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Education and equality of opportunity:
what have we learned from educational reforms?

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Education and equality of opportunity: what have we learned from educational reforms?[a]

by

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Abstract

Equality of opportunity has been one of the central ideas governing education policy in the Nordic welfare state. This paper takes its starting point in the shared history of educational reform in the Nordic countries, and presents evidence that the *comprehensive school reforms* that implied a shift from selective two-tier schooling systems to unified compulsory schools were beneficial for equality of opportunity. This evidence is compared to a *choice and voucher reform* that in the 1990's introduced pedagogical as well as organizational variety in the education system in Sweden. The Swedish choice reform is unique in an international perspective, and has reshaped the education sector dramatically as a growing number of pupils attend non-public independent schools. The current education debate shows a widespread concern that the introduction of choice has led to a backlash for equality of opportunity. Parental background remains a strong determinant of pupil performance. However, recent research finds no indication that family background has become more important over time in explaining pupil outcomes. The Swedish education system nevertheless faces a number of challenges if it is to level the playing field and create equal opportunities for all pupils: schools are becoming increasingly more segregated, much as a consequence of immigration, and disadvantaged pupils are less likely to exercise school choice compared to their more advantaged peers.

Keywords: Educational reform, equality of opportunity
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1 Introduction

There is a widely shared belief that all children, regardless of family background, should face equal life chances and have equal opportunities to succeed in life. Family background, in a broad sense, can be referred to as background factors not chosen by the individual, and inequalities in outcomes that are related to family background can therefore be considered unfair. Despite this belief, parental background remains a very strong predictor for children's educational attainment and for success in the labour market in general. For example, in PISA (Programme for International Student Assessment), all surveyed countries show a strong socioeconomic gradient with respect to students' results (National Agency for Education 2013) and correlations between parents' and children's years of schooling range from about 0.20 in the Nordic countries to about 0.5 in the U.S. (Holmlund et al. 2011). Because of these strong correlations, policy makers often turn to the education system as a tool to level the playing field and create equal opportunities for children from different backgrounds.

The Nordic countries have a shared history of educational reform, including the expansion of publicly subsidized pre-school and the school reforms that gradually expanded and re-modelled compulsory education. One of the explicit aims of these reforms was to enhance equality of opportunity and increase social mobility, and as such, these policies played an important role in the construction of the welfare state. Research shows that in the Nordic countries, the relationship between parents' and children's socio-economic status is weaker than in for example the U.S. (Björklund and Jäntti 1997; Björklund et al. 2002). Studies in this field typically estimate the association between parents' and children's education or earnings, and the stronger the association, the more important is family background for an individual's life outcomes, and the lower is social (or intergenerational) mobility. There are many different reasons why social mobility has been higher in the Nordic countries compared to many other nations, but the strong emphasis on equality of opportunity in education is one potential candidate that may explain this pattern.[1]

From a theoretical perspective, there are several reasons for which the design of the education system can be important for the intergenerational persistence in, e.g.,

[1] In this paper the term 'social mobility' is used broadly, as a synonym to 'intergenerational mobility', and refers to mobility in income and educational outcomes. In the sociology literature, 'social mobility' relates more closely to the concept of social class (see Erikson and Goldthorpe 1992).

educational outcomes. Public investment in education may help poor families to overcome credit constraints, and give all children access to education throughout the education system. Public policy can also affect intergenerational persistence through its interplay with educational choices (Björklund and Salvanes 2011). If families of different socio-economic status hold different information about school quality and future returns to education, or have different preferences for their children's education, elements of choice through early tracking or choice of school may imply a stronger intergenerational relationship compared to a comprehensive system with limited options to choose between different tracks, pedagogical orientations or schools. In the latter case, the degree of parental influence over educational choices will be limited.

