went to work in public administrations and health- and social services. Teachers with in-demand credentials and experience might therefore be able to find job-opportunities in occupation that require similar human capital to teaching. With a grander social network, job-switchers might have more access to information about job-opportunities and job-openings.

Social capital was explained as creating different forms of network through relations. Individuals can use these network to gain precedence on the labour market. Social networks are not equally distributed between classes (Borgen, 2010, p.26), which enables certain individuals to use these networks more often than others as an information channel. Networks are not only information channels. In terms of occupational following, Chen et al. (2017) refers to this mechanism as nepotism. Although nepotism and family networks do not guarantee job offers, they do still offer advantages to these individuals which again reduce risk of job-mobility. Furthermore, job-seekers are not the only ones who use networks as an information channel. Employers can use networks as a way of screening candidates who are more likely to be better suited for the tasks and for the work-environment (Borgen, 2010, p.26).

Switching careers from teaching might not be conceived as risky if this is a planned course of actions. This would make switching job from teaching a necessary step. Hence, being pulled in a different direction might not be risky if they have set their eyes on other professions already from the outset. Their values of trying out different occupations and wanting to continuously challenge themselves in different professional directions (Watt & Richardson, 2008) includes risks. These individuals might not weigh risks of changing career-paths as other teachers with different values. This can partly be supported by Watt and Richardson (2008) who, as mentioned, found that leavers had planned from the outset to leave.

Risks associated with leaving teaching for other jobs might vary with labour market demands, credentials, accumulated transferable human capital and social capital. Possessing these advantages, individuals' opportunity costs might outweigh potential risks of leaving teaching. Moreover, some individuals might not perceive changing careers as risky if this has been part of their career-plans.

2.2.5 Organisational- and work-environment differences

Teachers of different class backgrounds may be unevenly distributed in schools, and school effects may accordingly explain some of the differences in attrition by class background. Studies from the US have found that organisational differences such as low salaries, lack of support from school administrators and colleagues, discipline problems, poor student motivation and teachers' lack of influence over decision-making affects motivations to stay in the profession and push teachers out of the profession (Ingersoll, 2003; Ingersoll & May, 2012).

Organisational differences can derive from the structure of the educational system in Norway. Compulsory schools are the local government's responsibility (Falch and Strøm, 2005) and how educational policies are interpreted and carried out are both dependent on the local authorities as well as the administrations at the different schools (Malkenes, 2014; Prøitz, Mausethagen, & Skedsmo, 2019; Solstad & Thelin, 2006). The most notable difference is probably how schools in Oslo are organised compared to the other schools in Norway. The Oslo-schools work as an example and set guidelines for educational development for schools in Norway, which includes more external control, accountability policies and measurable/quantifiable management regimes (Malkenes, 2014, p.122). In addition, the labour market in Oslo might have more options for teachers who want to change or escape from teaching. Advantages with social background and labour market opportunities have been discussed previously. School-differences and location might explain differences in attrition for social background groups.

'Influence over decision-making', or 'autonomy', can thusly vary between schools and municipalities. Autonomy is associated with job-satisfaction because it entails teachers' room for professional development, construction of pedagogical integrity and forming their own

professional identity (Mausethagen, 2013c; Smith & Ulvik, 2017). Hence, autonomy and teacher identity can be linked to what I have previously discussed about realistic expectations to the teaching profession, preparedness and knowledge about the profession, which might play out differently depending on existing knowledge and insight to the occupation. On the other hand, it is conceivable that with increased education level and experience individuals install a professional integrity, pride and sense of entitlement that makes it harder to accept restrictions to autonomy. Mausethagen (2013c) finds differences in responses and legitimisation of accountability policies among beginning and experienced teachers.

Differences in support from peers, administration and local community can contribute to differences in attrition rates between schools. Induction and mentoring programmes encourage a collaborative environment for teachers, and collaboration and peer-support can increase feelings of self-efficacy (Caspersen et al., 2014; Hancock and Scherff, 2010). Furthermore, administrative support are seen to be significant factors for teachers' feeling of appreciation and feeling of having some level of autonomy in deciding pedagogical strategies that conform with their teaching integrity. Support is important for all teachers, but might mean more to individuals who are more unfamiliar with the teaching profession, with fewer resources and less access to information about the teaching profession.

On a slightly different note, but in terms of peer-support, it might be that individuals with similar background stick more together. There might exist a work-place segregation between certified and uncertified teachers in Norway, where attrition for tenured certified teachers increase with higher proportions of uncertified teachers (Falch & Strøm, 2005, p.617). According to Becker's (1971) discrimination theory, individuals want to work with others who are similar to themselves (Falch & Strøm, 2005, p.617). This can also be understood through Bourdieu's (1986) theory of cultural capital. Through embodied cultural capital, teachers might exhibit a form of life-style, world-view and preferences that distinguish them from others, and thusly making them a more homogenous group. Although student- and teacher composition might predict different attrition rates between schools for different types of teachers, Falch and Strøm (2005, p.624) caution against interpreting this as a pure discrimination effect. There might be other reasons for the associations, such as unmeasured

background factors or that the compositional factors work as proxy for something else (Falch and Strøm, 2005, p.624).

2.3 MINORITY BACKGROUND

It was suggested in the introductory chapter that cultural and ethnic diversity are important as teachers serve as role-models (Perlic & Foss, 2019; Kalmijn & Kraaykamp, 1996; Karunanayake & Nauta, 2004; Holt & Gershenson, 2015; Spernes, 2014). However, as Sleeter and Thao (2007, p.6) argue; despite focus on student diversity, there has been little focus on teacher diversity. There is also a discrepancy between proportion of children and teachers with minority backgrounds in schools. Whereas children with immigrant background make up 17% of the student population, less than 7% of teachers have immigrant backgrounds (Perlic & Foss, 2019). The low number of teachers with an immigrant background also suggest why there is little literature in the field of teacher attrition and ethnic background, as research have excluded teachers with minority background because this group is sometimes too small to study quantitatively (Murnane et al., 1988, p.25; Murnane et al., 1989, p.330; With, 2018, p.168; 2016, p.10; Sohn, 2009, p.3).

This sub-chapter aims to present the literature that exist on teacher attrition and ethnicity. Ethnicity, however, is not used in the same way across research fields and countries, and I will therefore mix literature on “race”, “ethnicity”, “native speakers” and minority background. Although these terms are coiled differently, they still entail telling a story of a group that is separate from the majority culturally and/or ethnically, which is one of the aims for this thesis. For simplicity’s sake, I will hereupon use the term ‘minority background’ as a commonality to all of the above terms.

2.3.1 Minority has lower risk of leaving, but not everything is black and white

Differences in attrition rates and attrition risks between majority and minority groups are found in international research from the US, Australia and Israel, where minorities are less likely to quit teaching (Addi-Raccah, 2005, pp.746-747; Borman & Dowling, 2008, p.385 Hancock & Scherff, 2010, p.333; Scafidi, Sjoquist & Stinebrickner, 2007, pp.7,10; Watt & Richardson, 2008, p.425). In the US, White teachers were found to have significantly shorter

duration in teaching than their Black colleagues (Murnane et al, 1989). And White teachers were 1.36 times more likely to leave the occupation than their non-White colleagues (Borman & Dowling, 2008, p.385). A possible factor that is often mentioned in many of these articles concerns ethnic minorities' prospects, opportunities and aspirations (Addi-Raccah, 2005; Hancock & Scherff, 2010; Watt & Richardson, 2008). In Norway, Immigrants have the highest proportion of individuals with only compulsory education (Olsen, 2018, p. 40). As explained in previous section on social background, this might generate different opportunities on the labour market. However, teacher attrition for minority groups might be more complex and deviate from the majority, as Murnane et al. (1989, p.330) find black teachers respond to factors differently and have different career-paths from the majority. Push- and pull factors might work differently for minorities.

2.3.2 Selection into teaching

The previous chapter considered self-selection to teaching by teachers from cultural middle-classes to affect both recruitment and attrition patterns. Chen et al. find that there is an intergenerational correlation of skills (or task-following) for both whites and blacks, but it is more common for whites (2017, p.5). From a Norwegian context, some minority teachers have reported to choose teaching because their fathers had worked as teachers and promoted teacher education as a smart educational choice (Spernes, 2014, p. 22). However, the low number of teachers with minority background might be a result of already few minority teachers, and hence fewer role-models to follow (Spernes, 2014). Hence, occupational and task following might not be applicable to the same extent for some minority groups.

Another explanation to selection into teaching among minorities could be that socialisation processes affect perceived occupational self-efficacy and aspirations (Bandura et al, 2001; Orupabo, 2014), which in turn might discourage them from wanting to become teachers. This is evident in Spernes' research (2014) where only *one* of the informants had been encouraged to consider teaching from guidance counsellors and teachers during school-years. Negative experiences such as generalisation, stigmatisation, lack of recognition of cultural background and teachers with minority background being ridiculed by pupils contributed to a negative view of schools as an ideal work-place (Spernes, 2014, p.20-22).

Socialisation processes are also considered in Social Cognitive Career Theory, where individuals' career paths can be interfered by perceived educational- and career barriers, despite high levels of self-efficacy and educational performance (Raque-Bogdan and Lucas, 2016, p.250; Orupabo, 2014, p.161). These barriers can be socially deemed gender-appropriated educational choices (Reisel, 2014, p.119), prioritisation and preferences and exclusion and discrimination processes (Reisel, 2014, p.145). By example, educational fields are more gendered for students with immigrant background, where boys are twice as likely as girls to enter educational fields such as mathematics and natural sciences (Schou, 2009, p.112-113). Proportionally among girls, however, girls with immigrant background more often choose atypical educational fields than Norwegian girls do (Schou, 2009), and particularly children of immigrants make more ambitious educational choices (Mastekaasa & Birkelund, 2009; Spernes, 2014). Hence, although immigrants might to a larger degree choose more atypical and ambitious educational fields, overall within the group there might exist more pronounced gender-differences.

Gender-differences in teacher attrition have already been explored, and one reason that was mentioned was child-rearing. Women in general self-realise their potential in terms of accumulated human capital to a lesser extent than men (Halrynjo and Teigen, 2016, p.300), and more often have to make career compromises to suit the family's need. And if gender-differences are more pronounced among minorities then this might affect their aspirations and intentions of choosing and remaining in teaching.

2.3.3 Differences in opportunities

If minority teachers have lower attrition rates than the majority group of Norwegians, then this might be explained by differences in opportunities. In Norway, it is well documented that immigrants or children of immigrants score lower GPA than children with native-Norwegian parents (Mastekaasa & Birkelund, 2009, p.221; Bakken, 2009b, p.48). On the other hand, descendants of non-western immigrant parents are proportionally higher represented in higher education than both the majority (native-Norwegians) and immigrants (Kolby & Østhus, 2009, p.137). Addi-Racah (2005) finds that Israeli teachers from privileged social- and ethnic backgrounds are more likely to leave teaching for other jobs with higher economic and status rewards. These individuals had also accumulated more human capital and higher

education, which made them more attractive on the labour market. Similarly, Watt and Richardson (2008) find that among Australian teachers, “switchers” were more likely to have majority background. As mentioned, many of these teachers had different career-aspirations and used teaching as a stepping-stone (Watt & Richardson, 2008, p.425). Minority teachers might therefore have other prospects on the labour market, as well as different career-aspirations than teachers with majority-background.

The difference in educational performance cannot be explained by socio-economic status background, but rather in terms of social capital and cultural capital where individuals lack access to Norwegian-specific cultural resources (Kolby & Østhus, 2009). Norwegian-specific human capital means resources and knowledge specific to Norway (Drange, 2009, p.166). These are innate for children to native-Norwegians. For immigrants these resources will be accumulated over time. Children of immigrants will have a good understanding and knowledge about Norway, its culture and society. However, it might still not fully compensate for differences that arise from parents’ contributions to children’s education, social and societal understanding (Drange, 2009, p.166). Differences in terms of country-specific human capital can be formed if employers value these informal resources, which in turn can create stereotypes and discrimination.

2.3.4 Discrimination: opportunities *ceteris paribus*

After accounting for own education, parents’ education, residential area and other controls, there are still differences in job opportunities between children of immigrants and children of native-Norwegians in favour of the majority. The researchers propose factors such as discrimination and limited social network can contribute to persistence of group-differences in education to labour transitions (Birkelund, Lillehagen, Ekre, & Ugreninov, 2014; Evensen, 2009; Midtbøen, 2014, p.178). In short, discrimination centres around actions that reflect a general aversion to hire ethnic minorities (Midtbøen, 2014, p.178). Minority women were to a lesser degree than minority men discriminated against during hiring-processes and discrimination was biggest and most apparent in the private sector (Midtbøen, 2014, p.174-178). Relating back to teacher attrition, the relative risk of changing occupations could be higher for minorities, and even more so for men. A lower attrition for minorities could suggest a more difficult labour market for individuals with minority backgrounds. A final

note should be made for municipality-differences, as Evensen (2009) finds that children of non-western immigrants have generally poorer prospects than the majority population on the labour market, except for in Oslo. This might be explained by a denser immigrant population in Oslo and different demand in the labour market (Evensen, 2009, p.189).

Discrimination might deter minority teachers from leave teaching, but discrimination at the work-place or during teacher training can also deter or push minority teachers out of teaching. The most common type of discrimination in countries such as Sweden and the UK are discrimination due to teachers' ethnicity (Stromquist, 2018, p.23). Despite efforts of promoting diversity in the US, teacher diversity itself increases the risk of leaving (Sohn, 2009, p.18), which is similar to the discrimination theory by Becker (1971) previously discussed in the social background-section. Discrimination is consistent with Spernes' research (2014) that find many of the teacher students have had negative experiences with school, and witnessed ridiculing of their teachers. Due to negative experiences, these individuals must be especially motivated and have a particular interest in the teaching profession (Spernes, 2014, p. 22). Moreover, if Becker's (1971) discrimination theory holds true (Falch & Strøm, 2005, p.617), then this might affect the social support from peers, administration and parents. And support is important for teachers in strengthening their level of self-efficacy and reduce apathy towards teaching (Hancock and Scherff, 2010, p.333, 335).

However, although Scafidi et al (2007, p.15) find that black teachers are less likely to leave minority schools than white teachers, they argue that their results represents more than racial bias. They propose one omitted school variable that might explain difference in attrition rates. The demographic area of black schools and distance to majority/minority background teachers might explain differences in attrition, as white teachers might leave further away from these schools than black teachers (Scafidi et al., 2007, p.15). If this is the case, then this could reflect more segregated neighbourhoods in Norway.

2.3.5 Gender roles and values

Although women might experience less discrimination in hiring processes, there exist cultural stereotypes that can affect women's choices in terms of labour participation and occupational choices (Orupabo, 2014; Drange, 2009). Full-time work for immigrant women are most

common right after graduation and then declines (Drange, 2009, p.163-176). Although it could be that the institutional organisation of the labour market or employers hiring decisions affect full-time work, it could also be due to employee's values (Drange, 2009, p.176-177). Systematic differences in labour participation could be a result of minority women's own preferences, wishes or expectations. Having children is more significant for working part-time for immigrant women than women with majority background (Brekke and Mastekaasa (2008) in Drange, 2009). Hence, child-rearing reasons might be even more important for minority women, which again can affect attrition rates.

In Israel, Addi-Raccah finds that female teachers with minority backgrounds are most likely to quit teaching and the labour force altogether (Addi-Raccah, 2005, p.745). She argues that this might be due to cultural reasons, as Arab women forego their jobs to men and child-rearing (Addi-Raccah, 2005, pp.745-746). As explored in the gender-section of this chapter, similar tendencies might be present also in Norway. As mentioned, Ellingsæter (2016, p.49) finds that there still exists conflict among women who need to balance career and child-rearing, and this might also be present for minority women. A higher attrition rate for minority women might indicate differences in values and appraisal of traditional family values. For Pakistani-women in Norway, their labour participation and income is perceived in mainly four different ways, where two-income party challenge the male-provider idea. Only one of the perspectives concern self-realisation and the three others is considered in terms of family-needs and complementary to the male-provider (Nadim, 2016, p.157).

Minority teachers might also have different altruistic values than the majority, which could affect both retention and attrition rates for minorities. Teachers of colour in the US were more likely to stay in schools that often were attributed conditions that made teacher-retention more difficult, than their colleagues with majority background (Achinstein et al., 2010 in Hancock and Scherff, 2010, p.333). The lower attrition rate for minorities is explained by Achinstein et al. (2010) as being ascribed from their "humanistic commitments", where helping low-income students of colour (sometimes like themselves) meant a lot. They were therefore less affected by negative conditions, climate and culture at the school (Hancock and Scherff, 2010, p.333). Social psychology proposes theory of similarity/attraction (Sohn, 2009); where individuals are attracted to work with people who resemble themselves (similar

to Becker's discrimination theory) to explain differences in attrition patterns. Hence, school-differences could affect attrition patterns which could indicate differences in humanistic commitments or a wish to work with people similar to oneself.

2.3.6 Cultural differences

There are cultural differences between majority and minority groups, as well as within minority groups. Socio-cultural contexts often matter in terms of appreciation and evaluation of extrinsic values. International studies have shown that sociocultural context matters, and that in less industrialised countries extrinsic values (such as income, job-security and status) are highly valued for choosing teaching (Watt & Richardson, 2008, p.409; Watt et al., 2012, p.792). Hence, attraction to teaching might depend on their country of origin, and attraction and attrition might differ within minority groups.

Children of first-generation Norwegians/immigrants are a heterogeneous group⁵, and Mastekaasa and Birkelund (2009, p.226-227) caution future researchers to treat this group as one big homogenous group. Even within a minority groups such as Asian-American there are big within differences, as the group is "incredibly diverse" (Lee, 2006, p.24). There might therefore exist great disparities between immigrants, immigrant-parents and their formal education level. Although it would have been ideal to categorise teachers according to their country of origin, due to small number of observations for different groups this cannot be done in this study. The heterogeneous aspect of minority background groups are still an important aspect, and is kept in mind when discussing the results.

⁵By example: children to Vietnamese-born parents are least likely to drop out from secondary-schools, while children of immigrants from e.g. Pakistan or Chile are more likely than the majority to drop out. Children of immigrants from e.g. India, Vietnam, or Iran who study in Norway, are also more likely to choose studies in health-professions, mathematics and natural sciences (Mastekaasa & Birkelund, 2009, p.227).

3 DATA AND METHOD

This chapter explains the construction of data and application of method. It has three parts, where the first examines the form of data, the second looks at the operationalisation of variables and the third examines the methods used to answer the research questions. The chapter has two functions. The first is to shed light on how the variables were prepared and hence how the results should be understood. The second is to promote transparency, which is important for replication and validity in research (Miguel et al., 2014).

3.1 DATA

Register data

The data is provided by Statistics Norway (SSB), and are comprised of data from official administrative registers. There are several registers in Norway. By example; information on education is recorded in educational registers, employment in employer/employee registers, and birth, deaths marriage, divorce, and migrations in the population registers (Lyngstad & Skardhamar, 2011, p. 614). Every resident is given a personal identification number (PIN), and this allows for possibilities of combining information from several of these registers (Lyngstad and Skardhamar, 2011). In terms of this thesis, register data provides detailed registered information on teachers, as well as providing a sample of an entire teacher population for a given period. And as Lyngstad and Skardhamar assert “the enormous scale of the data makes the register system a useful source for descriptive statistics” (2011, p.627). Register data is ideal for describing a population’s behaviour in answering *what* type of questions (Raaum, Røed, & Bratsberg, 2012). The sheer size of register data; covering an entire population also limits, if not removes, concerns over representativity (Lyngstad and Skardhamar, 2011).

Another feature of register data is that the registers are updated on a regular basis, which gives data on a “virtually continuous timeline in longitudinal data sets (Lyngstad and Skardhamar, 2011, p.613). In simpler terms; individuals can be followed over time (Raaum et

al, 2012), which is essential to study teacher attrition. The data set constructed for this thesis also follows individuals over time. It is not longitudinal in the conventional sense (giving a timeline for consecutive years), but follows individuals based on their career-years.

The analysis sample

The original sample consisted of 40485 teachers before any operations were executed. The sample consist of newly qualified teachers who are employed in schools for their first time in the period 2003 to 2013. After operationalisation of variables 30280 teachers remained. Exclusions of teachers will be explained throughout this chapter in consecutive order.

The focus of my thesis is on early career teachers at the beginning of their working careers. Most people will start their careers before they have turned 30, (SSB, 2019c). Thus, I have excluded teachers in the sample born in- or before 1968, as they are 35 years old or older in 2003.

An important distinction in this sample, as well as my thesis, is who are characterised as teachers. Teachers in this sample are newly qualified teachers with a teaching degree who are employed at a compulsory school for the first time. Table 3.1 displays descriptive traits of the sample for independent and control variables. From this we learn about the compositional traits of teachers in the sample; or who the teachers are. The composition of the sample is important for the broader picture. If certain groups experience a difference in attrition, then the total attrition must be understood from the compositional characteristics of the teaching population. The proportional distribution is given by the ‘mean’.

Table 3.1: Summative descriptive statistics of the independent variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Gender					
Female	30280	.7468296	.4348349	0	1
Social background					
Cultural Upper	30280	.0206077	.1420692	0	1
Professional Upper	30280	.0406539	.1974904	0	1
Economic Upper	30280	.0348085	.1832974	0	1
Cultural Upper-Middle	30280	.1532034	.3601894	0	1
Professional Upper-Middle	30280	.1632100	.3695633	0	1
Economic Upper-Middle	30280	.0734148	.2608205	0	1
Cultural Lower-Middle	30280	.0326288	.1776660	0	1
Professional Lower-Middle	30280	.1045905	.3060301	0	1
Economic Lower-Middle	30280	.0685271	.2526524	0	1
Skilled workers	30280	.1192206	.3240533	0	1
Unskilled, semi-skilled workers	30280	.0723910	.2591385	0	1
Farmers, Fishermen, Foresters	30280	.0083884	.0912046	0	1
Welfare, Transference	30280	.0666446	.2494097	0	1
Missing	30280	.0417107	.1999306	0	1
Immigrant background					
Born_Norwegian	30280	.8955416	.3058593	0	1
Immigrant	30280	.0512880	.2205881	0	1
Norwegian ties	30280	.0531704	.2243769	0	1
Educational achievement level year 0					
Bachelor's degree	30280	.9305482	.254225	0	1
Master's degree	30280	.0694518	.254225	0	1
Grade Point Average (GPA)					
GPA	16890	40.02946	5.663677	20	60
Income					
Sum personal income year 0	27135	187447.1	90935.69	0	844868.8
Sum personal income year 1	24283	250627.7	81993.19	0	875099.4
Sum personal income year 5	12415	296867.5	78486.83	0	1098935.0

The mean for female in table 3.1 is 0.75, which means that female teachers make up 75% of the teaching population in this sample. For social background; the biggest group is ‘professional upper-middle’ class and makes up 16% of the variable. The categories with lowest frequency in this variable is ‘Farmers, Fishermen, Foresters’ and ‘Cultural upper’ who make up 0.8% and 2% respectively. Not surprisingly, the majority of the teachers do not have an immigrant background as about 90% are born in Norway to Norwegian-born parents. Furthermore, the majority of 93% have obtained an undergraduate degree which supports previous research that the majority of teachers have completed a GTE.

Another aspect of sample composition depicted in Table 3.1 is the number of observations for each group. The size of the groups is important to bear in mind when interpreting results because too few observations will create a higher standard error (S.E) and less precise estimates. To meet this challenge, I have recoded variables to make broader categories

(further described under operationalization below). Less precision of estimates will make it more difficult to say with certainty whether there are differences in attrition rates among different groups, for example among teachers with different immigrant background. At the beginning of teaching career, teachers with immigrant background consist of 5% of the sample, which equals to about 1553 observations. This means that I do not have the power to separate between immigrants from different regions or countries, as further division of this immigrant group gives less precise estimates and increases the risk of chance-findings.

Furthermore, the number of observations (N) are not the same for all variables. For time-constant variables such as gender, social background and immigrant background, the N is constant with 30280 observations. The number of observations with information on grade point average from upper secondary school (GPA), however, is only half that of the other variables. Personal income is a time-varying variable because income increases with seniority. Number of observations decreases with time, and so does the number of observations for registered income. The varying number of observations will be further explained and described under operationalisation of variables in the next section.

3.2 OPERATIONALISATION AND DESCRIPTIVE STATISTICS OF VARIABLES

3.2.1 The dependent variable

I measure teacher attrition annually for a period of ten years from 2003 to 2013. The dependent variable is called 'attrition' and is given for each observational year 0 through 10. The variable takes the values of 0 for 'stayers' (i.e. no change), and 1 for 'leavers' (i.e. a change in employment status within a given year since first employment).

The easiest way is to consider the attrition variables as a length of registered employment. Attrition0 includes all teachers who have just started teaching at a compulsory school sometime between 2003 and 2013, and is the teachers' very start in teaching. Attrition1 gives average attrition rate of all teachers observed for 1 entire year, attrition3; for all teachers observed for 3 entire years and so on.