The Nordic countries all reformed their compulsory school systems throughout the 1950s–1970s. Common features were to extend the length of compulsory education, and to postpone the differentiation of pupils into different educational tracks (typically vocational and academic tracks) to a higher age. Since the early 1990s however, school reforms in Sweden have introduced new elements to the education system, which distinctly differentiate Sweden from most other countries.[2] In the 1980s, critics had started to question the long-lasting social-democratic influence over the school and education system, and in particular advocated more diversity in educational provision, and the right for parents to exert influence over their children's education (National Agency for Education 2003). This debate eventually led to the passing of a series of educational reforms in Sweden. In the early 1990s, a choice and voucher reform implied that private schools were granted public funding, and greater opportunities for pupils to opt out of their assigned local public schools to either attend a voucher-funded private (or 'independent') school, or a public school outside of their catchment area. During the same time period, the public school system was decentralized and the previous state control was replaced by a municipality (i.e. local authority) maintained system, with the purpose to let local priorities play a larger role in e.g., resource allocation.

Since the introduction of universal vouchers, many new independent voucher-funded schools have opened in Sweden. As of 2014, about 14 percent of all compulsory school

[2] Sweden is one of few countries in the world with a generalized voucher system and independent voucher schools face relatively loose regulations. In the Nordic countries, Denmark has a long tradition of independent schools (around 13 percent of all compulsory school pupils attend an independent school), which are often run by parent co-ops with religious or pedagogical profiles. Ownership regulations are different than in the Swedish system and imply that schools cannot be run as for-profit corporations. In Finland and Norway, independent schools are rare and only about 2 percent of compulsory school level pupils attend such a school (SOU 2013:56).

pupils attend an independent school.[3] These schools represent various pedagogical ideas and religious affiliations, but it is also common that for-profit corporations run schools with a general profile.

There were two main arguments for school choice and diversity in educational provision put forward in the debate: parents should have a right to choose their child's school, and competition between schools and different pedagogical ideas should increase efficiency in the school system and improve educational outcomes (Government bill 1991/92:95). Opponents of the reforms, on the other hand, argued that a choice-based system with independent schools would lead to segregation and inequality, and that the reforms were at odds with the ideals of an inclusive education system providing equal education to all pupils, regardless of family background (Opposition bill 1991/92: Ub62). In the current education debate, 25 years after the passing of the reform, equity concerns are again on the policy agenda: between-school inequality is rising both in terms of test scores and parental background (Holmlund et al. 2014). In tandem, Sweden's scores in PISA have declined sharply and this empirical correlation has brought additional light on the topic of choice, segregation and educational performance.

The purpose of this paper is twofold. The first purpose is to summarize the existing evidence on the role of educational reforms for intergenerational mobility in the Nordic countries. Specifically, the paper will compare *comprehensive schooling reforms* that took place in the 1950s–1970s, to the *choice and voucher reform* in Sweden in the 1990s.[4] The reforms are very different in nature and a comparison will illustrate how different features of the education system are related to equality of opportunity. Importantly, the latter reform has affected more recent cohorts that have not yet completed their education and entered the labour market. Research on intergenerational mobility in relation to this reform has therefore used age 16 school performance to proxy for intergenerational mobility. That is, using intermediate outcomes that are highly correlated with long-run education and labour market outcomes, it is possible to shed light on more recent trends in mobility.

[3] Calculation based on statistics available at www.skolverket.se.
[4] This paper will not cover the literature on the expansion of subsidized pre-school education in the Nordic countries. Evidence from Norway shows that provision of subsidized pre-school has increased intergenerational mobility (Havnes and Mogstad 2011).

The second purpose is to identify and discuss future challenges to the ideal of equality of opportunity in education, in light of recent developments in Swedish society. Reconciling the literature, the main conclusions of the paper are that the comprehensive school reforms likely have improved social mobility, while the more recent school choice reform in Sweden does not seem to have affected short-run outcomes that proxy for social mobility. The Swedish education system nevertheless faces a number of challenges if it is to level the playing field and create equal opportunities for all pupils: school segregation has been on the rise for a long time, much as a consequence of immigration, and disadvantaged pupils are less likely to exercise school choice compared to their more advantaged peers.

The remainder of the paper is structured as follows: section 2 discusses some theoretical predictions relating to intergenerational mobility and the workings of the school system; section 3 summarizes the evidence from the compulsory schooling reforms in the Nordic countries; section 4 moves on to more recent evidence on the choice and voucher reform in Sweden and section 5 outlines future challenges to equality of opportunity in the Swedish school system. Finally, section 6 concludes with a short summary and discussion.