A person could potentially be observed in several attrition years. If a person has been observed for 8 years, the data set is constructed such that s(he) will be included in every year up until year 8. However, because these teachers has not worked for more than 8 years, (s)he

will have missing values for the remaining time period. Hence, the number of missing values will increase over time. As stated, the variable is binary coded. By example; a person employed in 2003, and who remains employed at a school the entire 10 years observation time-period, will have the value of 0 for all attrition years. A newly qualified teacher who leaves after one year will have the value of 0 the first year (attrition1) and then take the value of 1 for the remaining observation period. The decrease in the number of observations, then, are not due to attrition; where people are dropped from the sample once they leave the profession (as is normal for event-history analysis, see Singer & Willett, 2003). The decrease in number is based on how long the teachers were observed for. And hence, the proportion of those taking the value 1 will increase over time.

Table 3.2 Descriptive statistics of dependent variable “attrition” for all observed years 1–10

Variable	Obs	Mean	Std. Dev.	Min	Max
Attrition0	30280	0	0	0	0
Attrition1	27304	.1303106	.336651	0	1
Attrition2	24441	.2312508	.421641	0	1
Attrition3	21305	.2904483	.4539799	0	1
Attrition4	18359	.3348766	.4719602	0	1
Attrition5	15450	.3662136	.4817844	0	1
Attrition6	12474	.3895302	.4876633	0	1
Attrition7	9526	.4157044	.4928689	0	1
Attrition8	6662	.4377064	.4961416	0	1
Attrition9	4347	.4628479	.4986752	0	1
Attrition10	1956	.5086912	.5000523	0	1

The increase of proportion of leavers is displayed in Table 3.2. The mean gives the share of teachers taking the value one; a change in employment status within a given year since first employment. First employment is given by attrition0. The table shows that after one year in teaching (attrition1), 13% have left the profession, and 23% have left after two years (attrition2).

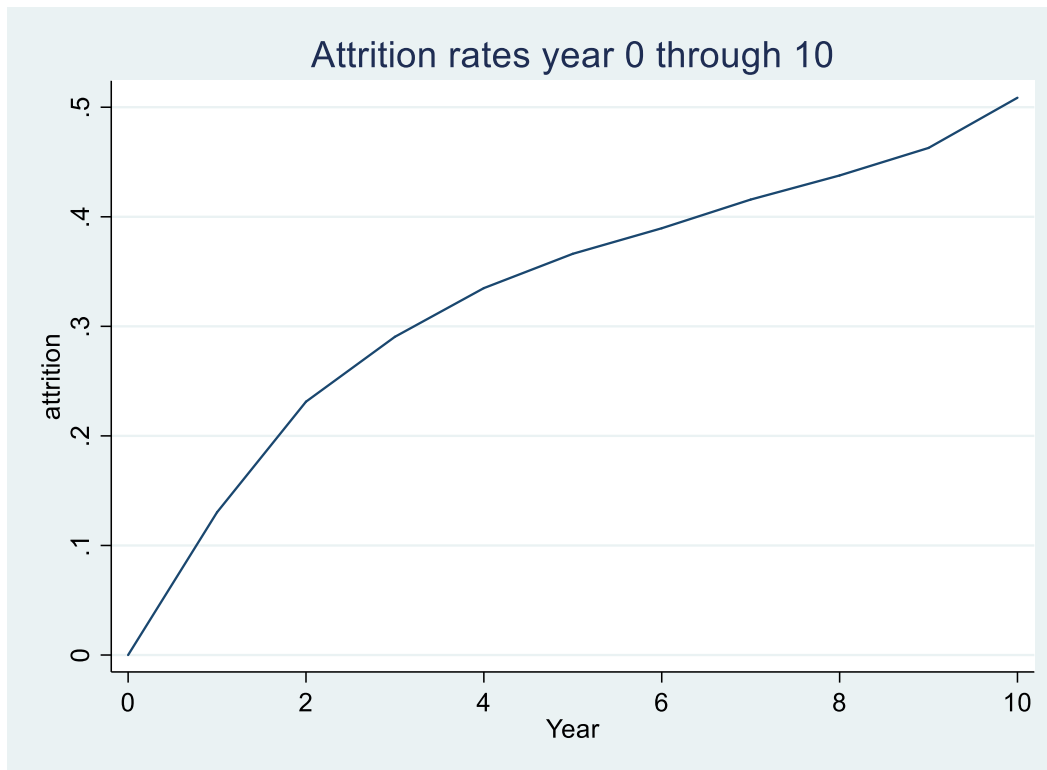


Figure 3.1: Attrition rates for the registered period, year 0 through 10

Figure 3.1 illustrates that attrition increases rapidly the first four years, and especially by the first two years. After the initial first four years, the rate is not as steep. There will be some people leaving the profession, but not at the same rate. By year nine the attrition rate increases considerably again. Given the number of explanatory variables in this thesis (gender, social background, immigrant background), it can quickly become disorganised with too many results. Because of this, I focus on a limited set of time-points. To see the most critical development over time, it is befitting to focus on the most impactful years; the time when people are most at risk of leaving. Regressions are therefore run for year 1 and 5 with year 9 as a sensitivity test to see whether the trend continues.

3.2.2 The independent variables

The three demographical characteristics of interest are the explanatory variables: 1) gender 2) social background and 3) minority/immigrant background.

3.2.2.1 Gender

The gender variable “female” is dummy coded 1 for women and 0 for men, hence men is the reference category.

As a point of departure, it is interesting to see the composition of gender by e.g. social background, GPA and education at the very start of their teaching career. This is displayed in Table 3.3. There are only small differences between men and women in terms of composition with the other three variables. At the initial start, a few more women hold a postgraduate degree and have slightly higher GPA than men. These differences are small, and so in terms of social background, education level and GPA, men and women are quite similar. This is an interesting compositional trait of the sample, which is useful to remember when discussing the results.

Table 3.3: Descriptive statistics of gender. Composition of gender by social background, GPA and education at initial start

Social Background categories	Men	Women	Total
Cultural upper	2,62	1,87	2,06
Professional upper	4,67	3,86	4,07
Economic upper	2,65	3,76	3,48
Cultural upper-middle	17,52	14,58	15,32
Professional upper-middle	17,49	15,92	16,32
Economic upper-middle	6,63	7,58	7,34
Cultural lower-middle	3,54	3,17	3,26
Professional lower-middle	10,27	10,52	10,46
Economic lower-middle	6,34	7,03	6,85
Skilled	10,91	12,27	11,92
Unskilled/semi-skilled	6,93	7,35	7,24
Farmers, fishermen, foresters	0,68	0,89	0,84
Welfare, transference	6,27	6,8	6,66
Missing	3,5	4,4	4,17
Total	100	100	100
GPA	39.16	40.36	40.03
Proportion w/Master's at start (year 0)	6.51%	7.10%	6.95%

The relative similarity between gender and social background is also interesting because it refers back to selectivity of becoming a teacher. Historically, With (2016) argues, there were differences between genders and social background because men and women had different reasons for becoming teachers. Working class men used teaching as a springboard to climb the social ladder, while upper class women used teaching as a springboard to enter the workforce. The similarity in class-positions among men and women shows that this type of gendered class-selectivity in teaching recruitment no longer exists.

3.2.2.2 Social background

Social background is a categorical variable consisting of fourteen categories; thirteen groups and one category for missing values. The variable is based upon the Oslo Register Data Scheme (ORDC) (Hansen, Flemmen & Andersen, 2009). Table 3.4 displays the values and their respective category-name. To maintain the nuances that the variable provides, the original values were kept. Missing values were kept for the analyses to maintain as high precision of estimates as possible. For the analyses, the variable was included as dummy variables to get the difference in attrition rate between the groups. Group with value 9 “Economic lower-middle” is the reference group. The analyses then, gives the difference in attrition rate in predicted percentage-points between a group and the reference category.

Table 3.4: Overview of Social background with values, proportion and category names

Vertical class-distinction	Value, group name and proportion in %		Value, group name and proportion		Value, group name and proportion	
The elite	1. Cultural upper	2.06	2. Professional upper	4.07	3. Economic upper	3.48
Middle-classes	4. Cultural upper-middle	15.32	5. Professional upper-middle	16.32	6. Economic upper-middle	7.34
	7. Cultural lower-middle	3.26	8. Professional lower-middle	10.46	9. Economic lower-middle	6.85
Working classes	10. Skilled	11.92	11. Unskilled/semi-skilled	7.24	12. Farmers, fishermen, foresters	0.84
Lower classes			13. Welfare, transference	6.66	14. Missing	4.17

This thesis uses the ORDC scheme rather than parental earnings, education or socio-economic status because the ORDC scheme captures the complexity of social background. The ORDC scheme builds upon Bourdieu’s class theory of different forms of capital, power and positions of occupational groups in the social space (Hansen et al, 2009). Table 3.5 presents the ORDC scheme with examples of occupations for each of the class-categories. The idea behind the ORDC scheme was to create a scheme that could both distinguish classes “vertically, according to the amount of capital, and horizontally, according to the composition of capital” (Hansen et al, 2009, p.8). Horizontally from the left, Table 3.5 displays groups that have more cultural than economic capital, and on the right; classes that have more economic than cultural capital. Classes with symmetrical composition of capital is found in the middle (Hansen et al, 2009). This distinction was not made for the lower level classes, and Hansen et al. (2009) also made an additional class for welfare recipients. Table 3.5 demonstrates the scheme’s complexity and how it incorporates more aspects than a mere

economic- or social one. In this way, the ORDC is suitable for a detailed study of the impact of social background on attrition.

The complexity of the ORDC scheme can also offer a few challenges. With fourteen categories, some of them will contain fewer number of observations which is displayed in Table 3.4. Although not definite, it might cause a higher standard error, which in turn might render more imprecise results. This risk is a trade-off for intricacy the scheme offers, where I have prioritised the latter. However, as the small number of observations might affect the results, it is important to consider this when analysing the results.

Table 3.5: The ORDC scheme, with examples of occupations (Hansen, 2009, p.10)

The ORDC categories, with examples of occupations		
Elite		
Cultural elite Professors, artists, executives in publishing etc.	Professional elite Doctors, assistant doctors, judges, pilots	Economic elite High capital income Executives and managers with salaries above NOK 1 million
Middle classes		
Cultural upper-middle Teachers with BA (“adjunkt”), special teachers, librarians, lecturers, journalists, musicians in entertainment	Professional upper-middle Consultants, engineers, lower executives, special nurses (higher ed), physiotherapists,	Economic upper-middle Medium capital income Various executives and managers in the private sector, financial brokers, accountants etc. with salaries ranging from NOK 0.5 to NOK 1 million
Cultural lower-middle Teachers, primary school teachers, child welfare pedagogues, social workers, children’s nurses	Professional lower-middle Nurses, authorized social educators, first secretaries, chefs, machinists,	Economic lower-middle Small capital income Occupational titles similar to higher economic class, but with incomes below NOK 0,5 million
Working classes		
Skilled workers		
Auxiliary nurse, milieu therapist (somewhat similar to social workers), electricians		
Unskilled and partly skilled workers		
Assistants, cleaners, private security officers, janitors, drivers, waiters,		
Farmers, foresters, fishermen		
Larger primary sector income than income from salaries, wages, and capital income		
Welfare transfers		
Larger welfare transfers than income from salaries, wages, and capital income		

There were three ORDC variables in this data set based on mother and father’s class position. The traditional literature, including Bourdieu (1984) usually considers father’s class position. The traditional view is criticised, not only for excluding women’s status, but also because it

does not consider the effect of advances women have made in the labour market (Sørensen, 1994). Lareau (1992) especially argued for the relevancy of mother's social background in influencing children's upbringing and their cultural capital. Andersen (2009) suggests that a combined class model with *both* parents' class-position are more propitious. In terms of social background's effect on school performance, more of the variation is explained with a combined model (Andersen, 2009; Johnston, Ganzeboom & Treiman, 2005). However, Johnston et al. (2005) also found that the parent with highest educational level exerted most influence, which is referred to by Erikson (1984) as the dominance model. Thus, I opt for using the dominance model in determining the effect of social background on teacher attrition. Compared to the conventional model, that only considers either the mother or the father, the dominance model is superior (Johnston et al., 2005; Korupp, Ganzeboom, & Van Der Lippe, 2002). However, for further investigations of this field, it could be advantageous to include a combined model for the analyses.

Table 3.6: Descriptive statistics of social background. Composition of social background by GPA, level of education at initial start and gender

Social Background categories	GPA	Proportion of group w/Master's at start (year 0)	Proportion women
Cultural upper	41.64	10.90%	67.79%
Professional upper	40.86	8.20%	70.92%
Economic upper	40.56	7.50%	80.74%
Cultural upper-middle	41.10	7.37%	71.05%
Professional upper-middle	40.12	7.00%	72.87%
Economic upper-middle	39.85	5.26%	77.15%
Cultural lower-middle	41.21	4.45%	72.57%
Professional lower-middle	39.62	5.05%	75.15%
Economic lower-middle	39.61	4.72%	76.58%
Skilled	39.25	3.60%	76.84%
Unskilled/semi-skilled	38.93	4.33%	75.78%
Farmers, fishermen, foresters	40.22	6.30%	79.53%
Welfare, transference	38.93	6.49%	76.16%
Missing	40.57	29.77%	78.78%
Total	40.03	6.95%	74.68%

Table 3.6 displays composition of social background with other control variables. From this, we learn that teachers, where the dominant parent is from a cultural middle- or elite class, have on average higher grades than other groups. Except for the category with farmers, teachers from higher strata have attained better grades. Furthermore, groups with teachers from higher strata have obtained more master degrees than other classes. Consistent with class theories, the group consisting of the most teachers with a master's degree is the cultural elite (almost 11%). The group with fewest teachers with a master's is skilled and unskilled. Proportion of females are fairly similar for all classes, with a majority of women around 75%. The only groups that somewhat deviates from this is the cultural- and economic elite. In these two groups, relative to the average, there are more men in the former group (68%) and more women in the latter (81%). These are interesting notions to remember for the following next two chapters.

3.2.2.3 *Minority background*

The minority background variable distinguishes between 1) teachers born in Norway to parents also born in Norway, 2) teachers immigrated to Norway and 3) teachers whose parents or themselves have ties to Norway but also to another country (category includes children of immigrants). For simplicity, the latter group is hereby referred to as “mixed-Norwegian”.

Table 3.7 gives the distribution of teachers for the three different categories. I am interested in seeing the difference in attrition rate between groups, and because Norwegian teachers are the majority I choose this category as the reference group. In the analyses, minority background is run as a dummy variable to see differences in attrition rate in predicted percentage-points between minority and majority groups.

Table 3.7: Descriptive statistics of immigrant category. Proportion of teachers' minority/majority background and other variables

Immigrant background	Value	Frequency in %	GPA	Proportion of group w/Master's at start (year 0)	Proportion women
Born_Norwegian	1	89.55	40.06	5.90%	74.59%
Immigrant	2	5.13	39.24	25.76	77.85%
Mixed_Norwegian	3	5.32	39.71	6.40%	73.17%
Total		100	40.03	6.95%	74.68%

The vast majority of teachers are people born in Norway to Norwegian-born parents (almost 90%, Table 3.7). The distribution of men and women across the different minority groups are a bit different. Immigrant teachers have proportionally most women, and mixed-Norwegian teachers are fewest women. Although not great differences, immigrant and mixed-Norwegian teachers score lower GPA than the majority. The proportion of teachers holding a master's is a bit more surprising. About 6% of Norwegian teachers and almost 6.5% of teachers with mixed Norwegian background have obtained a master's degree. However, almost 26% of immigrant teachers have completed a master's degree. If education is a determinant for higher attrition rates, as found by With (2017), then one would assume that higher education attainment level can explain some of the possible variation between teachers with immigrant background and Norwegian background.

3.2.3 The control variables

I control for GPA, educational level, income and school fixed effects (F.E) in order to explain attrition differences between demographic groups.

The education variable was made binary; taking value 0 for attained bachelor degree and value 1 for obtained master's degree. As the definition of being a teacher is to hold an educational degree (either bachelor or master's), any missing data were dropped. I do not distinguish between specified education programme with subject fields due to small sample size in subject fields and disciplines other than general teacher education. However, future studies might consider using educational fields as research find there is a difference in attrition based on teachers' subject area (e.g. Borman & Dowling, 2008; Murnane et al, 1988; 1989). About 92.29% had a bachelor's degree, about 7.69% had a master's and 0.02% had a PhD in year 1, and hence PhD graduates were dropped due to small sample size.

Grade point average (GPA) from upper secondary school is continuous ranging from 20 to 60, and symmetrically distributed around an average of about 40 (Figure 3.2). Information about GPA for teachers are taken from the Norwegian Universities and College admission Service [Samordna opptak] (graduated upper secondary school prior to 2001) or from students' secondary school graduate-certificate/baccalaureate (graduated upper secondary school after 2001). The former is of students applying to higher education through the Norwegian Universities and College admission Service in the years 1997-2004. The latter is

data containing school-leaving certificate from upper secondary education. Moreover, the sample consists of teachers' grades before the grade entry-requirement policy for teacher education was changed with stricter requirements in maths, Norwegian and English (With, 2018, p.178). Higher GPA have an effect of increased attrition rates (Murnane & Olsen, 1990; Gjefsen & Gunnes, 2015). Examining my data, I find a non-linear association between GPA and attrition rates, with the highest likelihood of attrition among teachers with either grades at the lower or higher end of the spectrum (Figure 3.2).

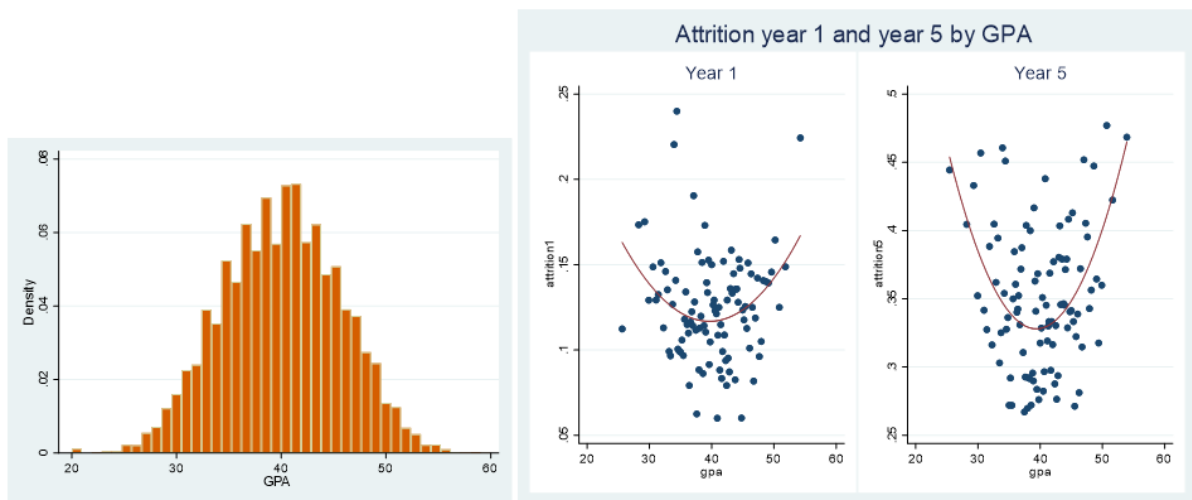


Figure 3.2: Histogram: dispersion GPA and Scatterplot: curvilinear dispersion of values

According to literature, it is important to include income when examining teacher attrition because lower income levels have shown to increase attrition rates. (Murnane et al, 1989; Murnane and Olsen, 1990; Tolbert and Moen, 1998). The income variable, which takes the sum of personal income [sumpi], is continuous.

The final model is run with school fixed-effects (school F.E), and hence holds between-school variations constant. There could be characteristics with each school that contributes to teachers deciding to leave. This could be anything from the school administration, funding, pupil- and parent compositions, colleagues, patronage programmes etc. This is an important mediating variable if teachers from certain class positions or immigrant background sort into schools that differs with regard to these characteristics. A way to consider fixed-effects is to

understand it as a dummy-variable; holding each school constant and hence comparing it with itself. For school F.E, I choose teachers' first workplace as the control variable.

The control variables have features that need to be considered. Firstly, a challenge with GPA and income is that they contain missing values. On the one hand, excluding all teachers with missing values will reduce sample size considerably, and consequently decrease precision of the estimated effects. On the other, not excluding teacher with missing values will result in differences in sample size across models with different sets of control variables, and it is hard to distinguish mediation (see below) from differences in sample characteristics. In the main results, I choose to keep all teachers in order to maximise sample size. However, I test the robustness of my results by re-running all models with the same number of observations (See appendices for sensitivity tests tables A4.10-A4.12). Excluding teachers with missing results give fewer statistical significant differences between groups, but this could be explained by S.E being twice as large.

Secondly, the variables for *educational level*, *income* and *schools* are time-varying which means that during the observation time-period a teacher's value within these variables can change. My focus is on the initial years where people are most at risk of leaving, and I have chosen control variables for the initial year in teaching. Moreover, I do not expect many teachers will opt for a master's degree and have a significant increase in income during the first five years in teaching. Teacher salaries are based on 1) seniority of years in the profession, 2) educational level, 3) percentage of full-time position or 4) job title/position (although having teacher education and working in a school, individuals might have an administrative position either exclusively or in addition to teaching). Over time, these determinants will affect the sum of personal income, but five years will most likely not change the sum of income a lot. Job-migration within the teaching occupation is possible, and teachers moving from one school to the next are kept in the analyses. Focus on initial effect of control variables means that the interpretation of the mediated effect of the control variable is more specific, and should be read as e.g. differences in teacher attrition between men and women when holding educational level *at the beginning* of teaching career constant.

The time-varying aspect is still interesting, and regressions with the respective educational level to the corresponding observation year were run as a sensitivity test. Comparisons between educational levels as a mediating effect on teacher attrition at the beginning of career to the corresponding observation year are presented in the appendix. In all models, the 95% confidence intervals overlap, indicating no statistically significant difference at the 5% level. There are, however, a few differences when substituting the beginning-of-career variable with a time-varying variable, which is further examined in chapter 4.4: “Sensitivity tests of the models”. Tables with sensitivity tests are found in the Appendix.

3.3 METHOD

This thesis uses Linear Probability Model (LPM) to determine differences in attrition rates between groups within the three different demographic variables. The aim of the thesis is, as already stated, to examine 1) whether there is a difference in attrition rates between demographic groups, 2) how these differences are explained; or rather whether the control variables can account for differences in attrition rates and 3) how these trends develop over time. Descriptive statistics from earlier on in this chapter help interpret directionality, relevance and significance of variables that effect results in Chapter 4. The following section presents the statistical method with explanations of how mediation effects can be interpreted. In addition, logistic regression is used as a robust test for the results generated by the LPM.

3.3.1 Linear Probability Model (LPM)

Linear regression analysis using the ordinary least square (OLS) estimator method has become one of the most commonly used statistical tools in the social science (Aldrich & Nelson, 1984, p. 9; Gordon, 2015, p. 105). Linear regression analysis assumes a linear correlation between dependent and independent variable(s) (Ringdal, 2013, p. 391). And as explained by Angrist and Pischke (2015, p. 57); a multiple linear regression model can be understood as the relationship (or effect) between one variable on the dependent variable while holding control variables constant. It can be expressed as the function:

$$y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki} + \varepsilon_i, \quad i=1,2,3,\dots,n \quad (3.1)$$

(Ahmed, 2017, p. 924).

In this function and in relation to my research aim, y signifies the outcome i.e. teacher attrition. β_0 is the constant; meaning it represents the average of y when values of $x = 0$, i.e. it is the mean of attrition for the reference group (men, economic lower-middle class or

Norwegian-born) when all other $x = 0$. β_1 is the coefficient for the independent variable X_1 , β_2 is the coefficient for X_2 and so on through β_k . The coefficient represents the percentage point change in the probability for attrition with a unit increase in X , while holding all the other x -values fixed. Hence, if the independent variable is e.g. *gender*, then $\beta_1 X_{1i}$ is how much higher attrition is among women (=1) than men (=0).

When the outcome variable is binary, the linear regression analysis is called a Linear Probability Model (LPM), and estimates how the proportion with the value 1 on the outcome changes with the independent variables (Skog, 2004, p. 353; Tufte, 2000, p. 13). In this sense, it is better expressed as:

$$P(y = 1|x) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k \quad (3.2)$$

(Wooldridge, 2002, p. 454)

The coefficient, then, gives differences in probabilities between groups relative to the reference group, and is intuitively easy to interpret. This is one of the main advantages of LPM (Hellevik, 2009, p. 66; Mood, 2010, p. 79; Tufte, 2000, p. 25). The regressions for the different demographic groups are run as dummies. Hence, in relation to my own analyses: the coefficients for e.g. social background give differences in probabilities of teachers leaving for different class-groups relative to the reference group *economic lower-middle* class. When probabilities are multiplied with one hundred, the results give differences in attrition rates between groups in percentage-points.

Despite being easy to interpret, some argue that the logistic regression model is more apt to study binary outcome variables than LPM (Allison, 2015; Mehmetoglu & Jakobsen, 2017, p. 62; Ringdal, 2013, p. 436; Skog, 2004, p. 353). There are three main concerns about using the LPM (Mood, 2010, p.78; Ringdal, 2013, p.435-436; Tufte, 2000, p.13-16). Firstly: linear regressions assume that the residuals, or error term (ε_i , in equation 3.1), is homoscedastic. In other words; that ε_i has constant variance. Secondly, linear regression assumes linearity, which means that when predicting probabilities it is possible to get values below 0 or higher than 1. This makes the predictions meaningless because probabilities have to be within 0-1 range, and is considered as the model's main weakness (Tufte, 2000, p.14). Thirdly, LPM

might give a misspecified functional form because the relationship cannot be assumed to be linear when the dependent variable is binary.

These issues are, as several researchers point out, not always too severe and they can be adjusted for (Hellevik, 2009, p.60; Mood, 2010, p.78; Ringdal, 2013, p.448; Tufte, 2000, p.16). The first concern “can easily be corrected for”, and the simplest way is to use heteroscedasticity-robust standard errors (Mood, 2010, pp.78,81). The second concern is only a serious problem if many of the predicted values fall below 0 or above 1 (Mood, 2010, p.78). In relation to my own thesis, this is less of a concern. I am more interested in the difference in attrition rates between groups than the predicted probability of teachers leaving, and hence this concern is not as relevant for my own thesis. The third concern is maybe the most critical (Mood, 2010, p.78), but it can be viewed more as a theoretical argument (Borgen, 2010, p.54; Tufte, 2000, p.16). Moreover, this concern depends on the research’s intent (Tufte, 2010, p.16; Mood, 2010, p.78), and if the main focus is not in the non-linearity of the relation, but rather in the sign, significance or average effect estimates than the LPM is preferable (Mood, 2010, p.78).

Logistic regression with average marginal effects (AME) is used as a robust test of my results, which also increase the results’ validity. The main differences between logistic regression and linear regression is the logistic transformation and the different parameter estimates. In logistic regression, the model is designed for binary outcomes, and the coefficient is given in logits (natural logarithm to the odds). A logistic curve is S-shaped (Figure 3.3), and displays the logistic relationship between e.g. gender and the probability of leaving the teaching profession. Moreover, Figure 3.3 shows how the curve never reaches the limit values of 0 and 1, even as X moves closer to positive or negative infinity (Tufte, 2000).

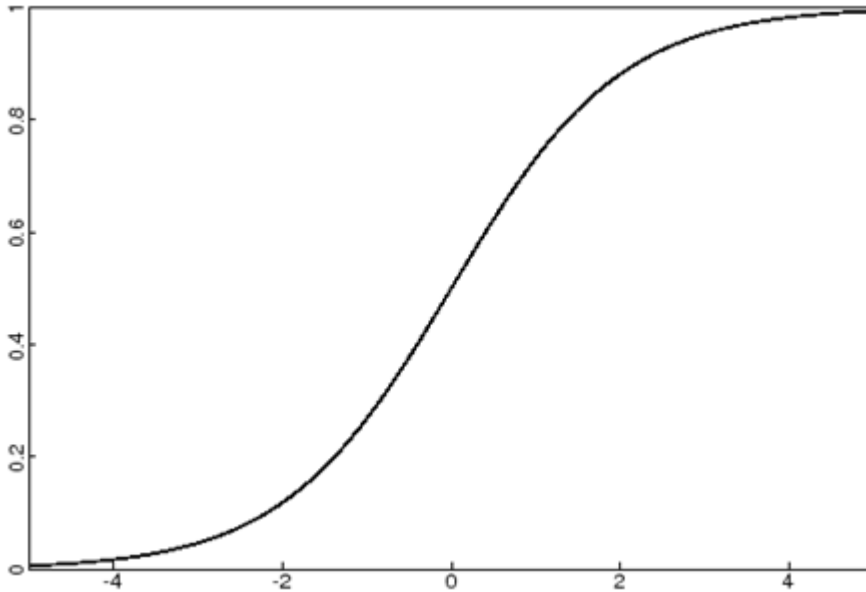


Figure 3.3: Logistic curve. Probability and the logit function. Model is designed to fit binary outcomes

The logistic transformation is less intuitive interpretable, and to reach a more intuitive concept of probability it is necessary to go through certain steps (Mehmetoglu & Jakobsen, 2017) (for more information about logistic regression models, see e.g. Tufte, 2000; Ringdal, 2013; Skog, 2004; Mehmetoglu & Jakobsen, 2017). From logistic regressions, it is possible to calculate the average marginal effects (AME), which is more intuitively understandable. Simply put; AME is the averages of the conditional effects (Mood, 2010, p.76). AME, then, represents the “linear combination of values on variables x and their estimated coefficients β ” (Mood, 2010, p.75). Logistic regression with AME is thusly just another way of calculating differences in probability for attrition between groups.

Although the functional form of logistic regression is advantageous, the logistic regression model has its disadvantages and is more complex than many sociologists seem to think (Mood, 2010, p.79). One of the main drawbacks with logistic regression is that unobserved heterogeneity can lead to bias in the parameter estimates, even though there is no correlation between the omitted variables and the included independent variables. The reason for this is because the estimation of the coefficients in logistic regression analyses are based on a standard logistic distribution with a given residual variance, or fixed variance, of 3.29. This means that the individual coefficient is not only an expression of the effect of the independent variable on the dependent variable, but it is also an expression of the unobserved heterogeneity of the dependent variable (Borgen, 2010, p.55; Mood, 2010, p.68-69).


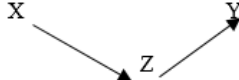

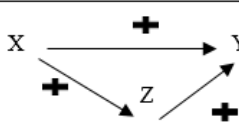
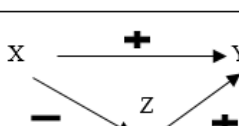
I will not move further into the discussion of which method is most appropriate, but as many of the issues of the LPM can be adjusted for I do find it reasonable to use this technique (for a comprehensive understanding of the methodical dispute see e.g. Mood, 2010; Tufté, 2000; Hellevik, 2009; Friedman, 2012; Allison, 2015; and Von Hippel, 2015). Moreover, appropriateness is dependent on the intent- and scope of the research (Von Hippel, 2015). The intent for this study is to examine differences in probability for attrition *between* groups, and not so much in the actual predicted probability of leaving; i.e. the non-linearity of the relation (Mood, 2010, p.78). Moreover, results from LPM and AME (from logistic regression models) are often identical, or very similar (Friedman & Schady, 2013, p. 614; Hellevik, 2009, p. 60; Mood, 2010, p. 78). Furthermore, LPM allows for introduction of multiple independent variables to account for differences in effects between demographic variables and attrition, which is the second aim of this thesis. Lastly, social sciences often deals with phenomena that is interesting to people outside the scientific milieu, and hence results should be accessible and easily interpreted and conveyed to these individuals (Hellevik, 2009, p.73-74; Mood, 2010, p.80). In short, I choose LPM for the purpose of this thesis due to the ease of interpretation, I am not interested in prediction but differences between groups, and LPM coefficients and AME are often as good as identical.

3.3.2 Mediation analysis: explaining correlation between two variables.

The thesis' second aim is to examine how differences in attrition rates between groups can be explained, and I use what is known in the mediation literature as the “difference method” (VanderWeele, 2016). This means that I start by looking at the bivariate association between demographic variables (to demonstrate mediation effects I use gender as example of independent variable, X) and the outcome (attrition, Y). Following this, I add a mediating variable (control variable, Z, e.g. education) and see how the coefficient for the demographic variable (e.g. gender) changes. Conceptually, all control variables that are included will be interpreted as mediating variables. As GPA, education, income and so on cannot affect demographic characteristics (such as gender), control variables cannot be confounding. Hence, confounding variables, which can cause a spurious relationship between gender and difference in attrition (as depicted in row 1 in table 3.8), is not an issue in this study.

The mediated effect is demonstrated in row 2, table 3.8, and demonstrate the causal sequence of the variables that form this relationship: $X \rightarrow Z \rightarrow Y$. This effect is also called an indirect effect of gender on attrition, because it goes through education (MacKinnon, Fairchild, & Fritz, 2007, pp. 595-596). Intuitively, this is understood as the differences of attrition between genders is explained by education. Hence, because the mediated effect explains (some of) the effect between gender and attrition, the coefficient will decrease from the bivariate model to the multiple model where the mediator is introduced (MacKinnon, Krull & Lockwood, 2000, p. 174; VanderWeele, 2016, p. 18). The *difference* (hence its name “difference method”) between the bivariate model and the model with education is interpreted as the indirect effect.

Table 3.8: Five possible effects/outcomes of introducing a third variable to the model

	Causal structure	Effect of X on Y is:	Parameter in bivariate model $Y = b_0 + b_1 * X$	Parameters in multiple model $Y = b_0 + b_1 * X + b_2 * Z$
1		Spurious	$b_1 \neq 0$	$b_1 = 0$ $b_2 \neq 0$
2		Indirect	$b_1 \neq 0$	$b_1 = 0$ $b_2 \neq 0$
3		Direct (part of multiple)	$b_1 \neq 0$	$b_1 \neq 0$ $b_2 \neq 0$
4		Both direct and indirect. The indirect effect has consistent mediation	$b_1 > 0$	$b_1 > 0$ but $b_1 > b_1$ $b_2 > 0$
5		Both direct and indirect. The indirect effect has inconsistent mediation	$b_1 > 0$ or $b_1 = 0$ or $b_1 < 0$	$b_1 > 0$ and $b_1 > b_1$ $b_2 > 0$

Note: Table is paraphrased from table 10.4 in Skog, 2004: 276

The indirect effect is also displayed in row 4 and 5 in table 3.8. Moreover, total effects and direct effects are also displayed in the same windows. The overall effect, or total effect, between gender and attrition is the bivariate association and consist of *both* the direct- *and* indirect effect. If the outcome remains significant after controlling for education, then the coefficient in the multiple model is often considered as the direct effect between gender and attrition.

The indirect effect can be a mediator, but it can also be a suppressor. As stated above, with mediating effects the coefficients will often become smaller. However, if the coefficient increases, this is often considered as a suppression effect (Gordon, 2015, p.398; MacKinnon et al., 2000, p.174). This is because the inclusion of a third variable “increases the predictive validity of another variable, or a set of other variables” to the bivariate association (MacKinnon et al., 2000, p.175). More intuitively; this can be understood as by introducing the third variable “education”, the association between gender and attrition becomes stronger because now the association is also mediated through the indirect effect (suppressor-effect: Watson, Clark, Chmielewski, & Kotov, 2013, pp. 929-930). This suppressive effect is usually indicative of either an inconsistent mediation or the indirect effect being stronger than the direct effect.

Suppression effects are often given by the relative signs of the direct and mediated effects (MacKinnon et al., 2000, p.176). In other words; suppression effect exists if there is at “least one mediated effect [that] has a different sign than other mediated or direct effects in a model” (MacKinnon et al., 2007, p.602) (depicted in row 5, table 3.8). The signs of the correlations of the demographic variables after including the mediator variables can help predict the sign of the mediating effect (Skog, 2004, p.60), as presented in table 3.9. This means that a positive association, or consistent mediating effect, indicates that all the coefficients (direct and indirect effect) have the same sign. If the sign when adding a mediator changes, then there is a suppression effect.

Table 3.9: How to interpret differences in the coefficients of the demographic variables after including the mediator variables

Consistent and inconsistent mediation	Direction of Association Between the Demographic variable and <i>Mediating</i> variables (e.g. gender and education)		
		Positive (+)	Negative (-)
Direction of Association Between <i>Mediating</i> Variable and <i>Outcome</i> Variable (e.g. education and attrition)	Positive (+)	++ = positive	+- = negative
	Negative (-)	-+ = negative	-- = positive

Note: Based on table 10.10 in Gordon (2015: 412).

Moreover, a mediation effect might exist even if there is no association between the dependent and independent variable (MacKinnon et al., 2000, p.175). This will also change

the sign of the coefficient. Gordon explains: when “the indirect effect of a suppressor variable is larger than the direct effect, the sign of the coefficient estimate for the predictor of interest will be in the wrong direction, relative to its expected direct effect” (2015, p.414). For example, if gender is positively associated with attrition (more women quit) then an inconsistent mediation occurs if gender is negatively associated with education (more men with higher educational level), but education is positively associated with attrition (higher educated teachers quit teaching more than lower educated). In this example, the suppression effect cancels out the difference in attrition between genders (association is non-significant) because although women are expected to leave more than men, more men have a higher educational degree and higher educational degree increase the probability of leaving. The indirect effect is larger than the direct effect (which is non-significant), and the difference in attrition between men and women must be understood as gendered differences in attained educational level.

Although I previously stated that confounding variable is not an issue in my thesis in terms of the bivariate association, including a mediator might introduce an unmeasured confounder for the mediating variable on the outcome (VanderWeele, 2016, p.24-26). Figure 3.4 show the association between Z and Y is confounded by the unobserved variable U. A regression of Y on X and Z will identify not only the direct effect of X on Y ($X \rightarrow Y$) but also the effect that goes through the collider variable Z ($X \rightarrow Z \leftarrow U \rightarrow Y$). By example, if U is a person’s intelligence, then difference in attrition between genders could be explained by the direct effect, the indirect effect or that gender could affect education, but IQ can also affect both education and attrition. Thus, all mediator-outcome confounders can bias my estimate of the direct effect of demographic variables. As with most mediation-studies, this is a limitation to the analyses in this thesis. Fortunately, however, the bias is most likely small.

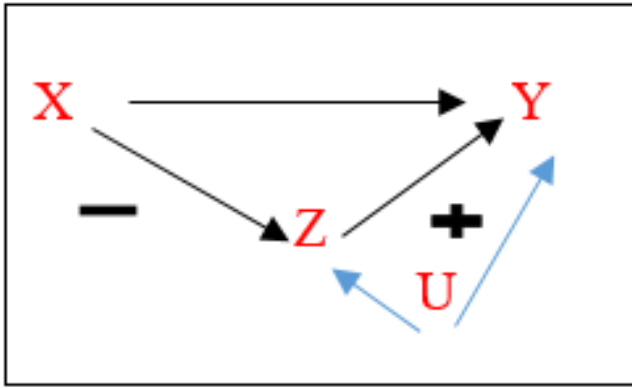


Figure 3.4: The problem with unmeasured mediator-outcome confounder(s)

4 RESULTS

The thesis aims to examine whether there are different attrition rates for demographic groups within the teacher population. Such differences could indicate that certain demographic groups are at a bigger risk of dropping out of the profession than others. The three aims of this thesis is to: 1) examine differences in attrition rates between teacher groups, 2) examine how these differences can be explained and 3) examine how the differences develop over time. I examine the effects of gender first, followed by social background and finally minority background. In all analyses, I start with a model without control variables to identify the total effect of the demographic variables, and then examine how the coefficients change when I include control variables (model 2 – 4).

4.1 GENDER AND ATTRITION RATES

The descriptive nature of the thesis aims to investigate how the attrition trends might be affected by gender. In the Norwegian context, research have found that more men leave teaching (Falch & Strøm, 2005; With, 2017). On the other hand, international research have found the opposite where women have higher attrition rates than men (e.g. Borman & Dowling, 2008; Lindqvist et al., 2014; Murnane et al., 1989; Singer & Willett, 2003; Stinebrickner, 2002). Moreover, Lindqvist et al. (2014, p.101) caution researchers to interpret findings after the research's scope as results will vary with its focus. As most of the literature points to higher attrition rates for women, I expect women will have higher attrition rates than men and that this trend will increase over time (due to the U-shape trend as discussed in the introduction).

4.1.1 Difference between genders by year 1

Table 4.1 with model 1 through 4 give differences in attrition rates for women in relation to men in percentage-points, after one year of teaching. The table shows the difference in attrition between men and women are small after one year, and statistically non-significant at

the 5% level. In model 1 the attrition rate is 0.86% higher for women than for men. This suggests that after year one, or at the very beginning of the career, there are no differences in attrition between genders. It is worth noticing that the p-value for the coefficient in model 1 is 0.063, so although it is not statistically significant at the 5% level it is not far off. The significance level is arbitrary, but due to fear of type 1 (false positive) and type 2 error (false negative), most sociologists set the significance level to 5%. The p-value is almost within the chosen significance level of 0.05, but not quite, and hence I have to conclude that by year one there is no difference in attrition between male and female teachers.

Table 4.1: LPM attrition differences between genders by year 1

Variables ^a	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Model 4 Full model
	By year 1	By year 1	By year 1	By year 1
female	0.00857 (0.00461)	0.00575 (0.00582)	0.00822 (0.00461)	-0.0139* (0.00631)
GPA	No	Yes	No	Yes
Educational level	No	No	Yes	Yes
Social background	No	No	No	Yes
Immigrant background	No	No	No	Yes
Income	No	No	No	Yes
School F.E	No	No	No	Yes
Constant	0.124*** (0.00396)	0.483*** (0.103)	0.120*** (0.00396)	0.723*** (0.120)
Observations	27304	16260	27304	15501
Robust standard errors in parentheses				
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				
^a The reference group is men.				

Controlling for GPA (model 2) and educational level (model 3) does not change the coefficients significantly and they are still not statistically significant. However, when including the full set of controls in model 4, I find that women have a decreased probability of leaving by 1.39 percentage-points than men by year one. This surprising change in effect was backtracked by adding each control variable one at a time.

By backtracking the steps and including one control variable at a time, I was able to see which variable affected the outcome significantly. The coefficient stays positive and statistically non-significant until adding the variable for income. Table A4.1 in the appendix shows how the full model without income produces similar results to the other models in table 4.1. This is also visually presented in Figure 4.1. Adding income to the regression changes the coefficient from positive to negative, increases in effect and makes it statistically

significant under a 5% significance level. This is what chapter 3.3.2 referred to as a mediation effect with a suppressor variable. Income is a suppressor variable in this model, and the indirect effect with income explain the difference in attrition between men and women. Intuitively, this can be understood as; when holding income constant I compare teachers with same income. When teachers earn the same, more men leave teaching. The change of sign both indicate that the indirect effect is larger than the direct effect, which is consistent with the non-significant effect in the bivariate model, as well as there is an inconsistent mediation in the indirect effect. With expected directionality of mediation effect (table 3.8 & 3.9), and running simple regressions, I learn that women on average earn less than men which increases the risk of leaving (because lower earnings is associated with higher risk of leaving).

4.1.2 Difference between genders by year 5

Table 4.2 presents results of differences in attrition rates between men (reference group) and women in percentage-points. As we can see from table 4.2, results after five years are very different. By year 5, women are more likely to leave the profession than men with a difference of 3.8 percentage-points (model 1). It also gives predicted probability of men leaving the profession of 33.8%. Difference between men and women remains about the same after including GPA (model 2) and educational level at the start of the career (model 3). The coefficients are similar for the first three models and statistically significant at the 5% significance level. With full set of controls (model 4), the coefficient turns statistically non-significant.

Table 4.2: LPM attrition differences between genders by year 5

Variables ^a	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Model 4 Full model
	By year 5	By year 5	By year 5	By year 5
female	0.0380*** (0.00869)	0.0415*** (0.00986)	0.0379*** (0.00865)	0.0150 (0.0110)
GPA	No	<u>Yes</u>	No	<u>Yes</u>
Educational level	No	No	<u>Yes</u>	<u>Yes</u>
Social background	No	No	No	<u>Yes</u>
Immigrant background	No	No	No	<u>Yes</u>
Income	No	No	No	<u>Yes</u>
School F.E	No	No	No	<u>Yes</u>
Constant	0.338*** (0.00741)	1.303*** (0.175)	0.327*** (0.00743)	1.661*** (0.186)
Observations	15450	11574	15450	11563
Robust standard errors in parentheses				
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				
^a The reference group is men.				

Again, by backtracking the results, I find that the income variable explains the gender difference. The three first models produce similar coefficients and they all have p-values of 0.000. The extra model (table A4.2, appendix), with full set of controls except income also produces similar coefficient and is statistically significant. By introducing income, the difference in attrition between genders become non-significant, and the difference is smaller. The difference in attrition is thusly mediated through income, and hence income (from year 1) teaching explains the difference in attrition rates between genders. This is presented in table A4.2 in the Appendix, and a visual presentation is given in figure 4.1. Intuitively, this is understood as by adding income to the regression and holding it constant, we compare women and men with similar income and find that there is no difference in attrition (model 4). Because difference in attrition is mediated with income, this is interpreted as women earn less than men and that having lower income increases the likelihood of attrition.

4.1.3 Difference between genders over time

Figure 4.1 summarises the findings explained above. Turquoise plot points are gender-coefficients for extra models without income-variable, and as the graph displays, income mediates the difference in attrition between male and female teachers.

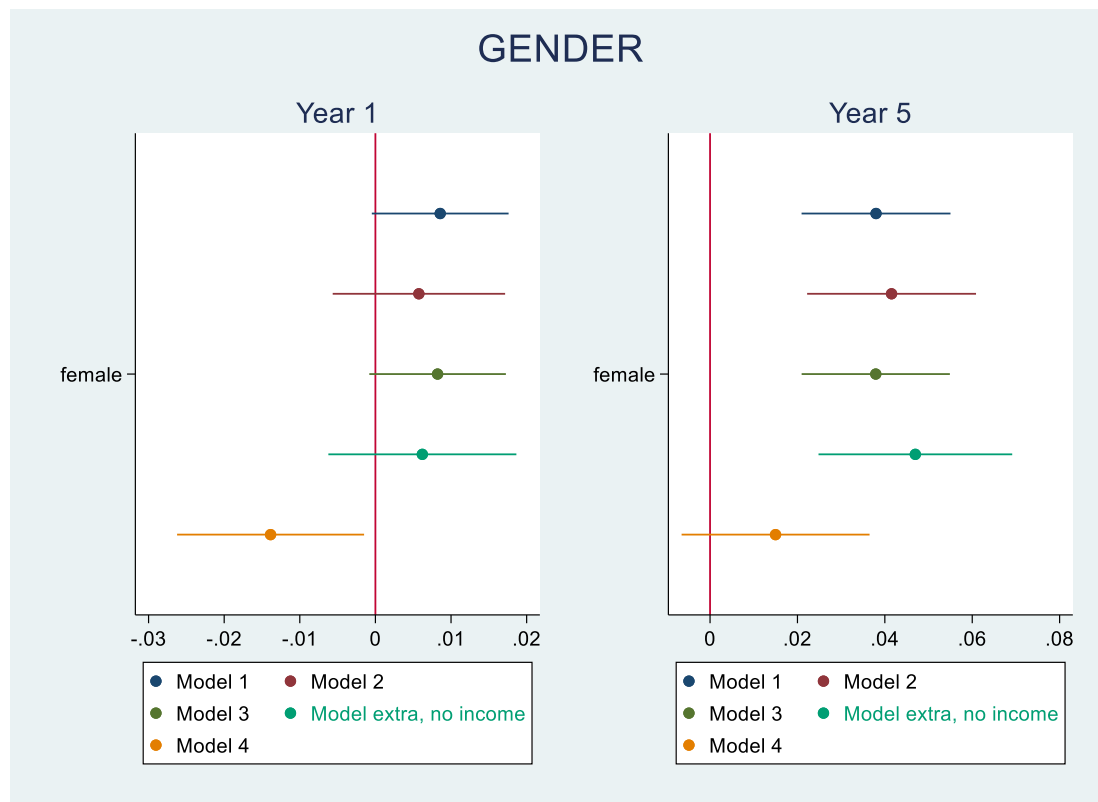


Figure 4.1: Comparison of models for year 1 and for year 5. Points give coefficients with their respective confidence intervals (C.I) of 95%. Baseline is set to 0 for no difference between gender; i.e. statistically non-significant

Whereas the difference is 0.86 percentage-points (although statistically non-significant) after one year (table 4.1), it is 4 percentage-points by year 5 (table 4.2) and almost 6 percentage-points by year 9 (appendix A4.3). Similar to year 5, GPA and educational level do not explain differences in attrition rates, but income and school-differences do. The difference in attrition is no longer significant when adding income and school fixed-effects (F.E). Moreover, the coefficient is closer to zero, which suggests that the difference is mediated through these two variables.