2 The education system and intergenerational transmission of human capital

Economic models of human capital take their starting point in a model of investment, originating from Becker and Tomes (1979). In such a model, a child's human capital, defined broadly as for example education, and cognitive and non-cognitive skills, will be determined by parental inputs (both in terms of nature and nurture) and by public investment in education. In this framework, one would expect a positive correlation between child's and parent's human capital (or income), in part because of the genetic transmission of abilities, and in part because credit constraints might imply that well-off families can afford to invest more in their offspring's education than poor families. Parental investment in human capital should be interpreted not only as formal education, but also as parents' own time spent with the child, the quality of time spent together, and their parenting skills.

The optimal parental investment will depend on factors such as the return to human capital, the degree of public investment, and the institutional set-up of the school system – and therefore these factors may in turn affect the strength of the intergenerational associations. As an example, a model by Solon (2004) shows that intergenerational income mobility is decreasing in the returns to human capital and increasing in the degree of public investment in education.

Public investment in education is clearly a policy that relaxes credit constraints for poor families and the theoretical prediction is therefore that it should lower inter-generational persistence in economic outcomes. But how can institutional arrangements such as ability tracking, comprehensive vs. selective systems, and school choice affect the intergenerational link and social mobility?[5]

First, consider the use of ability tracking within a school, i.e., pupils are sorted into different classes based on their previous school performance. As suggested by Betts (2011), in a system without tracking, affluent parents might invest in private tutoring on top of public education, in order to obtain good results and gain access to the best universities. In a system with ability tracking, on the other hand, well-off parents might see less need for extra tutoring if they consider placement of their children in a high track as a substitute for private investment.

Second, how does parental background influence educational choice in a selective two-tier system compared to a comprehensive system? Early differentiation is argued to increase the importance of parental characteristics for educational choice. The earlier the choice is made, the less accurate is information about pupil ability, which tends to put weight on parental socioeconomic background rather than pupil ability in the educational decision (Björklund and Salvanes 2011). Moreover, the younger is the child, the stronger is the influence of parental, rather than the pupils' own, preferences for education. The prediction is therefore that postponing differentiation into academic and vocational tracks to a later age will limit the importance of family background for educational choice, and therefore be beneficial for social mobility.

Third, school choice policies may also be of importance for intergenerational mobility. On the one hand, if parental preferences for education vary by family

[5] This question highlights the potential trade-off between efficiency and inequality, where proponents of tracking argue that tracking increases efficiency, while opponents point to increased inequality as a result of separating pupils into different tracks or schools (Betts 2011).

background, or if families have different access to information about school quality and different abilities to interpret such information, it is possible that choice leads to a segregated school system where the type or quality of the school attended is correlated with family background. On the other hand, it can be argued that school choice provides an opportunity for disadvantaged children to 'escape' low-performing schools in poor neighbourhoods and the link between school quality and family background should therefore weaken.

Most empirical studies that focus on the decision of opting out from assigned schools find that advantaged families are more prone to opting out (see Böhlmark et al. 2015 for a summary), which implies that increased sorting seems to be the dominating factor. In such systems, children with a favourable background will access the best schools, which will strengthen the association between parents' and offspring's outcomes. Parental choice in combination with financing through per-pupil school vouchers may also exacerbate quality differences if the least popular schools run short of funding. School choice within the publicly funded school system can thus lead to sorting and quality differences between schools, but it can also limit the demand for highly selective tuition-charging private schools (Epple et al. 2002). High demand for such schools could potentially lead to sorting between the public and private sectors, and imply very strong correlations between family background and children's educational and labour market outcomes.

All in all, summing up the theoretical predictions above, it can be argued that a comprehensive system without the possibility of opting out of assigned schools will tend to limit the influence of parental background for educational outcomes. However, in such a system, parental preferences for high-quality selective education or for a specific peer group composition might open up for a market of tuition charging private schools to which only affluent families have access. This scenario predicts that family background will have a strong influence on educational success. Which theoretical mechanism that dominates will ultimately be an empirical question.