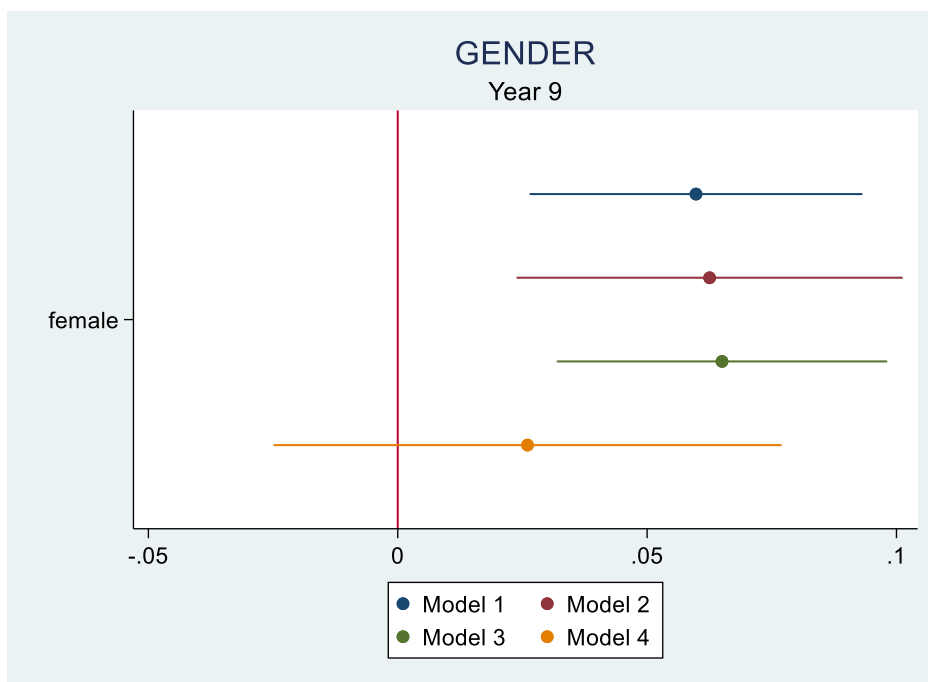


Figure 4.2: Models for year 9. Points give coefficients with their respective 95% C.I. Baseline, 0, signifies no difference between genders; i.e. statistically non-significant

4.2 SOCIAL BACKGROUND AND ATTRITION RATES

This section examines how attrition trends might differ with social class distinctions. Based on class theories and theories on social reproduction, I expect higher class positions will have a higher attrition than lower class positions. These individuals might be increasingly tempted and pulled out of the profession and I expect this effect will increase over time.

4.2.1 Differences between social background groups by year 1

Table 4.3 gives differences in attrition rates by year one for social background with differences relative to 'economic lower-middle' class. In model 1, although the patterns are in the expected directions, all of the differences are small and statistically non-significant after one year. Class theories predicted higher classes could leave teaching more than teachers from economic lower-middle class due to differences in cultural capital. The coefficients are positive, and had they also been significant then the results could have supported these theories. Coefficients for professional and cultural lower-middle classes are negative, suggesting that within vertical stratification, teachers from economic class could leave more had coefficients been significant. Thus, there are no differences in attrition rates between social classes in the beginning of the teaching career.

Adding GPA and educational level at the beginning of career do not alter the results greatly. The coefficients for model 2 and model 3 remain quite similar and are still statistically non-significant. Adding income and school F.E (model 4) produces some different coefficients as some coefficients change sign (suggesting suppression effects) but they are still not statistically significant. Hence, even after including all the control variables, there are no differences between social groups (relative to economic lower-middle class) in attrition rates by year 1.

Table 4.3: LPM attrition differences between social background groups by year 1

Variables ^a	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Model 4 Full model
	By year 1	By year 1	By year 1	By year 1
Cultural upper	0.0181 (0.0169)	0.00626 (0.0203)	0.0133 (0.0169)	-0.0256 (0.0204)
Professional upper	0.0230 (0.0134)	0.0186 (0.0163)	0.0205 (0.0133)	0.0178 (0.0181)
Economic upper	0.0104 (0.0137)	0.00892 (0.0169)	0.00877 (0.0137)	0.00296 (0.0193)
Cultural upper-middle	0.00630 (0.00941)	0.00699 (0.0117)	0.00471 (0.00940)	-0.0104 (0.0127)
Professional upper-middle	-0.00718 (0.00922)	-0.00800 (0.0114)	-0.00865 (0.00921)	-0.0115 (0.0126)
Economic upper-middle	0.00297 (0.0109)	0.0152 (0.0137)	0.00226 (0.0109)	0.00513 (0.0154)
Cultural lower-middle	-0.0246 (0.0129)	-0.0243 (0.0160)	-0.0244 (0.0129)	-0.0180 (0.0184)
Professional lower-middle	-0.00921 (0.00990)	-0.00487 (0.0123)	-0.00963 (0.00989)	-0.00316 (0.0141)
Economic lower-middle	0 (.)	0 (.)	0 (.)	0 (.)
Skilled	-0.00902 (0.00968)	-0.00257 (0.0121)	-0.00838 (0.00967)	0.00444 (0.0136)
Unskilled/semi-skilled	0.00154 (0.0109)	0.00431 (0.0137)	0.00157 (0.0108)	0.0000129 (0.0149)
Farmers, fishermen, foresters	0.00399 (0.0234)	-0.00284 (0.0292)	0.00279 (0.0233)	0.00860 (0.0355)
Welfare, transference	-0.00249 (0.0110)	0.00796 (0.0148)	-0.00421 (0.0109)	0.00761 (0.0161)
Missing	0.0458*** (0.0139)	0.0474 (0.0491)	0.0300* (0.0141)	0.0270 (0.0573)
GPA	No	Yes	No	Yes
Educational level	No	No	Yes	Yes
Gender	No	No	No	Yes
Immigrant background	No	No	No	Yes
Income	No	No	No	Yes
School F.E	No	No	No	Yes
Constant	0.130*** (0.00778)	0.488*** (0.104)	0.127*** (0.00777)	0.719*** (0.120)
Observations	27300	16256	27300	15496
Robust standard errors in parentheses				
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				
^a The reference group is economic lower-middle classes.				

4.2.2 Differences between social background groups by year 5

After five years, the results are a bit different. The coefficients in table 4.4 (model 1) for ‘Cultural upper-middle’ and higher classes are all statistically significant by year 5 at the 5% level. The other coefficients, on the other hand, are not. Most surprising here, is maybe that

the coefficient for cultural lower-middle is not statistically significant, and that the coefficient for cultural upper-middle is positive. Chapter 2 suggested that teachers from cultural upper- and lower-middle classes might experience lower attrition rates due to class theories and theories on occupational following. Although the coefficient for cultural lower-middle is the strongest negative one, it is non-significant and hence there are no statistically different attrition rates between the two classes.

More substantially; by year 5 the higher classes experience higher attrition rates than teachers from 'Economic lower-middle' class. Most notable difference is for the cultural elite that has an attrition rate that is 11.1 percentage-points higher than the 'Economic lower-middle' class. The second highest attrition rate is found in the economic elite with 6.94 percentage-points higher than the economic lower middle class. The coefficients for the other classes, whose coefficients are statistically non-significant, demonstrate that social background is *only* significantly different from economic lower-middle class for the higher class distinctions. Teachers from middle- or lower classes do not have a different attrition rate to economic lower-middle.

Table 4.4: LPM attrition differences between social background groups by year 5

Variables ^a	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Model 4 Full model
	By year 5	By year 5	By year 5	By year 5
Cultural upper	0.111*** (0.0325)	0.0570 (0.0364)	0.1000** (0.0320)	0.0120 (0.0368)
Professional upper	0.0595* (0.0249)	0.0477 (0.0278)	0.0571* (0.0248)	0.0364 (0.0294)
Economic upper	0.0694** (0.0265)	0.0698* (0.0296)	0.0678** (0.0263)	0.0510 (0.0324)
Cultural upper-middle	0.0430* (0.0176)	0.0314 (0.0198)	0.0388* (0.0176)	-0.0139 (0.0218)
Professional upper-middle	-0.0114 (0.0174)	-0.0241 (0.0195)	-0.0147 (0.0173)	-0.0437* (0.0216)
Economic upper-middle	0.00302 (0.0202)	0.00594 (0.0228)	0.00244 (0.0201)	-0.0242 (0.0256)
Cultural lower-middle	-0.0322 (0.0253)	-0.0493 (0.0280)	-0.0299 (0.0253)	-0.0638* (0.0305)
Professional lower-middle	0.0198 (0.0188)	0.0107 (0.0212)	0.0207 (0.0187)	0.00256 (0.0232)
Economic lower-middle	0 (.)	0 (.)	0 (.)	0 (.)
Skilled	-0.0104 (0.0182)	-0.0107 (0.0207)	-0.00723 (0.0182)	-0.0138 (0.0233)
Unskilled/semi-skilled	-0.0139 (0.0199)	-0.0309 (0.0227)	-0.0129 (0.0199)	-0.0333 (0.0257)
Farmers, fishermen, foresters	0.0128 (0.0410)	0.0157 (0.0486)	0.0106 (0.0408)	-0.000628 (0.0509)
Welfare, transference	0.0207 (0.0202)	0.0172 (0.0246)	0.0182 (0.0201)	0.00749 (0.0270)
Missing	0.144*** (0.0278)	0.0657 (0.0780)	0.0964*** (0.0284)	-0.0570 (0.0935)
GPA	No	Yes	No	Yes
Educational level	No	No	Yes	Yes
Gender	No	No	No	Yes
Immigrant background	No	No	No	Yes
Income	No	No	No	Yes
School F.E	No	No	No	Yes
Constant	0.351*** (0.0145)	1.348*** (0.176)	0.343*** (0.0145)	1.610*** (0.184)
Observations	15453	11575	15453	11564
Robust standard errors in parentheses				
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				
^a The reference group is economic lower-middle classes.				

Controlling for highest educational attainment level at the start of the teaching career (model 3) does not alter the coefficients as they remain statistically significant at the 5% level, and the effect (in difference) is almost the same. Hence, educational level (at the beginning of teaching career) cannot explain the attrition difference for the higher classes. However,

controlling for GPA (model 2), this difference is no longer statistically significant for three of the four groups. Only the economic elite has a statistically significant coefficient after controlling for grades. This means that for all other classes who had a significantly higher attrition rate in model 1, this effect can be explained by GPA. The positive mediation indicates a consistent mediation; people from higher classes get better grades and higher grades are positively associated with attrition. This is also supported by descriptive statistics in chapter 3 (table 3.6), that show economic lower-middle has a lower GPA than the average of the entire population and cultural upper-middle and elites score higher than the average.

Interestingly, the reason why there is no differences between economic lower-middle class and economic elite in model 4 is because of differences in income (appendix table A4.5). Teachers from the economic elite earn less than the economic lower-middle class, which is why this group has a higher attrition rate (in models without income). Inclusion of income, moreover, make coefficients for cultural lower-middle and professional upper-middle classes significant. The indirect mediation effect of income can therefore explain differences in attrition rates between teachers from the two classes and economic lower-middle. The coefficient is negative, which means that fewer teachers leave teaching once income is held constant. Comparing teachers from the three groups with same income, more teachers from economic lower-middle leave teaching. The expected directionality of mediation effect suggests that teachers from cultural lower-middle and professional upper-middle earn more than teachers from economic lower-middle, which explain the difference in attrition.

4.2.3 Differences between social background groups over time

Figure 4.3 show differences in attrition by year 1 and 5 as explained above. Overlapping confidence intervals (C.I) show statistically non-significant differences in attrition, and only in year 5 are some coefficients statistically significant.

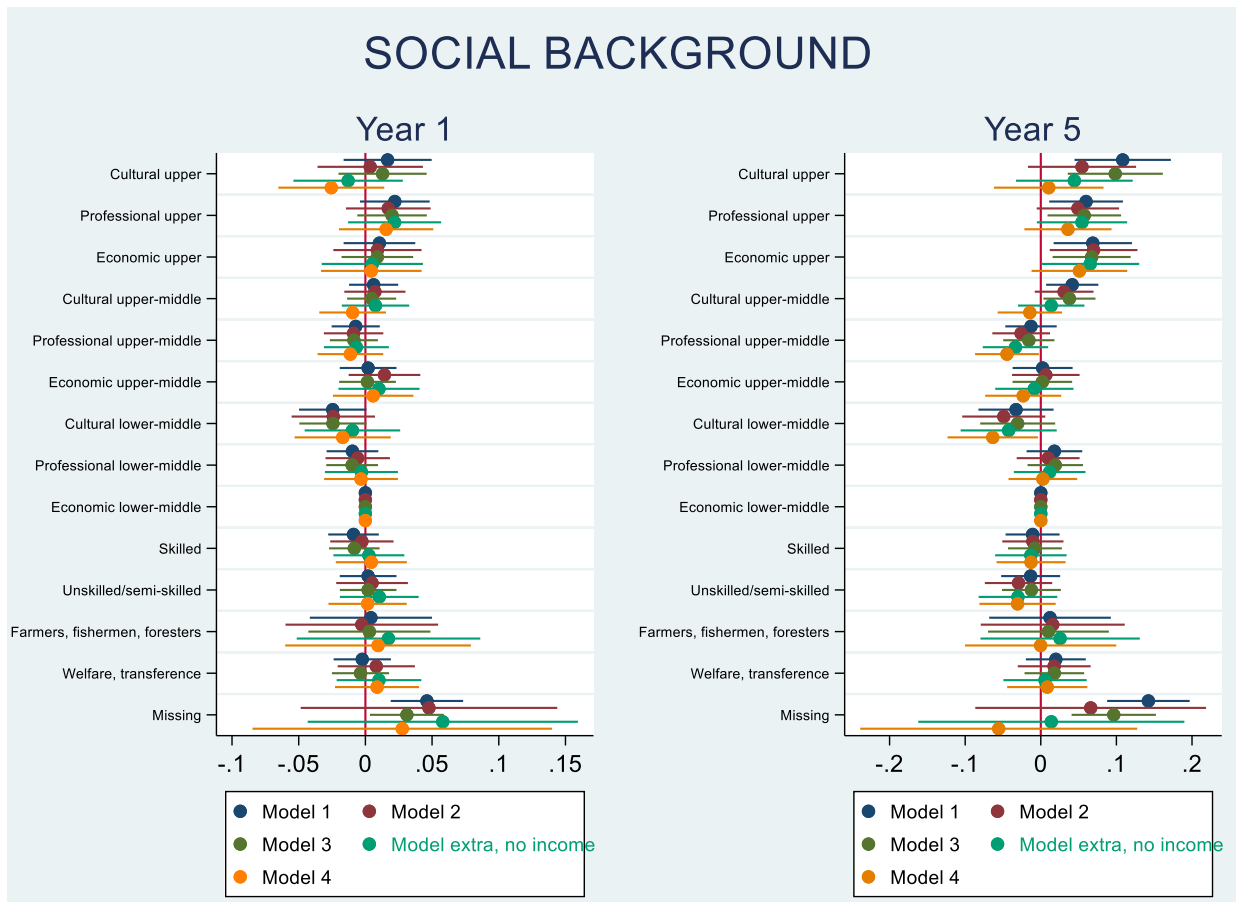


Figure 4.3: Comparison of models for year 1 and for year 5. Points give coefficients with their respective 95% C.I. Baseline, 0, for no difference between different class distinctions with economic lower-middle as reference group; i.e. statistically non-significant

From year 1 to year 5, the effect is increasing for the classes that are statistically significant. Although there were no statistical significant difference between groups by year 1, even if it had been this difference would have been stronger by year 5. For example; for the economic elite the difference in attrition to the economic lower-middle class increases from 1.04 percentage-points after one year to 7 percentage-points after five years of teaching. For teachers from “Cultural upper”, the difference in attrition to the Economic lower-middle goes from 1.8 percentage-points by year 1 (table 4.3) to 11.1 percentage-points after five years (table 4.4) and after nine years the difference between the two classes are 15.8 percentage-points (table A4.6, appendix).

Figure 4.4 shows coefficients of social background after nine years of teaching. After nine years, the only class that has a statistically significant different attrition rate to the economic lower-middle class is the cultural elite. This can be explained by GPA, school F.E and

income, as models 2 (red) and 4 (yellow) demonstrate where the C.I. to the plot coefficients touch the baseline (also appendix table A4.3). In contention to what I expected, this trend is not increasing over time, and hence difference in attrition rate is only significant the first few years. Moreover, there is only a difference in attrition for the higher class-distinctions compared to teachers from the economic lower-middle class. This stops sometime after five years (except for the cultural elite), as most coefficients are no longer statistically significant by year nine.

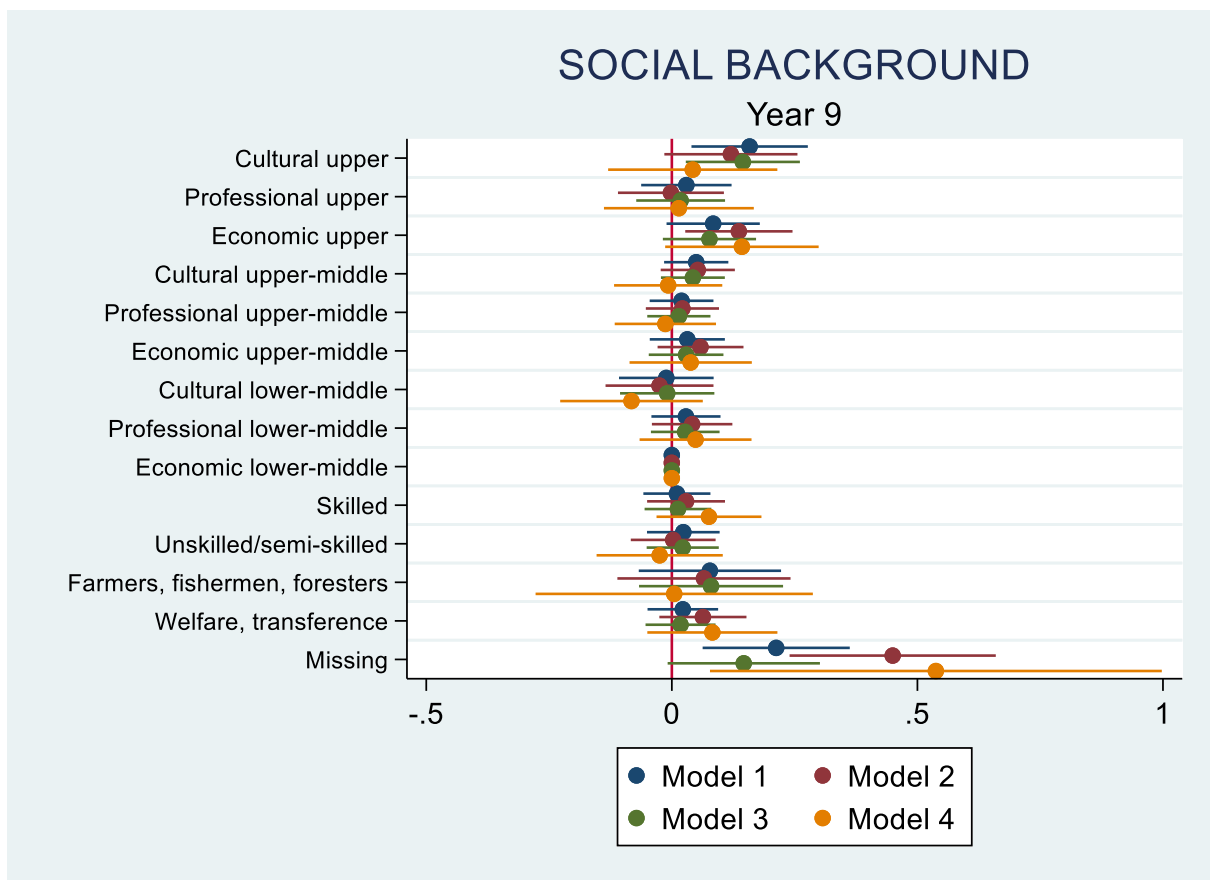


Figure 4.4: Models for year 9. Points give coefficients with their respective 95% C.I. Baseline, 0, for no difference between different class distinctions with economic lower-middle as reference group; i.e. statistically non-significant

Another notable result is that, although not statistically different, teachers from the cultural lower-middle class have in every examined time-points the lowest attrition rate. From year 1 to year 5 the difference increase. Hence whereas the difference increase in the upper-classes where more teachers leave, teachers from the cultural lower-middle have the opposite effect and leave less relative to economic lower-middle. Moreover, figure 4.4 and appendix table

A4.6 show how the only class by year 9 to have a lower attrition rate than economic lower-middle is teachers from the cultural lower-middle, albeit statistically non-significant. Moreover, relative to economic lower-middle's horizontal class-position, teachers from economic lower-middle class seem to have higher attrition the first five years although not statistically different from the other lower-middle class groups.

A final remark is needed for the size of the groups for year 5 and year 9. Chapter 3.2 discussed the advantages and possible limitations of using the ORDC scheme for this population. The ORDC scheme has 14 categories, which make information more nuanced and refined, but it also risk small sample size for some categories. The number of observations are reduced each year and affect some class-categories more than others. The statistical precision for year 5 and 9 might have been reduced. Due to fewer observations by year 5 than year 1, some of the groups might be too small to produce statistical significant coefficient due to this reduced precision. Furthermore, although I find a statistically significant attrition rate for the cultural elite by year 9, there are less than one hundred observation for this group that year. Some caution needs to be applied when reading the result, although the associated p-value for the coefficients for cultural elite by year 9 is 0.009.

4.3 MINORITY BACKGROUND

This section of chapter 4 seeks to examine differences in attrition for people with different minority background. Lindsay et al., (2017) found a gap in selectivity of entering teaching among different ethnic groups. Moreover, in many studies, the number of minorities have been so few that they have been dropped from the study due to too small statistical power (Murnane et al., 1988; Murnane et al., 1989; With, 2016; 2018). Most of the international research use ethnicity/race or country of origin as proxy for minority background, whereas I use immigrant background. The difference in categorisation of minorities could affect the results. However, as international research find minority groups have higher propensity to leave teaching (Addi-Racah, 2005; Borman & Dowling, 2008; Hancock & Scherff, 2010; Scafidi et al., 2007; Watt & Richardson, 2008), I expect similar results in this thesis and that the difference will be more pronounced over time.

4.3.1 Differences between minority groups by year 1

Table 4.5 displays differences in attrition rates after one year for teachers with minority background relative to teachers born in Norway to Norwegian-born parents (hereafter referred to as “Norwegian”). In contrast to the previous independent variables (gender and social background), the coefficients for immigrant- and mixed-Norwegian background are statistically significant at 5% significance level already by year 1 (model 1). Contrary to my expectations, teachers with immigrant and mixed-Norwegian backgrounds leave more than Norwegian teachers. This indicates that already from the outset teachers with immigrant background (first generation Norwegians) and mixed-Norwegian background leave more and are different from Norwegian teachers. Immigrant teachers have a higher propensity to quit by 4.88 percentage-points to Norwegians, and teachers with ties to Norway have a higher attrition rate by 2.58 percentage-points.

Table 4.5: LPM attrition differences between minority background groups by year 1

Variables ^a	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Model 4 Full model
	By year 1	By year 1	By year 1	By year 1
Born Norwegian	0	0	0	0
	(.)	(.)	(.)	(.)
Immigrant	0.0488***	0.0369	0.0368***	0.0415
	(0.0106)	(0.0277)	(0.0108)	(0.0336)
Mixed Norwegian background	0.0258**	0.0150	0.0256**	0.0145
	(0.00976)	(0.0123)	(0.00973)	(0.0131)
GPA	No	Yes	No	Yes
Educational level	No	No	Yes	Yes
Gender	No	No	No	Yes
Social Background	No	No	No	Yes
Income	No	No	No	Yes
School F.E	No	No	No	Yes
Constant	0.127***	0.482***	0.123***	0.723***
	(0.00212)	(0.103)	(0.00215)	(0.120)
Observations	27304	16260	27304	15501
Robust standard errors in parentheses				
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				
^a The reference group is born in Norway to Norwegian-born parents.				

When controlling for highest educational attainment level (model 3) at the start of the teaching career, the coefficients are still statistically significant. Education does not explain the difference in attrition for the different minority groups.

However, coefficients for both groups change when controlling for GPA (model 2). The difference is smaller and they are no longer statistically significant. GPA, then, might explain the difference in attrition rates by year 1 for the different minority groups, relative to Norwegians. Referring back to figure 3.2, GPA and attrition is shown to have a curvilinear relationship. Moreover, table 3.7 show teachers with immigrant- or mixed-Norwegian backgrounds score lower than the average. The direct effect is positive, and according to the directionality of mediation, we understand this effect as: teachers with minority backgrounds have a lower GPA, and lower grades is associated with higher risk of leaving. However, some caution is needed when interpreting this coefficient as the S.E is twice as large when adding GPA. Figure 4.5 show how the C.I to the coefficient touch the baseline, but it also show that the confidence intervals overlap. GPA could explain some of the attrition-difference of teachers with minority background, but it could also be that inclusion of GPA reduces precision of estimated effects.

4.3.2 Differences between minority groups by year 5

In table 4.6, we see teachers with minority backgrounds still have a statistically significant different attrition rate from Norwegian teachers after five years. The coefficients to both immigrants and mixed Norwegian background are statistically significant under the 5% significance level with a p-value of 0.000 (model 1). After five years, the attrition rate for immigrant teachers are 14.3 percentage-points higher than Norwegians, and 7.53 percentage-points higher for teachers with mixed Norwegian background.

Table 4.6: LPM attrition differences between minority background groups by year 5

Variables ^a	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Model 4 Full model
	By year 5	By year 5	By year 5	By year 5
Born Norwegian	0	0	0	0
	(.)	(.)	(.)	(.)
Immigrant	0.143***	0.0983*	0.107***	0.138**
	(0.0217)	(0.0459)	(0.0221)	(0.0466)
Mixed Norwegian background	0.0753***	0.0606**	0.0747***	0.0315
	(0.0183)	(0.0212)	(0.0182)	(0.0215)
GPA	No	Yes	No	Yes
Educational level	No	No	Yes	Yes
Gender	No	No	No	Yes
Social Background	No	No	No	Yes
Income	No	No	No	Yes
School F.E	No	No	No	Yes
Constant	0.357***	1.311***	0.348***	1.661***
	(0.00403)	(0.175)	(0.00408)	(0.186)
Observations	15450	11574	15450	11563
Robust standard errors in parentheses				
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				
^a The reference group is born in Norway to Norwegian-born parents.				

Educational level (model 3) and GPA (model 2) do not explain differences in attrition between minority groups and the majority group. Unlike after year one, coefficients remain statistically significant and about the same in effect size when controlling for GPA, although the p-value increase and the coefficient is only significant at the 5% level. More intuitively; teachers with minority backgrounds have significantly different attrition rates to Norwegian teachers after five years, even when GPA or educational level is held constant. Hence, whereas GPA might explain the difference in attrition after one year, there are other factors that explain attrition more substantially after year five.

Model 4 with full set of controls show difference in attrition between the two minority groups to the Norwegian majority. Teachers with mixed Norwegian background no longer have statistically significant higher probability of leaving than teachers born in Norway to Norwegian-born parents. By backtracking the steps, including one variable at a time, I find that sum of personal income (from year 1) explain attrition differences by year 5 (appendix table A4.8). More teachers from mixed-Norwegian group leave teaching, hence with the expected directionality of mediation effect we learn that mixed-Norwegian teachers earn less

than Norwegian teachers and higher wages is negatively associated with increased risk of leaving.

Interestingly, the difference in attrition rate for immigrant teachers remains statistically significant after five years of teaching, even with the full set of controls (model 4). Holding all the control variables constant, immigrants have a different and higher attrition rate than Norwegian teachers. Immigrant background in this model has a direct effect on teacher attrition, which means that there are other unaccounted variables that explain attrition differences between minority immigrant teachers and majority Norwegian teachers.

4.3.3 Differences between minority groups over time

The results from year 1 and 5 are summarised in Figure 4.5, where model 1 (blue) show there are significantly different attrition rates for minority teachers to majority Norwegian teachers. The C.I to model 2's coefficient (red) for year 1 touch the baseline. One interpretation is that GPA is a mediator; explaining the difference in attrition. Another is that because the C.I become twice as large (as C.I in model 1) and overlap, the non-significance can be understood as loss of precision due to missing values and reduced statistical power. In this case, it seems reasonable to assume it is the latter. The plot coefficients are very similar in year 1, indicating that there are at best small mediating effects.

The coefficients for minority groups remain statistically significant by year five in teaching, which means there are significant differences in attrition between minority and majority teachers. Contrary to my expectations GPA, education or full set of control variables cannot explain the difference in attrition for immigrant teachers. For teachers with mixed-Norwegian backgrounds, Figure 4.5 show that the C.I for model 4 (yellow) touch the baseline and the plot coefficient is closer to zero. Income explain the difference in attrition for this teacher group, and has a mediating effect on attrition.

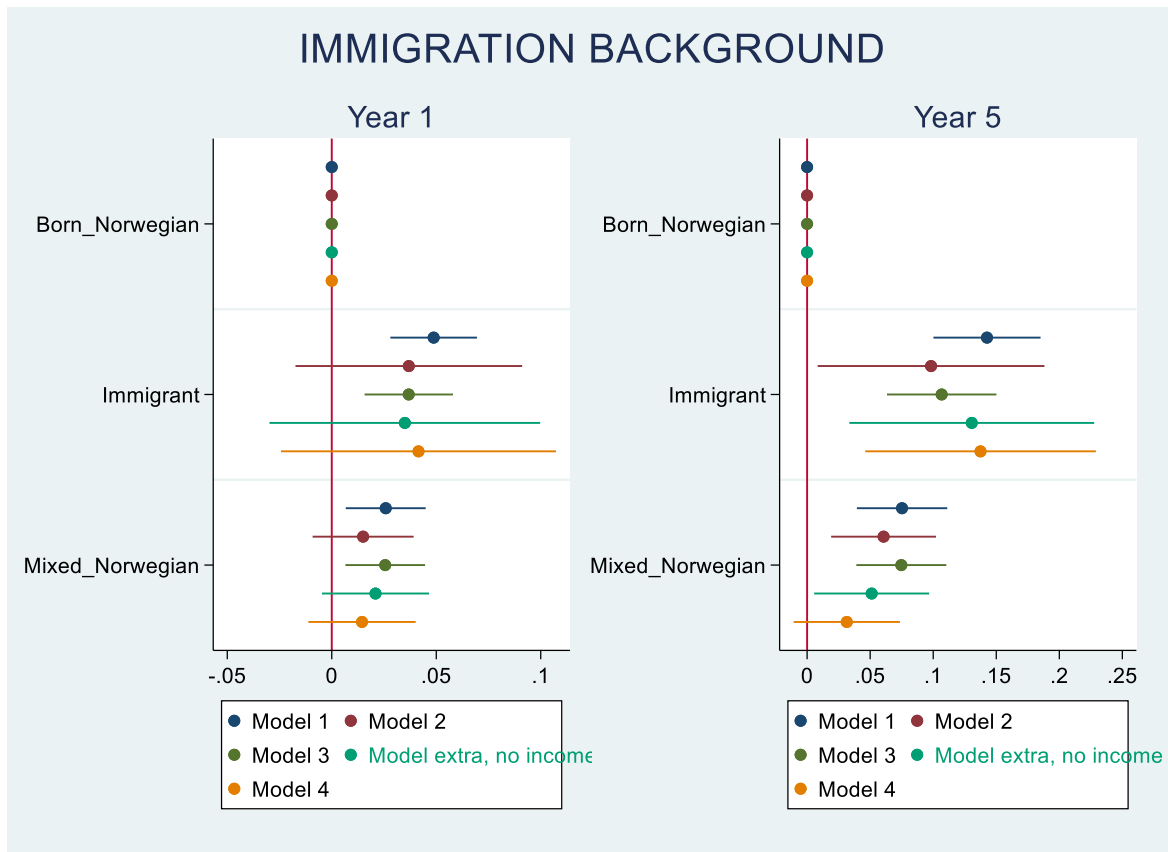


Figure 4.5: Comparison of models for year 1 and for year 5. Points give coefficients with their respective 95% C.I. Baseline, 0, for no difference between minority background groups with Norwegian-born as reference group; i.e. statistically non-significant

The difference in attrition rates between majority and minority teachers might stop sometime after five years. By year 9, none of the coefficients are statistically significant, and Figure 4.6 show how all C.I to the plot coefficients touch the baseline. However, some caution is needed when interpreting coefficients for year 9. Minority groups made up 5% each of the sample at entry-point to teaching (year 0), and by year 9 the sample size for minority groups are very small. This can be seen with S.E becoming 3.5 times larger from year 1 to year 9 for mixed-Norwegian background teachers and 6 times larger for immigrant teachers. Moreover, the p-value for the immigrant background-coefficient is 0.075, and not far from being significant. Some caution is therefore needed due to reduced statistical power, and I cannot with confidence conclude that there are no differences in attrition by year 9.

Including all control variables in year 9, changes the coefficient's sign to negative for teachers with immigrant background. When backtracking the steps, I find

that GPA, income and school F.E could have explained some of the attrition difference, had there been a statistical significant difference in model 1. Income and school F.E reduce estimated effect, and might therefore have some mediating effect. Interestingly, the sign changes when adding social background. Intuitively this could be understood as when holding social origin constant, fewer teachers with immigrant background leave teaching. Moreover, because more teachers leave when social background is not controlled for, this could suggest there exist socio-economic differences between majority and minority groups. Although I was mainly interested in the first five years, this result is interesting because it could indicate greater disparities between groups which is visible over time.

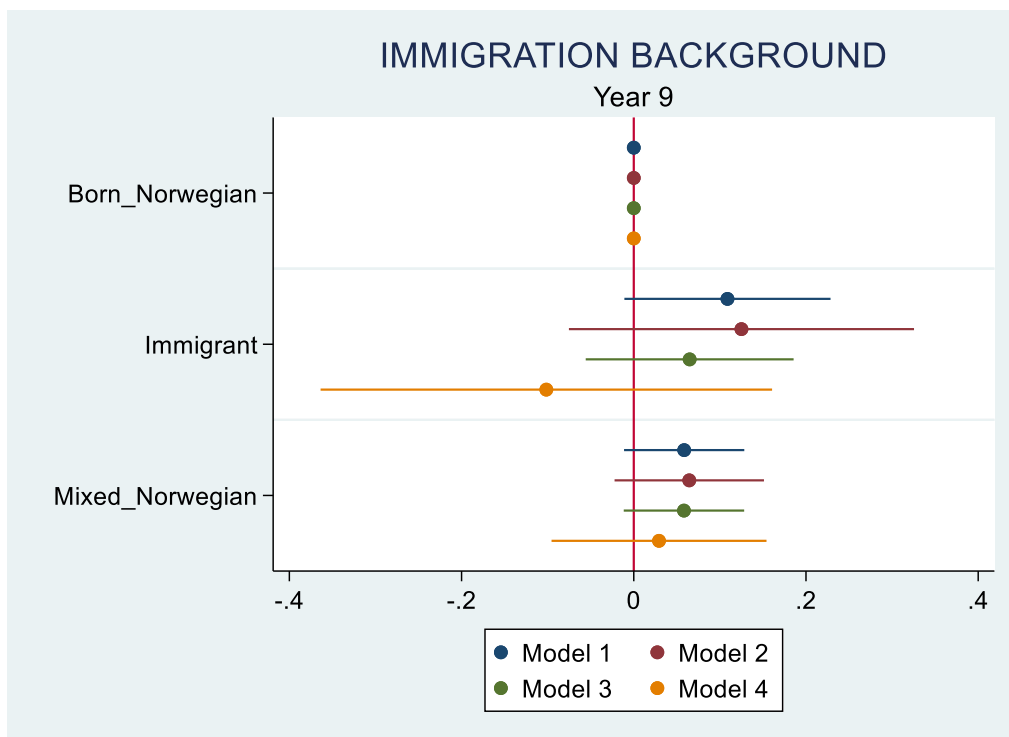


Figure 4.6: Models for year 9. Points give coefficients with their respective 95% C.I. Baseline, 0, for no difference between minority background groups with Norwegian-born as reference group; i.e. statistically non-significant

At the beginning of this section, I also hypothesised that the difference will increase over time. In accordance with this hypothesis, the difference in attrition between groups increased from year 1 to year 5. For immigrant teachers, the difference in attrition increases from 5 to 14 percentage-points by year 5, and for mixed-Norwegian teachers the attrition difference

increases from 2.6 to 7.5 percentage-points. However, the difference do not continuously increase, and by year 9 the coefficient is smaller than it was in year 5 (and is also possibly non-significant).

4.4 SENSITIVITY TESTS OF THE MODELS

4.4.1 Robust testing validity of model-comparisons: comparing main results to results from same-N-models

As explained in chapter 3, the regressions were run for all observed individuals for each year to maintain as high precision of estimates as possible. However, varying number of observations (N) might make it more difficult to distinguish whether differences between models are due to mediation or differences in sample characteristics. Regressions were therefore re-run for models with same N and compared with main results. This entail that for year 1, almost 12000 observations were dropped from the original model. For year 5, about 4000 observations were deleted. The results from models with the same N are put in appendix tables A4.10 – A4.12.

Results from models with same N are not very different to the main results, although some coefficients are no longer statistically significant when the observation number is reduced. Fewer statistically significant coefficients could be due to higher S.E, and when the S.E to a coefficient increases, the risk for chance finding increase (Angrist & Pischke, 2015, p. 62). This means that some precision is lost, which makes it more difficult to predict significant differences in attrition between teacher groups. Reduction in statistical power is a bit more pronounced for groups that already have smaller sample sizes. However, in most cases the coefficients are quite similar with only minor reduction in effect size. Moreover, the coefficients in models with varying and same N have the same directionality. Hence, although there are some smaller differences, these are not too problematic and my results are robust for comparison between models with varying number of observations.

4.4.2 Testing the method – LPM vs Logistic Regression.

Chapter 3.3.1 explained some of the strengths and weaknesses of LPM. When the dependent variable is dichotomous, logistic regression is often applied. From logistic regressions, it is possible to calculate the average marginal effects (AME), which coincides with LPM in terms of interpretation. To test the method, the analyses were re-run using logistic regression. As

depicted in table A4.13, A4.14 and A4.15 in the appendix, the results are robust and hold even when changing statistical method.

None of the models produced significantly different results. For Model 1, 2 and 3, which are all run with robust S.E, the results were almost identical. Results from both methods produce almost identical coefficients in terms of estimated effect size and statistical significance, as well as size of coefficients' associated S.E. Some of the S.E were slightly different, but only at the ten-thousandths place (10^{-4}). Stata does not allow for robust S.E when running fixed-effects with logistic regression, and for model 4 logistic regressions were run with conventional S.E. Coefficients for extra model (with full set of controls except for income) and model 4 (with full set of controls) differ from the LPM models, but are most likely due to different types of S.E. Thus, what I take from model 4 (table A4.13-15) is the directionality of trends (shown by the coefficients' sign), and not effect or significance. For both year 1 and year 5 in all three logistic/AME tables, coefficients have the same sign in model 4 to the original model. Hence, running sensitivity tests for the method, the results hold and are robust.

4.4.3 Testing the models with time-varying variables: results sensitive to time-varying changes?

The last test that was conducted was a comparison between the original models to models that accounted for time-varying changes. Chapter 3.2.3 explained how income, education and school/work-place might change over time. These changes could affect the result, and regressions for year 5 were re-run substituting the beginning-of-the-career variables with time-varying variables for the corresponding year. Most of the coefficients are robust when including time-varying variables, although some of the effects are closer to zero. This suggests that for some teacher groups, a bit more of the attrition difference is explained (by indirect, or mediated, effect) when including time-varying variables. Most of the coefficients' 95% C.I overlap, indicating no statistically difference at the 5% level (as depicted in appendix figures A4.1-A4.3). In fact, minority group "mixed-Norwegian" was very robust for time-varying changes, and the coefficient remained as good as the same when substituting with time-varying variables (figure A4.3).

The most significant difference is found for teachers with immigrant background. In the main analysis, there was a difference between immigrant and Norwegian teachers even after controlling for full set of control variables (model 4 in table 4.6 or figure 4.5). However, when including all the time-varying variables (appendix figure A4.3) this difference turns negative and zero. Backtracking the steps, the coefficient is no longer statistically different from zero when introducing sum of personal income to the model, and income by year 5 can explain attrition differences for year 5. The coefficient changes sign from positive to negative and is closer to zero when introducing time-varying school F.E. The change suggests that time-varying school F.E has a mediating suppressive effect on attrition differences. Once teachers' work-place for the corresponding year is accounted for, fewer immigrant teachers relative to Norwegian teachers leave teaching. Hence, teachers with immigrant background are sensitive to changes over time, where income for corresponding year and current work-place seem to explain the difference in attrition between the groups. Thus beginning-of-the-career variables are robust for time-varying changes, although there are some smaller differences. In some cases time-varying variables explain somewhat more of the attrition group-differences.

4.5 SUMMARY

Gender is not associated with teacher attrition after one year of teaching. However, after a few years into teaching there is a statistically significant and this remains statistically significant for the registered period. In addition, the difference in attrition between male and female teachers increases over time. The difference in attrition is explained by income (from first year in teaching); where women earn less than men, and teachers with lower wages leave the profession more often than people who earn more.

There are no differences in attrition rates between teachers from different social backgrounds after one year of teaching. After five years of teaching, attrition is statistically different and higher for Cultural upper-middle classes and the elite classes, relative to economic lower-middle. The other classes have no statistically significant different attrition rates than economic lower-middle. The difference between classes is higher in year five than in year 1. Excluding the economic elite, difference in attrition can be explained by GPA. Teachers in these classes get, on average, better grades than Economic lower-middle, and people with

higher GPA is more likely to quit teaching. Income explains the difference in attrition effect for the economic elite. Although not statistically different, cultural lower-middle classes have in all the time-points lower propensity to quit teaching. Only the cultural elite has a statistically significant different attrition rate than economic lower-middle by year 9. However, some caution is needed as the number of observations is reduced by each observation year. Hence by year 9, certain groups have small number of observations which reduces the statistical power and it is difficult to get precise estimates, which in turn increases the risk of chance findings.

Teachers with minority backgrounds have different attrition rate from Norwegian teachers already from the start. This difference increases by year 5, but by year 9 the difference is smaller than it was in year 1. GPA might explain the difference in attrition by year 1 for both minority groups, but a more likely explanation is that by introducing GPA, the S.E increases which turn the difference 0. For year 5, the difference between immigrant teachers and Norwegian teachers are statistically different even after including all control variables. For teachers with mixed-Norwegian background, the difference in attrition rate can be explained by sum of personal income (by year 1). As this group has higher attrition than Norwegian teachers, the difference is explained by teachers with mixed-Norwegian background earning less than Norwegian teachers, and lower wages are associated with higher attrition rates. After nine years, there are no significant differences in attrition rates between the groups. However, some caution is needed as the S.E are at least 3 times larger for both groups in year 9 than it was in year 1. Hence, there might not be any difference in attrition by year 9, but this cannot be concluded with confidence as the number of observation within the minority groups are too small and lack precision.

5 DISCUSSION: TEACHER ATTRITION AND DEMOGRAPHIC GROUPS WITHIN THE NORWEGIAN TEACHING POPULATION

Teachers have an important function for a knowledge-based society, and are responsible for children's learning outcomes and often serve as role-models (With, 2016, p.6; Spernes, 2014, p.6). Thus, studying differences in attrition patterns for different teacher groups are both sociologically and educationally important. From a sociological standpoint, differences in attrition patterns for different teacher groups can reflect issues with societal inequality and issues with educational policy-making. The latter is also an issue from an educational perspective. Furthermore, differences in attrition rates between teacher groups can also affect educational quality and to varying degrees for the student population. Despite concerns about teacher attrition and focus on teachers' reason for leaving (e.g. Mausethagen, 2013a; 2013b; Skaalvik & Skaalvik, 2010; 2015), there is little research on demographic characteristics of leavers. This thesis aims to fill the gap in the literature on demographic characteristics of leavers and differences in attrition rates.

This thesis has three aims; 1) examine differences in attrition rates between groups within the Norwegian teaching population, 2) examine how these differences can be explained and 3) how attrition rates between groups develop over time. The chapter follows the same outline as has been done so far in the thesis; considering each demographic group at a time. First, I examine attrition differences for year 1 and 5, which is followed by interpretation of results from mediation analysis. Literature from chapter 2 and descriptive statistics from chapter 3 are used for interpretation of attrition differences between groups. Furthermore, the data for the analyses do not allow for hard conclusions on why there exists attrition differences, and the following interpretations should be considered as an attempt to specify how the mechanisms in this thesis can affect attrition rates and decisions to exit the teaching occupation.

5.1 GENDER

According to literature, teaching is considered more as a feminine occupation because it requires soft skills; i.e. the skill of forming inter-personal bonds with children and their parents (DeArmond et al., 2018). This could contribute to uphold stereotypical gender-specific occupations (Halrynjo & Teigen, 2016), and female teachers are overrepresented in compulsory schools (With, 2016, p.16; Aamodt & Næsheim, 2019). Moreover, when teachers quit, far more women go to other occupations that involves soft skills and working with or for children (Aamodt and Næsheim, 2019).

My data demonstrates that teaching is a female-dominated profession as 75% of the beginning compulsory schoolteachers (2003-2013) are women. Moreover, it was proposed in chapter 2 that women might choose teaching because the occupation does not penalise temporary career-breaks or part-time employment with loss in status or reduced relative wages (With, 2016, p.42). In this sense, they might not have planned a life-long career in teaching because they have planned from the outset to forego a career (at least for a while) to start and take care of a family (Ingersoll, 2003; Murnane et al, 1988; Murnane et al. 1989; Watt & Richardson, 2008). Moreover, as noted by Addi-Racah, when men choose teaching they go against a sex-typical occupation (2005, p.741). Hence, there might be some gendered reasons or societal expectations in selectivity into teaching. Structural constraints might also limit perceived possibilities (Gambetta, 1987, p.8), which is supported by Bandura et al. (2001, p.196) who finds that perceived self-efficacy affects perceived future occupational efficacy. Although this study does not test for societal expectations or other reasons for entering teaching, family-reasons can play a role and the aspect is useful to keep in mind when discussing the results.

5.1.1 Differences in attrition rates

The first aim of this thesis was to examine whether there exist differences in attrition rates between men and women. I find no differences in attrition rates between men and women in year 1. However, by year 5 more women have left teaching than their male colleagues. After nine years, this difference in attrition have even increased between female and male teachers. This is somewhat unexpected as the Norwegian literature on teacher attrition and gender have found the opposite where more men than women leave teaching (With, 2017, p.1730; Falch and Strøm, 2005, p.623). Falch and Strøm (2005) argue that the fact that they find men have a

higher probability of leaving teaching than women might be due to the Scandinavian welfare system with subsidised leave, day-care and more generous rules for parental leave. Moreover, when treating teachers on parental leave as “quitters”, the gender effect is almost equal and hence they conclude that family-reasons cannot explain the difference in gendered attrition rates between Norway and the US (Falch and Strøm, 2005, p.623).

My results correspond to previous results from international research that find higher quit propensities for women (Borman and Dowling, 2008; Murnane and Olsen, 1990; Murnane et al. 1988; 1989; Singer (1993) in Singer and Willett, 2003; Stinebrickner, 2002; Lindqvist et al 2014). In this study, teachers on parental leave are not considered as leavers (unlike many of the American research), and hence I only study teachers who have resigned from teaching. However, whether one of these reasons is to pursue starting or taking care of the family is not controlled for. Societal expectations might still place structural constraints on women, at least for a period, and encouraging them to quit teaching for a period while pursuing raising children. This study looks at teachers’ first teaching spell. The leavers might return to the profession, as Lindqvist et al. (2014) found in their study in attrition differences between genders among the Swedish teaching population. They argue that it is imperative to note the research’s design, because the focus of the study alters the image of attrition (Lindqvist et al., 2014, p.101). Results from this study are similar to Lindqvist et al.’s study (2014), where, when only considering teachers first spell and parental leave is not controlled for, women tend to have higher attrition rates than men. When the researcher controlled for parental leave, the difference between genders was no longer statistically significant (Lindqvist et al., 2014, p.98), which suggests a limitation to my own study that future research should include.

Differences in attrition rates increase over time. Whereas female teachers had a higher attrition rate of 0.9 percentage-points compared to men (although statistically non-significant) in year 1, the difference increases and by year 5 the difference is 3.8 percentage-points. The difference in attrition between male and female teachers with nine years work experience are 5.8 percentage-points. It is interesting that there is no difference after the first year of teaching, but that after a few years into teaching there is a difference. It could be that selectivity to the profession affect attrition and work as a motivator, or that one year is not enough to create differences between genders. Addi-Racah, suggested (although from an

Israeli context) that men might face social consequences of choosing a gender-atypical, which over time, encourage them to switch jobs (2005, p.741).

Another reason could be that difference in attrition rates between genders can be interpreted as the likelihood of starting a family, as proposed by Lindqvist et al. (2014, p.98). This means that the initial years the proportion of graduates with a teaching degree will increasingly enter teaching, but with each year the likelihood of them having children increases. Thus according to their study, by year 3 the trend changes and fewer graduates work in teaching (Lindqvist et al., 2014, p.98). I do not control for children, but this theory might explain how there are differences between genders by year 5. The next section presents some possible reasons for the difference in attrition rates.

5.1.2 Differences examined

5.1.2.1 *Opportunities and aspirations*

To examine how the differences might be explained, mediation analysis was applied and controls were added to the model. It was suggested that education and educational performance might be predictors for increased attrition. Research have found that teachers' educational field, educational level and grade point averages (GPA) are correlated with increased risk for leaving teaching (Murnane et al., 1988; Murnane et al., 1989; Harris & Adams, 2007; Ingersoll, 2001; With, 2017). This was seen in terms of social mobility, increased female labour participation and expansion of education.

Although educational level and educational performance might affect attrition rates, they do not explain the difference in attrition rates between genders in this study. The coefficients remain statistically significant after adding the control variables and are about the same as the original model for both year 5 and 9. This could be interpreted as ambitions between genders have become more similar. If individuals are pulled out of the profession due to other more tempting opportunities, this affect both men and women to a similar extent. With (2016, p.73) also proposes that the decline in teacher recruits might be due to increased opportunities for women in the labour market where they can manoeuvre more freely and chase other careers as men have been able to.

Hence, contrary to Falch and Strøm (2005, p.623) who propose that their result (of men having a higher propensity to quit than women) might be due to an unequal labour market where men have higher opportunity costs in other occupations than teaching in terms of expected wages, there is no evidence for this prevalence in my study. If anything, in line with the *liberal view of the OED triangle* (Goldthorpe, 2016, p.101), it would rather seem like educational expansion have created a more equal labour market between genders. According to this view, expansion of education has strengthened the E-D association (education-destination) and created more equality based on educational credentials rather than origin (Goldthorpe, 2016, p.101).

However, the results should also be seen in terms of the educational composition of teachers. Table 3.3 shows how similar men and women are in terms of GPA and completed higher educational level. This could indicate that in terms of ambitions, the teaching population is quite homogenous. Grades are also normally distributed with a bell-shaped curve, and the large majority is centred around the average of 4. If teachers are homogenous within the group, then this could also indicate that they have a different set of values from other occupational groups. Referring back to Watt and Richardson (2008); teachers who wanted to remain in teaching were those who valued altruistic and intrinsic-type of motivational factors (Watt & Richardson, 2008, p.415). There are no big educational differences between genders in this sample. Most teachers have a lower-degree higher education (i.e. bachelor level) and score about average in terms of grades. This could suggest that male and female teachers on average have similar aspirations. Watt and Richardson (2008, p.425) find that teachers who are more likely to stay have lower aspirations and usually have lower GPA scores.

It could also be that higher educational level is not as in demand as educational fields. In this respect, opportunities in the labour market are also dependent on educational fields.

Goldthorpe (2016, p.102) suggests that the educational expansion might also have caused an inflation in educational credentials, which have created new distinctions for high status educational directions. This is supported by other researchers who emphasise the importance of considering educational hierarchy horizontally as well as vertically (Helland, 2006; With, 2018; Askvik, 2015; Helland & Wiborg, 2019; Strømme & Hansen, 2017). Moreover, research have found that attrition varies with educational field, where maths and science

teachers have a higher propensity for leaving teaching (With, 2017; Murnane & Olsen, 1990; Murnane et al, 1991; Ingersoll, 2003). Due to limitations in the number of observations, there is not enough statistical power in this study to separate teachers based on their educational field. A large majority of the compulsory-school teachers have completed a general teacher degree, and the data set did not distinguish what subject specialty these teachers have. For future studies, if more information about teachers' subject specialty is available, researchers should include this information as it might add important contributions to the field of study and our interpretation of teacher attrition.

5.1.2.2 *Income-variation and significance of money*

Income explain differences in attrition rates between genders at every observation points; for year 1, 3 and 9. Although there was no difference in attrition between genders in year 1, with the inclusion of income the coefficient became statistically significant, changed sign and the difference increased. This is what chapter 3.3.2 referred to as suppression effect, which means that by including income to the model, the difference in attrition rates was mediated through the indirect effect of income. When holding income constant and compare men and women with same income, there is a difference in attrition where more men leave the occupation. Furthermore, the inconsistent mediation suggests that women earn less than men do, and higher wages is negatively associated with attrition. In year 5 and 9, there was a statistical significant difference between attrition rates for men and women, where more women left teaching. When introducing *income*, the association is reduced and becomes non-significant, which means that the effect is explained and mediated through income.

One interpretation to this could be that extrinsic values such as income mean more to men. Once male and female teachers earn the same, more men leave teaching. The literature on the association between wages and attrition/turnover rates are quite extensive, although most of the literature are from an American context (Falch and Strøm, 2009; Harris & Adams, 2007; Murnane and Olsen, 1989; Stinebrickner, 1998; 2001; 2002). Research find a linear association between wages and attrition rates where increased income levels reduces the likelihood of teachers leaving the profession. In addition, according to literature, extrinsic values have been shown to mean more to men (Falch & Strøm, 2009; Ingersoll, 2003; Stinebrickner, 2001). The importance of extrinsic values is not measured with register data, and is an avenue worth exploring for future research. However, the role of extrinsic factors

and motivations might not be as important for teachers as intrinsic values are, as explored in chapter 2 (Watt & Richardson, 2008). Moreover, Marini et al. (1996) found no differences in extrinsic values between male and female workers over time. Hence, although income mediates attrition rates for year 1 through 9, there might be other underlying mechanisms that explain this effect.

The central government in Norway regulates teacher wages (Falch & Strøm, 2005, p.614). Chapter 2 outlined which formal criteria income levels are generally set by, which in short are based on individuals' 1) experience, 2) attained educational level, 3) percentage of full-time employment or 4) job-title/position. Understanding how differences in income are determined can help understand why there is a wage-gap that affect attrition rates between genders. The first, which concerns seniority-pay, is not very relevant for explaining differences in attrition rates in this study. I focus on beginning teachers, and most teachers are in their twenties or early thirties. The amount of accumulated experience that affect salaries will be limited. Table 3.3 showed that the proportions of men and women with postgraduate degrees are quite similar. If anything, in this sample, slightly more female teachers have completed a postgraduate degree, and hence educational level cannot explain the difference in income and attrition rates.

The third criteria for income level is percentage of full-time employment. It could be that more women work part-time. There can be several reasons why more women work in reduced full-time positions. One reasons is that more women might leave teaching, at least for a period, due to family-specific reasons. This would be consistent with what is mentioned previously in this chapter about women choosing teaching because it does not penalise career-breaks for teachers who want to pursue child-rearing activities (With, 2016, p.42). Moreover, it could also explain why the difference in income and attrition rates between genders increase, as Lindqvist et al. (2014, p.98) point out, that the likelihood of having children increase with time. Norway's parental-leave system allows parents to choose whether they want longer leave with lower-degree compensation, or shorter leave with full-compensation (Mjaaland, 2018, p.27). A possibility is that a female teacher might choose to work part-time to take care of the family or choose to go on a longer maternity leave with less compensation, and then decide to quit teaching for a period until the children are older. As

mentioned, family factors, such as being married, having children or receiving parental paid leave are not included in these analyses and I cannot control for this. However, Falch and Strøm (2005, p.623) argue that the quit behaviour of women in Norway differ from the US because of highly subsidised child-care, paid leave and flexibility in teachers' working time. Hence, the extent the welfare system and government funded parental schemes affect attrition rates is an important avenue that needs further examination.

Reduced full-time positions could also be a result of difference in coping mechanisms. Olson et al. (2019) found that male and female teachers coped with stress, challenges and emotions differently. Women connected closer with their students, embraced emotions and used them as a tool to create closeness. On the other hand, women also experienced more distress and emotional exhaustion. Distress and frustration with the profession can also be considered in terms of self-efficacy, and self-efficacy is strongly correlated with teacher burnout (Skaalvik & Skaalvik, 2010). The difference in pay, could therefore also suggest that there are differences in how male and female teachers handle stress, pressures and challenges. With reduced feeling of self-efficacy, teachers might reduce their percentage of full-time employment due to burnout, job-dissatisfaction and teacher apathy (Hancock and Scherff, 2010). This suggestion could also explain why the difference increase over time, as these factors might increasingly affect and strain teachers who cannot cope with the challenges they face.

The fourth criteria that income levels are set by; job position, could also affect differences in income for men and women. Although this study aimed at only focusing on teachers, the data set does not differentiate between people who are employed in the school administration or as teachers. Dahl et al. finds that the wage gap between male and female teachers in Norway can be explained by more men working in school administration in leadership positions. Moreover, Falch and Strøm (2005, p.623) find that principals and school leaders are more reluctant to leave. Another reason for the wage gap, according to Dahl et al., was that they did not distinguish between secondary school teachers and compulsory school teachers. Although this study only include compulsory school teachers, their finding could point to what is mentioned previously in this chapter that men on average might value extrinsic factors more than women. Chapter 2 suggested that teaching can be considered a flat

profession with limited opportunities for climbing a career ladder (Smith & Ulvik, 2017), and that occupational status increased with children's ages (Stromquist, 2018, p.14). Thus, although Watt and Richardson (2008) find that altruistic and intrinsic values mean more to teachers to remain in teaching, there could still be gendered differences in the extent these are valued.

5.2 SOCIAL BACKGROUND

Norwegian literature on teacher attrition have focused on negative aspects of teaching that contribute to discontent and increased risk of leaving (Skaalvik & Skaalvik, 2010; Mausethagen, 2013b). However, Smith and Ulvik (2017) propose that teacher attrition can also be viewed as a sign of agency, where teachers are in control of their own career choices. They are not just *pushed* into teaching or out of leaving, but some teachers are motivated to leave and *pulled* out. Moreover, Watt and Richardson (2008) find that Australian teachers who are most motivated to leave teaching have planned from the outset to leave the occupation. In this sense, teacher attrition could be a result of deliberate career switches and mobility. Investigation into opportunities, career paths, occupational- and educational choices have often been examined with social origin (e.g. Askvik, 2015; Helland & Wiborg, 2019; Borgen & Mastekaasa, 2018; Helland, 2006; Hansen & Mastekaasa 2006; Hansen, 2005; Goldthorpe, 2016; Boudon, 1974; Breen & Goldthorpe, 1997; Bourdieu, 1984;). These theories and research can help explain how differences in attrition between social groups can be understood and interpreted.

Although social selectivity to teaching is found to be declining, there does seem to be some self-selection as middle-class youth are over-represented in teacher education in Norway (With, 2018). This is present also in this data set, where almost 40% of the teachers come from upper-middle class and about 20% come from lower-middle backgrounds (table 3.4). In addition, With (2018) finds that the likelihood for entering different college courses varies with social origin. Individuals from high-income origins are least likely to enter teacher education, and individuals from higher cultural-capital backgrounds are more likely to enter teacher education than individuals from lower-capital backgrounds. This was also discussed in terms of theories on occupational- and task following (Chen et al., 2017). Not surprising, then, the two largest groups are cultural- and professional upper-middle, where families have

accumulated more cultural capital (table 3.4). According to the ORDC scheme (table 3.5), primary school teachers belong in cultural lower-middle classes, and hence according to occupational-following theories, it is a bit surprising that the number of teachers from this group is low (table 3.4)

The descriptive statistics suggest that there might be some self-selection into teaching from families who posit higher cultural capital. The self-selection can, as discussed in chapter 2, affect attrition rates. However, opportunities are also dependent on economic- and labour market conditions (With, 2017, pp.1728,1738), where more teachers leave when alternate career options are more prosperous (Falch and Strøm, 2009, p.122). The labour market can therefore place structural constraints on individuals' prospects and opportunities. Moreover, the constraints might affect social classes differently resulting in different attrition rates.

5.2.1 Differences in attrition rates

Consistent with human capital theories, where education is a type of accumulated capital (Becker, 1993; van de Werfhorst & Kraaykamp, 2001, pp. 297-298), there was no difference in attrition between social background groups after year 1. Although there could be other reasons for no attrition differences by year 1 between teachers with different social backgrounds, one explanation could be that after completing an educational degree they want to try out teaching first. Moreover, in order to use teaching as human capital, they would first need to accumulate enough experiences. Human capital is more general in the beginning of the career, which also means that it is more transferable. Hence, attrition will be highest during the early career-stages in teaching because the longer teachers stay the more *specific* and non-transferable the human capital becomes (Borman and Dowling, 2008, p.397).

By year 5, however, there are a few differences in attrition between teachers from different social backgrounds. Teachers from all the upper-classes, or elites, as well as cultural upper-middle class have a significantly higher attrition than teachers from economic lower-middle by year 5. This is consistent with previous results in the literature that find the proportion of *persisters* have a higher proportion coming from lower socio-economic-status (SES) backgrounds (Watt & Richardson, 2008). Reversely, leavers more often come from higher SES backgrounds. It could be that teachers from higher social distinctions never planned to stay in teaching (Watt & Richardson, 2008) and used teaching as a stepping-stone to prevent

downward mobility (Boudon, 1974; Breen & Goldthorpe, 1997). Or that teachers from higher social distinctions might have higher aspirations and ambitions (Lareau, 2003; Barone, 2006; With, 2016; Bandura et al, 2001). The next sections presents some interpretations in how differences might be explained.

According to Hansen's ORDC scheme (table 3.5) teachers belong in the cultural middle-class. Hence, inconsistent with theories on occupational- and task following (Chen et al., 2017), teachers from the cultural upper-middle class leave more than teachers from the economic lower-middle class. The coefficient for cultural lower-middle class is negative, consistent with the following-theories, but non-significant. This could mean there is no significant different attrition, but it could also be due to limited number of observations.

With fourteen social class-positions, the number of observations by year 9 reduces the precision of estimates significantly. This might explain why there is almost no significant difference between social background groups by year 9, but it could also be that there are no differences. No differences between social background groups could be affected by the U-curved attrition trend (Grissmer & Kirby, 1997; Harris & Adams, 2007), where most teachers leave during the five first years (Stinebrickner, 1998). Hence, according to this trend, beginning teachers leave the occupation more often (With, 2017, p.1736), when they have accumulated some human specific capital but still want to explore other career options (Watt & Richardson, 2008). Only the cultural elite has a significantly different attrition rate to economic lower-middle class. This suggests that the difference in attrition between the groups persists over time only for cultural upper-class.

5.2.2 Differences examined

5.2.2.1 Opportunities and accumulation of resources

Teachers from all the upper-classes, or elites, as well as cultural upper-middle have a significantly higher attrition rate from the economic lower-middle class in year 5. According to Bourdieu (1984) people from higher social strata can manage and position themselves more advantageously due to their accumulated cultural capital. This can be due to acquiring in-demand and higher educational credentials, as well as information about expected educational returns that enable them to guide themselves better on the labour market (With, 2018, p.176). Grade point average (GPA) and highest attained education level were therefore

added to the models to see whether the variables could explain some of the difference between social background groups.

Although research have found higher attrition rates from teachers holding a postgraduate degree (Harris & Adams, 2007; Murnane et al., 1988; With, 2017), educational level does not explain the difference in attrition between social groups in this thesis. This is interesting because proportions with a postgraduate degree increases with higher vertical class distinctions as well as horizontal (cultural classes have highest proportion master's graduates) (table 3.6). Moreover, it was proposed earlier in Chapter 2 that higher educational level might be more sought after in the labour market which could open up for more opportunities. This could suggest that there exist some form for educational- reproduction and following (Helland & Wiborg, 2019). However, rather than using educational level as a means of getting ahead on the labour market, this could reflect that higher strata have higher educational aspirations. Horizontally, teachers from higher economic classes have similar proportion of master graduates as teachers from lower cultural classes. This could indicate that teachers from cultural classes have an academic curiosity and follow in their parents' footsteps, although they do not use it on the labour market. They might have higher educational aspirations in completing postgraduate degrees, but not necessarily have higher career status aspirations.

On the other hand, it might also be, as mentioned above, that the educational expansion have created an inflation in credentials, with new distinctions for high status educational (Goldthorpe, 2016, p.102; Helland, 2006; With, 2018; Askvik, 2015; Helland & Wiborg, 2019; Strømme & Hansen, 2017). This could also be reflected in the labour market, which might value and prefer certain educational fields (With, 2017; Murnane & Olsen, 1990; Ingersoll, 2003). Following Bourdieu's theory (1984), as presented first in this sub-chapter, according to people's social background, teachers from families with higher cultural capital might know the expected educational return for different educational fields and manage their careers more well-informed. In this sense, educational level might not explain differences in attrition between social groups and their opportunities on the labour market.

GPA was found to explain some of the difference in attrition between teachers from the cultural elite, upper-middle and professional elite to teachers from economic lower-middle. Examining the descriptive statistics from chapter 3, all of the social groups mentioned above score higher GPA than the average (table 3.6). Horizontally, cultural classes have higher GPA than the other social groups, and economic capital background groups have lowest. This is consistent with Norwegian research, which have found that social origin affect academic performance (Hansen & Mastekaasa, 2006, p.288). Hence, although GPA was also found to have a curvilinear association with attrition, the descriptive statistics and expected directionality of mediation effect suggest that teachers from these classes get higher GPA, which is associated with increased risk of leaving.

This is consistent with educational reproduction and inequality theories, where social origin can explain differences in opportunities through educational performance (Bourdieu & Passeron, 1990; Bourdieu, 1996). In other words, inequality is reproduced in the education system because children with parents with higher educational degrees score higher GPA than other children. Moreover, GPA can be considered as transferable skills (Murnane et al., 1989, p.329; Murnane & Olsen, 1990, p.122) or signal higher cognitive abilities (Borgen, 2010), that are desirable traits on the labour market (Murnane et al., 1989, p.329). According to these theories and research, my results could suggest that despite Norway's society being considered as "*relative egalitarian*" (Hansen & Mastekaasa, 2006, p.289), a relationship between social origin and academic performance persists which can contribute to unequal career opportunities. Obtaining higher grades that are desirable on the labour market could also increase associated opportunity cost, and make the job mobility more tempting for high-achieving individuals. As explained by Askvik (2015, p.456); social origin position individuals differently in terms of accessible opportunities, when costs and risk are added up and evaluated.

However, the GPA in this thesis is measured from upper-secondary schools and might not mean as much on the labour market as grades from higher education. However, different levels and forms of aspirations might be formed during childhood and educational course (Lareau, 2003; Barone, 2006; With, 2016; Bandura et al., 2001). GPA could signal ambitions, where high-ability students develop higher aspirations. And as research have found; some

individuals never planned to stay in teaching, and rather use teaching as a stepping-stone or springboard for tempting, alternative careers (Addi-Racah, 2005; Smith & Ulvik, 2017; Watt & Richardson, 2008). Doing well in secondary school could also lead to higher perceived self-efficacy. Bandura et al. (2001, p.187) finds that children's perceived academic efficacy influence types of occupational activities. Although perceived academic efficacy was more important than actual academic performance (Bandura et al., 2001), it might still be that by acquiring higher GPA individuals feel more accomplished which affect their career choices. Teachers who wanted to switch careers, reported that they wanted to continuously challenge themselves in different professional directions (Watt & Richardson, 2008).

5.2.2.2 Money matters?

An interesting result was that income explains some of the difference in attrition but only between economic upper and economic lower-middle. Teachers from the economic elite have almost 7 percentage-points higher attrition than economic lower-middle. This was interpreted as when holding income constant, teachers from the economic elite leave more than teachers from economic lower-middle. Moreover, the higher attrition rate can also be explained by the mediated indirect effect; teachers from the elite earn less than the economic lower-middle and lower wages is associated with higher risk of leaving. Teacher salaries are a predictor for turnover and attrition (Borman & Dowling, 2008, p.381; Murnane & Olsen, 1990; Shen, 1997; Stinebrickner, 1998), and chapter 2 presented theories on inheritance and transfer of values (Barone, 2006; Bourdieu & Passeron, 1990; Gambetta, 1987; Chen et al., 2017).

The economic elite might have a different career path, and might value income more than teachers from economic lower-middle class. This cannot be tested in this study, but class theories of relative risk aversion argue that people often choose an occupation that prevent downward social mobility (Boudon, 1974; Breen & Goldthorpe, 1997). Hence, to these teachers, teaching might act as a stepping-stone to alternative career paths (Watt & Richardson, 2008). Addi-Racah (2005) finds in her study on Israeli teacher that when teachers left, many of the teachers came from higher SES backgrounds and moved to occupations with higher rewards. Moreover, these individuals might have a different social network. Their opportunity cost is higher because their expected return might be higher in other occupations. Moreover, with extended social network they can utilise, job-transitions might be smoother and seem less risky (Chen et al., 2017).

There could be a difference in how extrinsic factors, such as income and status, are valued. Once income is controlled for, there is a significant difference between economic lower-middle and cultural lower-middle and professional upper-middle. Holding income constant, fewer in cultural lower-middle and professional upper-middle leave the profession than teachers from economic lower-middle. This could be interpreted as teachers from the economic lower-middle earn more than teachers from the other two groups, which explains the difference. However, more substantially it also means that comparing teachers with same income, more teachers from the economic lower-middle leave teaching.

Just as intrinsic and altruistic values can be transferred from parents to their children for classes positing higher cultural capital (as presented in chapter 2) (Barone, 2006; Bourdieu and Passeron, 1990; Gambetta, 1987; Chen et al., 2017), so can extrinsic values from families positing higher economic capital. Teaching can be considered as a flat profession, with limited alternatives to climb a career ladder (Smith and Ulvik, 2017, p.941). Hence, if climbing a career ladder with expected higher returns are important, then the teaching profession cannot offer this to great extent. These teachers might from the outset plan a different career route, or want to change career paths because teaching was “not a career for them” (Watt & Richardson, 2008, p.425). Reversely, this could also be understood as among teachers who earn the same, other motivations might be more important than wages.

Altruistic and intrinsic values are considered as affecting motivations to remain in teaching more than extrinsic (Watt & Richardson, 2008; Watt et al., 2012; Dahl et al, 2016). If these factors mean more to individuals from families with higher cultural capital backgrounds, then this might affect their motivations to stay. Comparing teachers who earn the same, teachers from economic capital backgrounds might therefore feel more pulled out of teaching. The significance of income, or how it is valued, is not measured in this thesis. But the significance it has for teachers with higher economic capital background could suggest an interesting area for future studies.

5.3 MINORITY BACKGROUND

There has been little focus on teacher diversity and diversifying the teacher population (Sleeter & Thao, 2007). Moreover, Murnane et al (1989) argued “black” teachers might have

a significantly different career path because predictors for employment duration differed with race. This suggests that there is a need to explore teacher attrition between teacher groups with different ethnic and minority backgrounds. However, due to limited number of observations, minority groups are often dropped from the analyses (Murnane et al., 1988; 1989; With, 2016; Sohn, 2009).

According to the literature, a vast majority of teachers have ethnic majority background; born in the country they are teaching in (Perlic & Foss, 2019; With, 2016; Murnane et al., 1989; Scafidi et al., 2007). This is concurrent with descriptive statistics from my data, where almost 90% of the teaching population are Norwegian teachers with parents born in Norway. Of beginning teachers in the period 2003-2013, immigrant teachers made up about 5% and so did teachers with ties to Norway (hereafter mixed-Norwegian for brevity).

There are a few differences between the groups, in terms of descriptive observable differences (table 3.7). Firstly, immigrant teachers have a higher proportion of women, where almost 78% of the group are women. This could indicate there exists some gendered-selection into teaching that is more pronounced among immigrants. The findings are consistent with Norwegian research that educational fields are more gendered among immigrants (Schou, 2009; Reisel, 2014). Mixed-Norwegian teachers have a slightly lower proportion of women than the majority and the average, which is consistent with existing literature where children of immigrants more often choose atypical educational fields (Mastekaasa & Birkelund, 2009). The difference in proportion of women for immigrant teachers could affect attrition rates as it could reflect family-oriented reasons for choosing teaching (as presented in the gender-section of this chapter).

In terms of grades and educational level (types of human capital), immigrants and mixed-Norwegians differ from the majority. Consistent with research, mixed-Norwegians have a higher proportion of higher-degree education graduates (Kolby and Østhus, 2009). What is surprising is that immigrant teachers have a very high proportion of master-degree graduates of almost 26%. Comparative to the majority-group of teachers where about 6% have a postgraduate degree. In addition, among Norwegian citizens with only compulsory education, immigrants have the highest proportion. This could suggest that it is something about the

teaching profession that is ideal for immigrants with higher education who want to enter the Norwegian labour force. It could also suggest that the immigrant teachers are a selective different group from the majority and from other immigrants. However, length of residency for immigrants are not accounted for in this study and it is not possible to tell the whether teaching is immigrants' first job in Norway.

Differences in GPA are also consistent with Norwegian literature on minority groups' educational performance. Like previous research, I find that both immigrant and mixed-Norwegians score slightly below average and lower than the majority (Bakken, 2009b; Mastekaasa & Birkelund, 2009). In turn this could give them different prospects on the labour market.

5.3.1 Differences in attrition rates

Both minority groups have higher attrition in all of the three time-points, which is contrary to international literature that find lower attrition rates for minority groups (Borman & Dowling, 2008; Hancock & Scherff, 2010; Murnane et al., 1989; Scafidi, Sjoquist, & Stinebrickner, 2007; Watt & Richardson, 2008). Differences in attrition between minority groups differ from the two previous demographic traits. Whereas there were no significant differences between genders or social background groups by the first year, there are significant differences in attrition between minority groups. This suggests there are factors already from the beginning of the teaching career that affect minority groups differently from the majority. Due to limited research in this area, suggestions to why these differences exist is also limited. Two plausible explanations could be differences in aspirations or the effect of (possibly different) socialisation processes for individuals.

The high proportion of women, especially among teachers with immigrant background, could affect attrition rates. Section 5.1.2 examined some possible mechanisms and reasons for differences in attrition rates between genders. These could also be applicable for minority groups, and affect the attrition rate. Consistent with the child-rearing aspect, examined above, Addi-Racah (2005, p.745-746) finds that minority (Arab) women quit the teaching profession in Israel to give way for men and stay home with children. In the Norwegian population, Ellingsæter (2016, p.49) finds there still exists a conflict that is more pronounced in women in terms of balancing family-life and needs and their career-aspirations.

Differences in attrition are significant already by year 1 for both minority groups and the differences increase by year 5. Whereas the difference in attrition was almost 5 percentage-points higher for immigrants by year 1, the difference is a little more than 14 percentage-points by year 5. For teachers with mixed-Norwegian background the difference goes from 2.6 percentage-points higher by year 1 to 7.5 percentage-points higher by year 5. The main focus for this thesis is the first five years. Hence, although the difference is possibly smaller by year 9, the groups are most likely too small for statistical precision and the results are not commented in this section.

5.3.2 Differences examined

5.3.2.1 Literature and inexplicable attrition-differences

There were differences in attrition rates between groups already after one year in teaching and remains different by year 5. Except for income for mixed-Norwegians, adding control variables do not change the coefficients significantly for neither year 1 or 5. Thus, most of the differences cannot be explained by the control variables. Although GPA changes the coefficients to non-significant for both minority groups by the first year, it is hard to determine GPA's significance as the S.E also increases. The coefficients are slightly reduced, and it could be that the non-significance is due to decreased precision, but it could also be that GPA explains some of the difference. For teachers with immigrant background by year 5, none of the control variables can explain differences in attrition between majority and teachers with immigrant background. There seems to be differences between the minority- and majority teaching population that are not accounted for in this thesis that simultaneously affect their attrition rates. This could suggest that minority teachers, and especially immigrant teachers, have different career-paths from the majority. This is also consistent with research by Murnane et al. (1989, p.330), who find black teachers respond to other variables than white teachers do.

Literature in chapter 2.1.3 suggested higher attrition rate for the majority due to more advantages in the labour market including more accumulated resources (cultural-, social- and human capital) (Addi-Raccah, 2005; Drange, 2009; Mastekaasa & Birkelund, 2009; Watt & Richardson, 2008) and discriminatory behaviour in hiring-processes (Birkelund et al, 2014;

Evensen, 2009; Midtbøen, 2014; Stromquist, 2018). However, the results in this thesis go in the opposite expected-direction. Hence many of these theories cannot be applied to explain the results of differences in attrition between minority groups. If immigrants and teachers of immigrant-parents are discriminated against during hiring-processes or lack required capitals, then this would increase their relative risk when changing occupations.

According to literature, work-place discrimination (Becker, 1971 in Falch & Strøm, 2005) and prejudices might cause teachers to experience social discrimination (Stromquist, 2008) from colleagues, the administration or from parents. In the US, diversity was found to increase the rate of leaving in support of similarity/attraction theory (Sohn, 2009). Achinstein et al. (2010) propose minority-teachers might have different humanistic commitments (Hancock and Scherff, 2010). And minorities might live closer to higher-proportion minority schools (Scafidi et al., 2007). However, school F.E does not explain the difference in attrition, and my results cannot support these theories either.

Teacher attrition is dependent on labour market conditions (With, 2017, p.1738), and opportunities in the labour market are often considered in terms of accumulated human capital (Becker, 1993). Due to educational differences between minority groups and the majority, it could be that this would explain differences in attrition between groups. However, controlling for education by year 1 and 5 do not change the coefficients and education cannot explain attrition differences between teachers with minority backgrounds. As mentioned, it could be that educational field is a better marker for desirable human capital on the labour market, or that there are other factors than educational level that matters more in the labour market. Educational performance was proposed as being indicative of signalling differences in cognitive abilities. However, minorities score lower GPA than the majority and leave more than the majority. Hence, educational level and performance cannot explain differences in attrition rates in terms of labour market prospects.

There is thusly little evidence to support discrimination to affect attrition between minority groups and majority. Although the results in this thesis cannot support the discrimination literature because it expected lower attrition with increased risk of leaving, this does not mean discrimination does not occur or affect minorities' leaving-patterns. For one, I do not

follow their careers after teaching and thusly cannot tell whether these individuals go to lower- or higher status/income jobs or quit the labour force. Additionally, there might be other ways discrimination affect attrition patterns than what is accounted for in this thesis, or that other reasons obscures discrimination effects. For example discrimination effect could be unnoticeable if a factor increases attrition more than discrimination effect encourage individuals to remain in teaching.

5.3.2.2 *Opportunities and aspiration-differences*

Socialisation processes have been proposed in chapter 2.3.2 as a possible contributing factor for higher attrition between minority groups. Hence, because socialisation-processes are different and can persuade certain individuals to enter teaching, selection-differences can affect attrition between groups differently. Socialisation processes and motivations for entering teaching are not accounted for in this thesis, but the larger majority of women among teachers with immigrant-background could indicate that there is a cultural gender-appropriation of teaching as pre-dominantly female. This is consistent with literature on gendered-educational fields being more pronounced among immigrants (Schou, 2009).

Moreover, consistent with Drange (2009), employment among teachers with minority backgrounds are most common right after graduation and then declines. The decline in labour participation, or increased attrition have been proposed as being a consequence of child-rearing activities (Drange, 2009; Lindqvist et al., 2014). In the Norwegian labour-force, women in general feel more obligated than men to balance family's need and their careers, which can result in making more compromises and less self-realisation of own potential (Ellingsæter, 2009; Egeland and Drange, 2016; Halrynjo and Teigen, 2016). The higher proportion of women for immigrant-teachers could therefore reflect higher attrition due to family-reasons. However, gender is controlled for in the full model, and if women leave due to family-reasons then there are no differences between minority and majority female teachers.

Although minority-teachers with mixed-Norwegian backgrounds have higher proportion of men than both the other two groups, socialisation processes and family-values could explain some of the difference in attrition also for this group. Income was the only significant control variable for teachers with mixed-Norwegian backgrounds (by year 5). As mentioned in

section 5.1.2, part-time is one reason of income-differences, and in terms of working part-time, having children was more significant for immigrant and children of immigrants than the majority (Brekke and Mastekaasa (2008) in Drange, 2009). Nadim (2016) finds that two-income party can challenge the male-provider idea, where three of four perspectives are considered in terms of the family's needs or as a complementary income to the male-provider.

However, family-values, the extent of integration and familiarity and appreciation of the Norwegian welfare-system (with day-care and subsidised parental-leave) might differ with country background. At least in terms of extrinsic and intrinsic values, there are research supporting that values can differ with country and its economic conditions, where less industrialised countries value factors such as stable income and job-security more than intrinsic values (Watt et al., 2012). Furthermore, there could be differences in aspirations and family-views within the minority groups as well as between the majority and minority. This is not accounted for in this study, and as Mastekaasa and Birkelund (2009) observe, minority groups (in the general population) are heterogeneous with different valuation of extrinsic and intrinsic values and aspirations. It would therefore be interesting for further studies to account for country of origin as well as destination after teaching.

6 CONCLUSION

Teachers are responsible for children's academic and social learning outcomes, and they can often serve as role models. In this sense, they are important for children's personal development and a requirement for a knowledge-based society. In American literature, teachers' racial characteristics have been particularly important for minority students (e.g. Dee, 2005; Gershenson et al., 2018; Holt & Gershenson, 2015; Karunanayake & Nauta, 2004). And the Norwegian government has a policy that the teaching population should reflect the general population (Kunnskapsdepartementet, 2013). Thus, teachers have an important role for the education system as well as society. Despite a consensus that teacher diversity is important, it is still a largely unexplored research field. Moreover, teachers need the motivation and the opportunity to change careers (With, 2017). Hence, differences in attrition between teacher groups with different demographic characteristics might suggest differences in opportunities and inequalities in the labour market. Teacher diversity and teacher attrition are both educationally and sociologically interesting, and the thesis gives an important contribution to the field on teacher diversity and teacher attrition.

This thesis has examined teacher attrition rates for different demographic groups, with a particular focus on the first five years of their teaching careers. The three aims were to examine differences in attrition between teacher groups with different demographical characteristics, how differences might be explained by relevant control variables and to examine how differences in attrition between groups develop over time. It is important to bear in mind that teacher attrition is multifaceted, and although I find that some variables can explain some of the attrition-differences, these factors are not the only ones. This chapter presents the main results from the thesis with some considerations of its implications and suggestions for future research.

6.1 MAIN RESULTS AND IMPLICATIONS

Consistent with existing literature, teacher attrition is highest during the first five years and the difference between teacher-groups are more pronounced by year five for all demographical characteristics. Attrition is higher for teachers who are women, from higher social strata or who have a minority background. Many of the group differences can be explained by income and/or GPA.

Particularly for teachers from classes with higher professional or cultural capital, GPA explains difference in attrition (relative to economic lower-middle). Teachers from cultural and professional social backgrounds have, on average, higher grades than economic lower-middle. This could suggest reproduction of educational inequality, where individuals from higher cultural backgrounds perform better in schools (Bakken, 2009b), which again give them advantages on the labour market. GPA is from upper-secondary schools, which is related to individuals' academic self-efficacy and career-aspirations. The results could, therefore, suggest that teachers from these backgrounds with higher attrition also have higher ambitions. Motivations for leaving teaching might differ with social background, but is not accounted for in this thesis. However, Watt and Richardson (2008) find that teachers with higher SES backgrounds more often leave teaching and use their experiences as a stepping-stone to other professions. If teachers from higher cultural and professional strata have higher propensity to quit because of differences in aspirations, then 1) there is little policies can do to mitigate attrition for these groups as teaching is a relatively flat-profession, 2) attrition is also a sign of agency and might be part of a planned career-course. Literature in this field need to reframe the view on attrition as teachers might also be pulled out. And 3) there might be differences in socialisation processes (in transfer of job-values and level of self-efficacy) that make social inequalities persist.

Income can explain attrition differences between genders, teachers with different vertical economic class positions and between minority teachers with mixed-Norwegian background and majority Norwegian teachers. Income differ with experience, educational level, percentage of full-time employment and job-position. Thus, because teachers in these analyses are beginning teachers, most of them have about the same work-experience, or

seniority, and wage-differences will be small. Income is an extrinsic job-value and might explain differences in attrition as a motivational factor. Motivation for leaving is not accounted for, but class-theories and theories on occupational following suggest transfer of values, and economic classes might value income and other extrinsic factors more than other classes. However, because income is conditional on e.g. percentage of full-time employment, there could be other underlying-mechanisms that explain attrition-differences between teacher groups.

The most likely explanation to differences in income between gender and between minority mixed-Norwegian and Norwegian teachers, are either reduced full-time positions or job-positions. There could be more men in leadership positions so that men earn more, or that more women earn less because they have reduced full-time positions. Both hypotheses suggest persisting gender-roles and gender-segregation on the labour market. If both male and female teachers want to enter administration or leadership positions, but more men work in these positions then this might suggest gender-segregation on the labour market and more women are pushed out. And if more women leave due to reduced full-time positions, this could suggest that women still struggle with balancing family's need (Ellingsæter, 2016) and more often make career-compromises. These reasons for differences in income could explain attrition differences between mixed-Norwegian and Norwegian teachers. However, the literature is small and there is little evidence to suggest mixed-Norwegians follow same pattern as women. The only indication could be that having children was more significant for working part-time for children of immigrants (Brekke and Mastekaasa (2008) in Drange, 2009). Reduced full-time positions could also reflect difficulties and differences in coping-strategies (Olson et al., 2019). From a policy view-point, this is interesting because if differences in attrition and income are due to differences in coping-mechanisms then teacher education should aim to equip future teachers with these skills.

Interestingly, none of the control variables can explain attrition differences between immigrant and Norwegian teachers. There are, therefore, unexplained variables that affect these two teacher groups differently. Murnane et al. (1989) find minorities respond to variables differently from the majority, and it might be that immigrant teachers in Norway

value other factors or have a significantly different career-path than the majority. Moreover, it might be that none of the control variables can explain attrition differences because the group can be heterogeneous. Watt et al. (2012) find job-values (intrinsic and extrinsic) vary with socio-cultural background and Mastekaasa and Birkelund (2009) find educational aspiration and performance vary with country of origin. Although results cannot support discrimination theories, it does not mean that discrimination is not occurring in some other way. Moreover, the thesis does not account for destination after teaching, and it could be minorities leave the work-force or go to less prestigious jobs. Apart from Spernes (2014) research on teacher diversity and recruitment to teaching, the literature in this field in Norway is scarce. Moreover, if the aim is to recruit and retain more teachers with minority backgrounds there is a need to investigate diversity and attrition further. This is especially important if minorities have a different career-path, are heterogeneous or are affected by other factors than the majority. Studies and policies should aim to understand these mechanisms to better retain teachers and accommodate their needs.

6.2 CONSIDERATIONS AND WHAT COMES NEXT....

Some considerations of limitations and improvements have already been discussed throughout the thesis. For example, I have demonstrated that coefficients from LPM are similar (almost identical) average marginal effects derived from logistic regression. I have also checked whether the results are sensitive to differences in observation numbers. There are, however, some limitations that future studies should consider.

When interpreting differences in attrition rates between genders and minority background, one limitation of this study was that it did not account for *family-status* (married/co-habiting and children). Controlling for parental-leave and family-status are reported to be significant factors for attrition (e.g. Lindqvist et al., 2014). It would be expedient for future studies to include *educational fields*, as educational expansion might have caused a shift in high-status education from level to different, prestigious university-courses. In turn this shift could also affect differences in opportunities on the labour market. Other factors that should be considered in future research are *country of origin* and *destination* after teaching. Minority groups are heterogeneous and values and aspirations have been found to differ based on socio-cultural context (Mastekaasa & Birkelund, 2009; Watt et al., 2012). Destination after

teaching could also examine differences of individuals going to jobs with higher/lower expected returns or quit the labour force (at least temporarily). It could be that Norwegian teachers, like Australian teachers, never planned an entire career in teaching (Watt & Richardson, 2008).

This thesis has studied teacher attrition based on years in the profession. Another way of studying attrition is to consider attrition annually using longitudinal data (Singer & Willett, 2003). Singer and Willett use survival analysis and hazard functions to study *if, when* and *who* are most likely to leave and remain in teaching. This method enables researchers to study attrition trend over time using time-series or a continuous time-line. For survival analysis, given individuals have not left teaching, they remain in the sample. Hence, an advantage of this method is that it includes more observations and increases statistical precision. This could possibly allow for more observations for smaller groups such as educational fields. Additionally, teachers should also be observed for a longer period of time, as teachers are reported in international literature to return to teaching and have multiple teaching spells (Ingersoll, 2001; Lindqvist et al., 2014).

Although, as Borman and Dowling (2008, p.396) rightfully ascertain some attrition might be healthy for the institution and education quality. If teachers are discontent and unmotivated, but do not have the opportunity to leave, this could affect their job-engagement and thereby the schooling-quality (With, 2017, p.1739). However, attrition is regarded as being negative in that it disrupts work-place stability for children and colleagues. Moreover, attrition is a concern if highly-skilled teachers leave due to pushing-factors. Teachers' role in society and the education system makes studying teacher diversity and teacher attrition both educational, societal and sociological important. The mediating effects that vary with demographic groups suggest there is a need for a better understanding of mechanisms driving push/pull factors for these different groups. However, the literature in the field of teacher attrition and teacher diversity is scarce and hence this thesis gives an important, or rather imperative, contribution.

APPENDICES

LPM models with extra model

Gender

Appendix A4.1: LPM attrition differences between genders by year 1 with extra model

Variables	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Extra model: full - income variable	Model 4 Full model
	By year 1	By year 1	By year 1	By year 1	By year 1
female	0.00857 (0.00461)	0.00575 (0.00582)	0.00822 (0.00461)	0.00621 (0.00634)	-0.0139* (0.00631)
GPA	No	Yes	No	Yes	Yes
Educational level	No	No	Yes	Yes	Yes
Social background	No	No	No	Yes	Yes
Immigration background	No	No	No	Yes	Yes
Income	No	No	No	No	Yes
School F.E	No	No	No	Yes	Yes
Observations	27304	16260	27304	16260	15501
Standard errors in parentheses					
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Appendix A4 2: LPM attrition differences between genders by year 5 with extra model

Variables	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Extra model: full - income variable	Model 4 Full model
	By year 5	By year 5	By year 5	By year 5	By year 5
female	0.0372*** (0.00869)	0.0404*** (0.00986)	0.0375*** (0.00865)	0.0466*** (0.0113)	0.0147 (0.0110)
GPA	No	Yes	No	Yes	Yes
Educational level	No	No	Yes	Yes	Yes
Social background	No	No	No	Yes	Yes
Immigration background	No	No	No	Yes	Yes
Income	No	No	No	No	Yes
School F.E	No	No	No	Yes	Yes
Observations	15453	11575	15453	11575	11564
Robust standard errors in parentheses					
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Appendix A4.3: LPM attrition differences between genders by year 9 with extra model

Variables	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Extra model: full - income variable	Model 4 Full model
	By year 9	By year 9	By year 9	By year 9	By year 9
female	0.0583*** (0.0170)	0.0619** (0.0197)	0.0642*** (0.0169)	0.0492 (0.0264)	0.0262 (0.0259)
GPA	No	Yes	No	Yes	Yes
Educational level	No	No	Yes	Yes	Yes
Social background	No	No	No	Yes	Yes
Immigration background	No	No	No	Yes	Yes
Income	No	No	No	No	Yes
School F.E	No	No	No	Yes	Yes
Observations	4348	3141	4348	3142	3135
Robust standard errors in parentheses					
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Social background

Appendix A4.4: LPM attrition differences between social background by year 1 with extra model

Variables	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Extra model: full - no income variable	Model 4 Full model
	By year 1	By year 1	By year 1	By year 1	By year 1
Cultural upper	0.0167 (0.0168)	0.00363 (0.0202)	0.0129 (0.0169)	-0.0130 (0.0209)	-0.0256 (0.0203)
Professional upper	0.0221 (0.0133)	0.0172 (0.0162)	0.0200 (0.0133)	0.0219 (0.0178)	0.0156 (0.0180)
Economic upper	0.0105 (0.0137)	0.00904 (0.0169)	0.00898 (0.0137)	0.00522 (0.0193)	0.00442 (0.0192)
Cultural upper-middle	0.00618 (0.00940)	0.00711 (0.0117)	0.00470 (0.00939)	0.00756 (0.0129)	-0.00958 (0.0127)
Professional upper-middle	-0.00727 (0.00921)	-0.00886 (0.0114)	-0.00861 (0.00920)	-0.00678 (0.0124)	-0.0112 (0.0126)
Economic upper-middle	0.00204 (0.0109)	0.0143 (0.0137)	0.00157 (0.0108)	0.0102 (0.0155)	0.00582 (0.0154)
Cultural lower-middle	-0.0245 (0.0129)	-0.0241 (0.0160)	-0.0243 (0.0129)	-0.00972 (0.0183)	-0.0170 (0.0184)
Professional lower-middle	-0.00969 (0.00989)	-0.00576 (0.0123)	-0.00995 (0.00988)	-0.00298 (0.0140)	-0.00329 (0.0141)
Economic lower-middle	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Skilled	-0.00891 (0.00967)	-0.00262 (0.0121)	-0.00831 (0.00966)	0.00261 (0.0136)	0.00446 (0.0136)
Unskilled/semi-skilled	0.00204 (0.0109)	0.00499 (0.0137)	0.00207 (0.0108)	0.0104 (0.0151)	0.00165 (0.0150)
Farmers, fishermen, foresters	0.00413 (0.0234)	-0.00271 (0.0292)	0.00298 (0.0233)	0.0173 (0.0351)	0.00948 (0.0355)
Welfare, transference	-0.00235 (0.0110)	0.00818 (0.0148)	-0.00365 (0.0109)	0.0102 (0.0162)	0.00875 (0.0161)
Missing	0.0461*** (0.0139)	0.0477 (0.0491)	0.0311* (0.0141)	0.0580 (0.0517)	0.0276 (0.0573)
GPA	No	<u>Yes</u>	No	<u>Yes</u>	<u>Yes</u>
Educational level	No	No	<u>Yes</u>	<u>Yes</u>	<u>Yes</u>
Social background	No	No	No	<u>Yes</u>	<u>Yes</u>
Immigration background	No	No	No	<u>Yes</u>	<u>Yes</u>
Income	No	No	No	No	<u>Yes</u>
School F.E	No	No	No	<u>Yes</u>	<u>Yes</u>
Observations	27304	16260	27304	16260	15501
Robust standard errors in parentheses					
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Appendix A4.5: LPM attrition differences between social background by year 5 with extra model

Variables	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Extra model: full - income variable	Model 4 Full model
	By year 5	By year 5	By year 5	By year 5	By year 5
Cultural upper	0.108*** (0.0325)	0.0545 (0.0365)	0.0985** (0.0321)	0.0444 (0.0393)	0.0105 (0.0369)
Professional upper	0.0599* (0.0249)	0.0491 (0.0278)	0.0575* (0.0248)	0.0545 (0.0304)	0.0359 (0.0294)
Economic upper	0.0688** (0.0265)	0.0698* (0.0296)	0.0673* (0.0263)	0.0653* (0.0331)	0.0511 (0.0323)
Cultural upper-middle	0.0416* (0.0176)	0.0309 (0.0198)	0.0379* (0.0176)	0.0138 (0.0224)	-0.0145 (0.0217)
Professional upper-middle	-0.0130 (0.0173)	-0.0260 (0.0195)	-0.0158 (0.0173)	-0.0335 (0.0221)	-0.0447* (0.0215)
Economic upper-middle	0.00242 (0.0202)	0.00662 (0.0228)	0.00203 (0.0201)	-0.00853 (0.0264)	-0.0233 (0.0256)
Cultural lower-middle	-0.0328 (0.0253)	-0.0490 (0.0280)	-0.0306 (0.0253)	-0.0425 (0.0324)	-0.0635* (0.0305)
Professional lower-middle	0.0180 (0.0188)	0.00970 (0.0212)	0.0192 (0.0187)	0.0117 (0.0242)	0.00274 (0.0232)
Economic lower-middle	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Skilled	-0.0109 (0.0182)	-0.0105 (0.0206)	-0.00776 (0.0182)	-0.0131 (0.0241)	-0.0129 (0.0233)
Unskilled/semi-skilled	-0.0134 (0.0199)	-0.0295 (0.0227)	-0.0124 (0.0199)	-0.0302 (0.0265)	-0.0307 (0.0257)
Farmers, fishermen, foresters	0.0122 (0.0410)	0.0158 (0.0486)	0.0101 (0.0408)	0.0256 (0.0537)	-0.000212 (0.0510)
Welfare, transference	0.0199 (0.0202)	0.0177 (0.0246)	0.0179 (0.0201)	0.00559 (0.0281)	0.00854 (0.0270)
Missing	0.142*** (0.0279)	0.0660 (0.0779)	0.0965*** (0.0285)	0.0139 (0.0897)	-0.0557 (0.0934)
GPA	No	Yes	No	Yes	Yes
Educational level	No	No	Yes	Yes	Yes
Social background	No	No	No	Yes	Yes
Immigration background	No	No	No	Yes	Yes
Income	No	No	No	No	Yes
School F.E	No	No	No	Yes	Yes
Observations	15450	11574	15450	11574	11563
Robust standard errors in parentheses					
* p < 0.05, ** p < 0.01, *** p < 0.001					

Appendix A4.6: LPM attrition differences between social background by year 9 with extra model

Variables	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Extra model: full - income variable	Model 4 Full model
	By year 9	By year 9	By year 9	By year 9	By year 9
Cultural upper	0.158** (0.0604)	0.120 (0.0691)	0.145* (0.0592)	0.0952 (0.0935)	0.0426 (0.0878)
Professional upper	0.0296 (0.0469)	-0.00183 (0.0550)	0.0179 (0.0461)	0.0171 (0.0780)	0.0143 (0.0778)
Economic upper	0.0842 (0.0484)	0.136* (0.0557)	0.0766 (0.0484)	0.156* (0.0784)	0.143 (0.0797)
Cultural upper-middle	0.0496 (0.0334)	0.0528 (0.0385)	0.0428 (0.0332)	-0.00676 (0.0574)	-0.00749 (0.0562)
Professional upper-middle	0.0198 (0.0331)	0.0215 (0.0380)	0.0143 (0.0328)	-0.0205 (0.0519)	-0.0132 (0.0526)
Economic upper-middle	0.0315 (0.0390)	0.0584 (0.0446)	0.0290 (0.0388)	0.0456 (0.0634)	0.0383 (0.0635)
Cultural lower-middle	-0.0113 (0.0491)	-0.0251 (0.0561)	-0.00946 (0.0490)	-0.0948 (0.0775)	-0.0822 (0.0740)
Professional lower-middle	0.0287 (0.0359)	0.0413 (0.0418)	0.0273 (0.0357)	0.0387 (0.0588)	0.0483 (0.0581)
Economic lower-middle	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Skilled	0.0103 (0.0348)	0.0289 (0.0404)	0.0125 (0.0347)	0.0612 (0.0550)	0.0756 (0.0545)
Unskilled/semi-skilled	0.0234 (0.0377)	0.00277 (0.0440)	0.0221 (0.0375)	-0.0403 (0.0667)	-0.0248 (0.0655)
Farmers, fishermen, foresters	0.0775 (0.0739)	0.0654 (0.0899)	0.0798 (0.0748)	-0.00790 (0.149)	0.00480 (0.144)
Welfare, transference	0.0224 (0.0366)	0.0633 (0.0452)	0.0177 (0.0364)	0.0688 (0.0678)	0.0825 (0.0675)
Missing	0.212** (0.0764)	0.450*** (0.107)	0.146 (0.0791)	0.558** (0.214)	0.538* (0.234)
GPA	No	Yes	No	Yes	Yes
Educational level	No	No	Yes	Yes	Yes
Social background	No	No	No	Yes	Yes
Immigration background	No	No	No	Yes	Yes
Income	No	No	No	No	Yes
School F.E	No	No	No	Yes	Yes
Observations	4347	3142	4347	3142	3136
Robust standard errors in parentheses					
* p < 0.05, ** p < 0.01, *** p < 0.001					

Minority background

Appendix A4.7: LPM attrition differences between minority background groups by year 1 with extra model

Variables	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Extra model: full - income variable	Model 4 Full model
	By year 1	By year 1	By year 1	By year 1	By year 1
Born Norwegian	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Immigrant	0.0488*** (0.0106)	0.0369 (0.0277)	0.0368*** (0.0108)	0.0350 (0.0330)	0.0415 (0.0336)
Mixed Norwegian background	0.0258** (0.00976)	0.0150 (0.0123)	0.0256** (0.00973)	0.0209 (0.0131)	0.0145 (0.0131)
GPA	No	Yes	No	Yes	Yes
Educational level	No	No	Yes	Yes	Yes
Gender	No	No	No	Yes	Yes
Social Background	No	No	No	Yes	Yes
Income	No	No	No	No	Yes
School F.E	No	No	No	Yes	Yes
Observations	27304	16260	27304	16260	15501
Robust standard errors in parentheses					
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Appendix A4. 8: LPM attrition differences between minority background groups by year 5 with extra model

Variables	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Extra model: full - income variable	Model 4 Full model
	By year 5	By year 5	By year 5	By year 5	By year 5
Born Norwegian	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Immigrant	0.143*** (0.0217)	0.0983* (0.0459)	0.107*** (0.0221)	0.131** (0.0495)	0.138** (0.0466)
Mixed Norwegian background	0.0753*** (0.0183)	0.0606** (0.0212)	0.0747*** (0.0182)	0.0512* (0.0233)	0.0315 (0.0215)
GPA	No	Yes	No	Yes	Yes
Educational level	No	No	Yes	Yes	Yes
Gender	No	No	No	Yes	Yes
Social Background	No	No	No	Yes	Yes
Income	No	No	No	No	Yes
School F.E	No	No	No	Yes	Yes
Observations	15450	11574	15450	11574	11563
Robust standard errors in parentheses					
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Appendix A4.9: LPM attrition differences between minority background groups by year 9 with extra model

Variables	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Extra model: full - income variable	Model 4 Full model
	By year 9	By year 9	By year 9	By year 9	By year 9
Born_Norwegian	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Immigrant	0.109 (0.0611)	0.125 (0.102)	0.0649 (0.0616)	-0.0950 (0.165)	-0.102 (0.134)
Mixed Norwegian background	0.0585 (0.0356)	0.0644 (0.0443)	0.0583 (0.0357)	0.0400 (0.0672)	0.0293 (0.0637)
GPA	No	Yes	No	Yes	Yes
Educational level	No	No	Yes	Yes	Yes
Social background	No	No	No	Yes	Yes
Immigration background	No	No	No	Yes	Yes
Income	No	No	No	No	Yes
School F.E	No	No	No	Yes	Yes
Observations	4347	3142	4347	3142	3136
Robust standard errors in parentheses					
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Sensitivity tests

Testing model with same observation number (N)

Appendix A4.10: testing observation number (N) for gender

	Model 1	Model 2	Model 3	Model 4
	By year 1	By year 1	By year 1	By year 1
female	0.00497	0.00449	0.00475	-0.0139*
	(0.00591)	(0.00597)	(0.00589)	(0.00631)
Observations	15501	15501	15501	15501
	Model 1	Model 2	Model 3	Model 4
	By year 5	By year 5	By year 5	By year 5
female	0.0432***	0.0415***	0.0431***	0.0150
	(0.00980)	(0.00987)	(0.00975)	(0.0110)
Observations	11563	11563	11563	11563
Robust standard errors in parentheses				
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				

Appendix A4.11: testing observation number (N) for social background

	Model 1	Model 2	Model 3	Model 4
	By year 1	By year 1	By year 1	By year 1
Cultural upper	0.0011 (0.0205)	0.00082 (0.0204)	-0.0033 (0.0205)	-0.0256 (0.0203)
Professional upper	0.0188 (0.0167)	0.01950 (0.0165)	0.0169 (0.0167)	0.0156 (0.0180)
Economic upper	0.0111 (0.0174)	0.01199 (0.0174)	0.00857 (0.01733)	0.00442 (0.0192)
Cultural upper-middle	0.00617 (0.01190)	0.0061 (0.0119)	0.00425 (0.01190)	-0.00958 (0.0127)
Professional upper-middle	-0.00888 (0.01163)	-0.00852 (0.0116)	(-0.0111) (0.01162)	-0.0112 (0.0126)
Economic upper-middle	0.01491 (0.01404)	0.0155 (0.0140)	0.01362 (0.01402)	0.00582 (0.0154)
Cultural lower-middle	-0.0213 (0.0165)	-0.0225 (0.0165)	-0.0214 (0.0164)	-0.0170 (0.0184)
Professional lower-middle	-0.00418 (0.01265)	-0.00376 (0.0126)	-0.00465 (0.01262)	-0.00329 (0.0141)
Economic lower-middle	0 (.)	0 (.)	0 (.)	0 (.)
Skilled	-0.00266 (0.01240)	-0.00223 (0.0124)	-0.00128 (0.01239)	0.00446 (0.0136)
Unskilled/semi-skilled	0.00336 (0.0140)	0.0035 (0.0140)	0.00361 (0.01397)	0.00165 (0.0150)
Farmers, fishermen, foresters	0.00181 (0.0300)	0.00104 (0.030)	0.00045 (0.0299)	0.00948 (0.0355)
Welfare, transference	0.00818 (0.0151)	0.00788 (0.0151)	0.00654 (0.0150)	0.00875 (0.0161)
Missing	0.0466 (0.0525)	0.0452 (0.0525)	0.0466 (0.0522)	0.0276 (0.0573)
Observations	15501	15501	15501	15501
	Model 1	Model 2	Model 3	Model 4
	By year 5	By year 5	By year 5	By year 5
Cultural upper	0.054 (0.0365)	0.0544 (0.0365)	0.0503 (0.0362)	0.0105 (0.0369)
Professional upper	0.0463 (0.0278)	0.0491 (0.0278)	0.0443 (0.0279)	0.0359 (0.0294)
Economic upper	0.0664* (0.0296)	0.0698* (0.0296)	0.0650* (0.0294)	0.0511 (0.0323)
Cultural upper-middle	0.0291 (0.0199)	0.0301 (0.0198)	0.0252 (0.0199)	-0.0145 (0.0217)
Professional upper-middle	-0.0282 (0.0195)	-0.0260 (0.0195)	-0.0312 (0.0195)	-0.0447* (0.0215)
Economic upper-middle	0.00435 (0.0228)	0.00666 (0.0228)	0.00293 (0.0228)	-0.0233 (0.0256)
Cultural lower-middle	-0.0460 (0.0281)	-0.0484 (0.0281)	-0.0445 (0.0281)	-0.0635* (0.0305)
Professional lower-middle	0.0071 (0.0213)	0.00975 (0.0212)	0.0086 (0.0212)	0.00274 (0.0232)
Economic lower-middle	0 (.)	0 (.)	0 (.)	0 (.)
Skilled	-0.0127 (0.0207)	-0.0102 (0.0207)	-0.00957 (0.0207)	-0.0129 (0.0233)
Unskilled/semi-skilled	-0.0311 (0.0228)	-0.0290 (0.0227)	-0.0305 (0.0228)	-0.0307 (0.0257)
Farmers, fishermen, foresters	0.0171	0.0157	0.0117	-0.00021

Welfare, transference	(0.0488) 0.0184	(0.0486) 0.0182	(0.0479) 0.0170	(0.0510) 0.00854
	(0.0246)	(0.0246)	(0.0245)	(0.0270)
Missing	0.048	0.0506	0.0493	-0.0557
	(0.0810)	(0.0806)	(0.0820)	(0.0934)
Observations	11563	11563	11563	11563
Robust standard errors in parentheses				
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				

Appendix A4.12: testing observation number (N) for minority background

	Model 1	Model 2	Model 3	Model 4
	By year 1	By year 1	By year 1	By year 1
Born_Norwegian	0	0	0	0
	(.)	(.)	(.)	(.)
Immigrant	0.0359	0.0345	0.0369	0.0415
	(0.0293)	(0.0293)	(0.0291)	(0.0336)
Mixed_Norwegian	0.0150	0.0150	0.0154	0.0145
	(0.0128)	(0.0127)	(0.0127)	(0.0131)
Observations	15501	15501	15501	15501
	Model 1	Model 2	Model 3	Model 4
	By year 5	By year 5	By year 5	By year 5
Born_Norwegian	0	0	0	0
	(.)	(.)	(.)	(.)
Immigrant	0.102*	0.0983*	0.106*	0.138**
	(0.0472)	(0.0467)	(0.0473)	(0.0466)
Mixed_Norwegian	0.0631**	0.0614**	0.0653**	0.0315
	(0.0213)	(0.0212)	(0.0212)	(0.0215)
Observations	11563	11563	11563	11563
Robust standard errors in parentheses				
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				

Testing the method with Logistic regression

Appendix A4.13: Logistic Regression for Gender

A4.13: Logistic Regression for Gender					
Variables	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Extra model: full - income variable	Model 4 Full model
	By year 1	By year 1	By year 1	By year 1	By year 1
female	0.00869 (0.00475)	0.00585 (0.00590)	0.00835 (0.00474)	0.00163 (0.00229)	-0.000625 (0.000774)
Observations	27304	16260	27304	10121	9503
Variables	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Extra model: full - income variable	Model 4 Full model
	By year 5	By year 5	By year 5	By year 5	By year 5
female	0.0384*** (0.00887)	0.0421*** (0.0101)	0.0383*** (0.00883)	0.00320 (0.00283)	0.000301 (0.000344)
Observations	15450	11574	15450	9339	9331
Standard errors in parentheses (RSE model 1-3) (Conv.SE model 4 & extra)					
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Table 4. 1: The logistic regression models are estimated using the logit and xtlogit command in Stata 15. Model 1-3 includes robust standard errors. Stata does not allow for robust- or cluster robust S.E for xtlogit. Hence, Model 4 and extra include conventional standard errors.

Appendix A4.14: Logistic Regression for Social Background

Variables	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Extra model: full - income variable	Model 4 Full model
	By year 1	By year 1	By year 1	By year 1	By year 1
Cultural upper	0.0167 (0.0168)	0.00365 (0.0201)	0.0128 (0.0167)	-0.00308 (0.00577)	-0.00206 (0.00241)
Professional upper	0.0221 (0.0133)	0.0172 (0.0162)	0.0200 (0.0133)	0.00537 (0.00692)	0.00144 (0.00201)
Economic upper	0.0105 (0.0137)	0.00904 (0.0169)	0.00900 (0.0137)	0.00140 (0.00501)	0.00116 (0.00186)
Cultural upper-middle	0.00618 (0.00940)	0.00710 (0.0117)	0.00472 (0.00944)	0.00187 (0.00388)	-0.000658 (0.00108)
Professional upper-middle	-0.00727 (0.00921)	-0.00885 (0.0114)	-0.00859 (0.00925)	-0.00193 (0.00357)	-0.000728 (0.00111)
Economic upper-middle	0.00204 (0.0108)	0.0143 (0.0137)	0.00159 (0.0109)	0.00249 (0.00462)	0.000493 (0.00119)
Cultural lower-middle	-0.0245 (0.0129)	-0.0238 (0.0158)	-0.0245 (0.0130)	-0.00223 (0.00509)	-0.000593 (0.00141)
Professional lower-middle	-0.00969 (0.00989)	-0.00577 (0.0123)	-0.0100 (0.00995)	-0.000846 (0.00360)	-0.000128 (0.000975)
Economic lower-middle	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Skilled	-0.00891 (0.00967)	-0.00260 (0.0121)	-0.00842 (0.00975)	0.000616 (0.00363)	0.000593 (0.00120)
Unskilled/semi-skilled	0.00204 (0.0108)	0.00496 (0.0137)	0.00209 (0.0109)	0.00275 (0.00490)	0.000458 (0.00122)
Farmers, fishermen, foresters	0.00413 (0.0234)	-0.00267 (0.0290)	0.00301 (0.0234)	0.00409 (0.0108)	0.00111 (0.00295)
Welfare, transference	-0.00235 (0.0110)	0.00811 (0.0147)	-0.00363 (0.0110)	0.00286 (0.00520)	0.000803 (0.00149)
Missing	0.0461*** (0.0139)	0.0463 (0.0482)	0.0291* (0.0136)	0.0234 (0.0308)	0.00345 (0.00648)
Observations	27304	16260	27304	10121	9503
Variables	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Extra model: full - income variable	Model 4 Full model
	By year 5	By year 5	By year 5	By year 5	By year 5
Cultural upper	0.108*** (0.0325)	0.0545 (0.0364)	0.0985** (0.0321)	0.00326 (0.00419)	0.000121 (0.000725)
Professional upper	0.0599* (0.0249)	0.0492 (0.0278)	0.0575* (0.0248)	0.00399 (0.00418)	0.000730 (0.000912)
Economic upper	0.0688** (0.0264)	0.0699* (0.0296)	0.0673* (0.0263)	0.00519 (0.00515)	0.00114 (0.00126)
Cultural upper-middle	0.0416* (0.0176)	0.0309 (0.0198)	0.0379* (0.0176)	0.000979 (0.00182)	-0.000237 (0.000437)
Professional upper-middle	-0.0130 (0.0173)	-0.0260 (0.0194)	-0.0158 (0.0173)	-0.00214 (0.00225)	-0.000760 (0.000767)
Economic upper-middle	0.00242 (0.0202)	0.00665 (0.0228)	0.00203 (0.0201)	-0.000657 (0.00180)	-0.000477 (0.000600)
Cultural lower-middle	-0.0328 (0.0253)	-0.0487 (0.0279)	-0.0307 (0.0253)	-0.00253 (0.00285)	-0.000915 (0.000947)
Professional lower-middle	0.0180 (0.0188)	0.00973 (0.0212)	0.0192 (0.0187)	0.000805 (0.00185)	0.0000585 (0.000439)

Economic lower-middle	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Skilled	-0.0109 (0.0182)	-0.0105 (0.0206)	-0.00779 (0.0182)	-0.000912 (0.00172)	-0.000212 (0.000445)
Unskilled/semi-skilled	-0.0134 (0.0199)	-0.0295 (0.0227)	-0.0124 (0.0199)	-0.00191 (0.00227)	-0.000538 (0.000638)
Farmers, fishermen, foresters	0.0122 (0.0410)	0.0157 (0.0484)	0.0101 (0.0407)	0.00146 (0.00447)	-0.00000664 (0.00103)
Welfare, transference	0.0199 (0.0202)	0.0176 (0.0245)	0.0179 (0.0201)	0.000380 (0.00200)	0.000208 (0.000559)
Missing	0.142*** (0.0279)	0.0656 (0.0780)	0.0963*** (0.0287)	0.00182 (0.00734)	-0.000743 (0.00157)
Observations	15450	11574	15450	9339	9331
Standard errors in parentheses (RSE model 1-3) (Conv.SE model 4 & extra)					
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

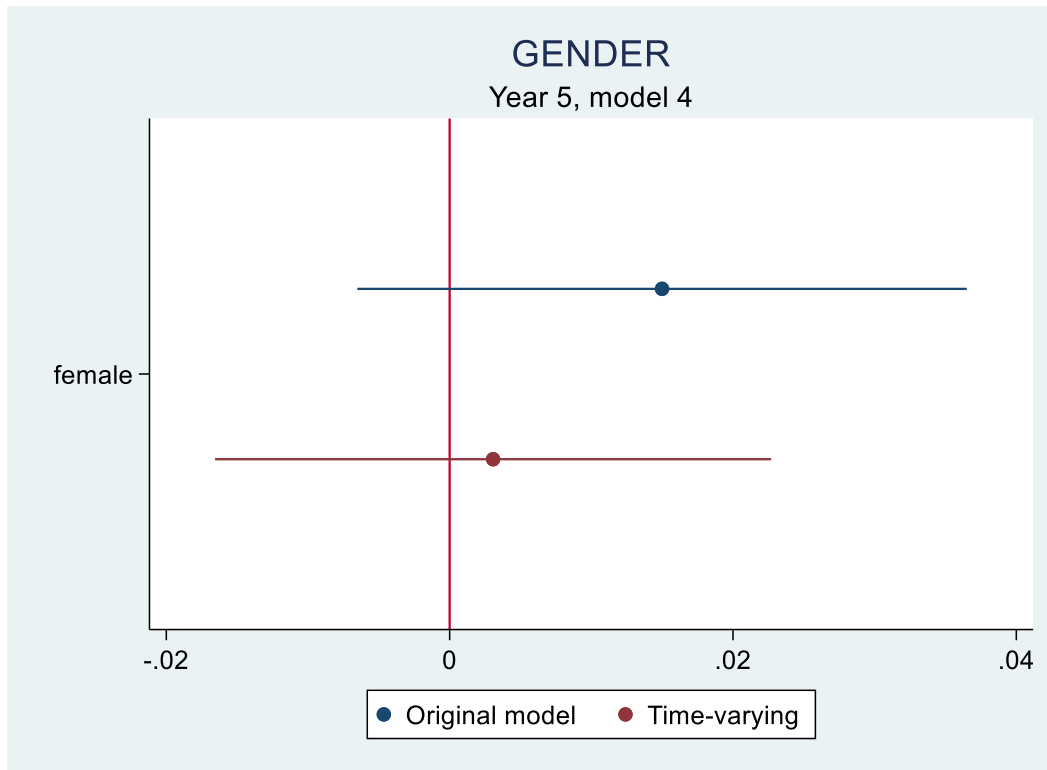
Table 4. 2: The logistic regression models are estimated using the logit and xtlogit command in Stata 15. Model 1-3 includes robust standard errors. Stata does not allow for robust- or cluster robust S.E for xtlogit. Hence, Model 4 and extra include conventional standard errors.

Appendix A4.15: Logistic Regression for Minority background

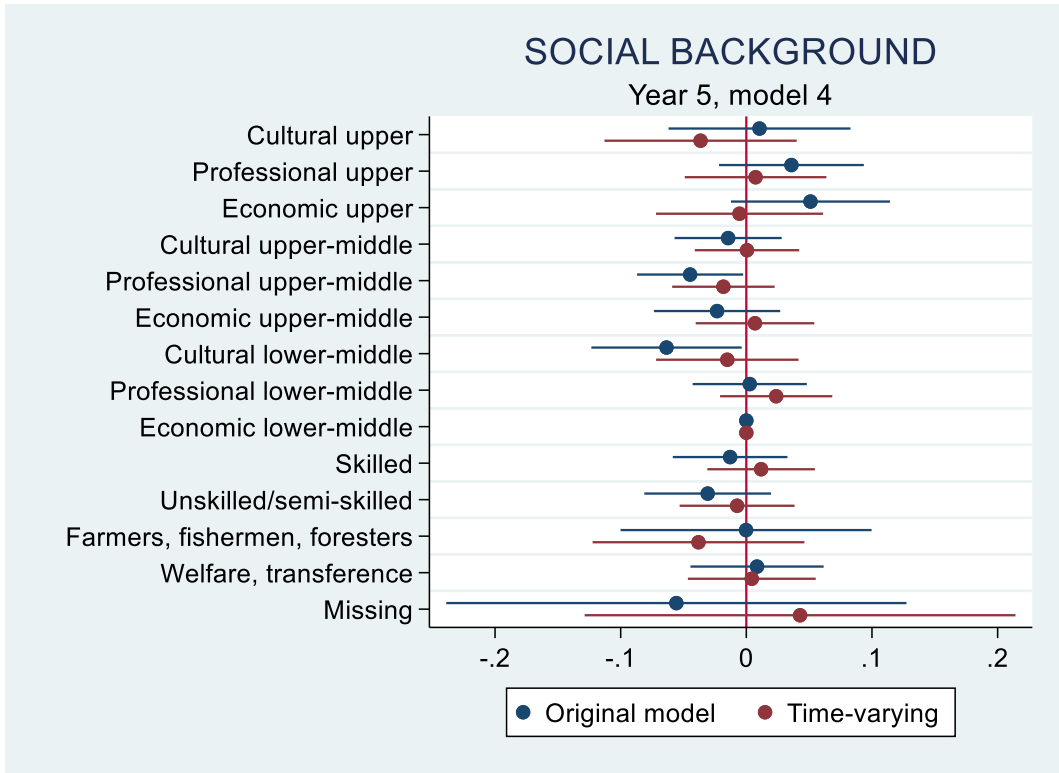
Variables	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Extra model: full - income variable	Model 4 Full model
	By year 1	By year 1	By year 1	By year 1	By year 1
Born_Norwegian	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Immigrant	0.0488*** (0.0106)	0.0363 (0.0274)	0.0351*** (0.0103)	0.00895 (0.0127)	0.00287 (0.00414)
Mixed_Norwegian	0.0258** (0.00976)	0.0150 (0.0123)	0.0256** (0.00975)	0.00571 (0.00645)	0.00101 (0.00145)
Observations	27304	16260	27304	10121	9503
Variables	Model 1 no controls	Model 2 w/GPA	Model 3 w/Educ0	Extra model: full - income variable	Model 4 Full model
	By year 5	By year 5	By year 5	By year 5	By year 5
Born_Norwegian	0 (.)	0 (.)	0 (.)	0 (.)	0 (.)
Immigrant	0.143*** (0.0217)	0.0980* (0.0459)	0.107*** (0.0224)	0.0113 (0.0115)	0.00323 (0.00346)
Mixed_Norwegian	0.0753*** (0.0183)	0.0606** (0.0212)	0.0747*** (0.0182)	0.00356 (0.00353)	0.000595 (0.000700)
Observations	15450	11574	15450	9339	9331
Standard errors in parentheses (RSE model 1-3) (Conv.SE model 4 & extra)					
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Table 4. 3: The logistic regression models are estimated using the logit and xtlogit command in Stata 15. Model 1-3 includes robust standard errors. Stata does not allow for robust- or cluster robust S.E for xtlogit. Hence, Model 4 and extra include conventional standard errors.

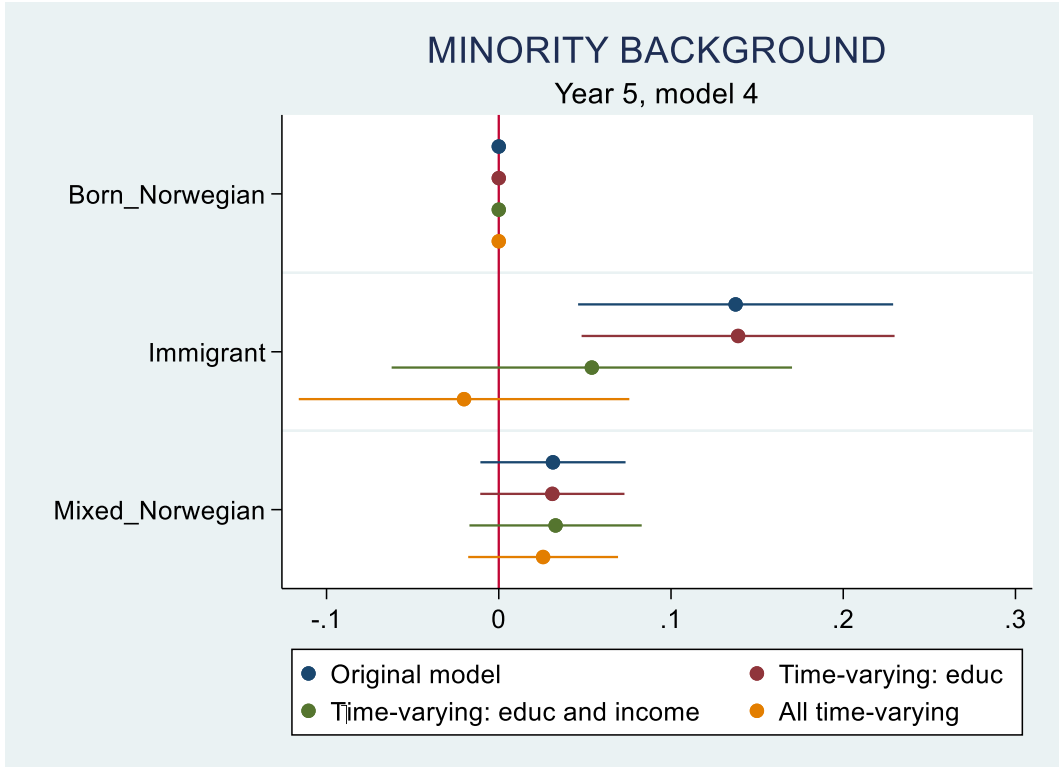
Comparing models with beginning-of-the-career variables to time-varying variables



Appendix A4.16: Comparison of model 4, year 5 for original model and model with time-varying variables. Points give coefficients with their respective 95% C.I, and baseline, 0, for statistically non-significant



Appendix A4.17: Comparison of model 4, year 5 for original model and model with time-varying variables. Points give coefficients with their respective 95% C.I, and baseline, 0, for statistically non-significant



Appendix A4. 18: Comparison of model 4, year 5 for original model and model with time-varying variables. Points give coefficients with their respective 95% C.I, and baseline, 0, for statistically non-significant

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