3 Compulsory schooling reforms, tracking and intergenerational persistence

3.1 The compulsory schooling reforms

In the 1940s and 1950s, children in the Nordic countries commonly started school at the age of 7 and went to a common primary school for 4–6 years, after which they were split into two tracks: remaining in primary school or attending a general lower secondary school.[6] Pupils who remained in primary school completed 7–8 years of schooling, which at the time was the compulsory minimum. Admission to lower secondary school was typically based on school grades, teacher assessments and entrance examinations. Attending lower secondary school implied leaving school after 9–10 years, if not continuing further at the upper secondary level. This two-track selective system differentiated pupils at the age of 10–12, into paths that were distinctly different: the secondary school path had a more academically oriented curriculum and prepared for future academic studies, while the primary school path was followed by vocational training and did not grant access to academic studies.

This educational model was reformed and replaced by a comprehensive school with a similar curriculum for all pupils from 1st to 9th grade.[7] One explicit motivation for these reforms in the Nordic countries was to give all children, irrespective of family background, the same basic education, that is, to provide equal educational opportunities for all. Early differentiation was considered a disadvantage for children from low-educated households who disproportionally remained in primary school, and the reforms aimed at raising these children to a higher academic level.[8]

One common feature of the reforms was that they were rolled out gradually across different regions. In Sweden, the reform started at a small scale in 1949 and was implemented throughout the 1950s. In Norway, the reform period spanned 1960–1972. In Finland, the comprehensive school was introduced in the 1970s, but at this point in time the length of schooling had already been harmonized for different tracks, and as such the reform served mainly to merge the two-tier system into a comprehensive

[6] This section builds on Meghir and Palme (2005), Arendt (2005), Pekkarinen et al. (2009) and Aakvik et al. (2010).
[7] In Sweden, some tracking initially remained within the comprehensive system, but was abolished in 1969 (National Agency for Education 1969).
[8] Equality of opportunity was an explicit motivation for the reforms, but also other motivations are worth highlighting. In Sweden for example, demand for education beyond the compulsory level was growing among the baby boom cohorts born in the 1940s, and the education level was increasing in the population already before the reform was rolled out. The compulsory school reform was therefore also a means to meet increased demand for education in the population (see Holmlund 2007).

school system. The gradual implementation has been of great importance to researchers, who have been able to evaluate the reforms by comparing individuals who went to school in different regions at different points in time. The exception is Denmark, where reforms were implemented throughout the country at a single point in time: In 1958 early sorting was limited, and in 1975 the two track-system was fully abandoned and the years of compulsory education increased from 7 to 9. The next section summarizes some of the findings from this research.

3.2 Causal effects of compulsory schooling reforms on intergenerational mobility

Although there are some theoretical predictions that relate features of the education system, such as ability tracking, to social mobility, it is a challenging task to provide empirical evidence on this topic. As already mentioned, comparisons of intergenerational income mobility in different countries have shown that mobility is higher in the Nordic countries than in continental Europe and in the U.S. and the U.K. (Björklund and Jäntti 1997; Blanden 2013). This pattern is often interpreted as a success of the Nordic welfare state, but cross-country comparisons are not enough to understand the underlying mechanisms of specific policies, and may also be explained by other cross-country differences. When it comes to education policy and ability tracking specifically, most cross-country comparisons show that tracking increases inequalities and the role of family background for educational outcomes (Amermüller 2005; Hanushek and Wossman 2006; Brunello and Checci 2007).[9] These studies all share the limitations of a cross-country comparison: it is not obvious that the analysis can account for all the 'other' relevant factors that explain differences in outcomes between countries.

In a different strand of research, experimental designs have been used to compare the outcomes of ability-grouped vs. mixed-group pupils. Evidence from primary school children in Kenya (Duflo et al. 2011) and university students in the Netherlands (Booij et al. 2015) shows that tracking can have positive effects on outcomes both for low and high ability students, and that the positive tracking effects for low ability students can be higher than the positive peer effects that would be incurred from a mixed peer group.

While the cross-country variation is potentially unsuitable for causal inference, the recent experiments are more compelling when it comes to internal validity of the

[9] See Waldinger (2007) for an exception.

estimates. Nevertheless, their results cannot always be generalized to a system-wide context and they provide limited evidence on the effects of reforms at the institutional level. Instead, a large body of research based on the comprehensive school reforms in the Nordic countries has provided evidence on the causal effects of a system-wide change to the education system on a range of outcomes. These within-country comparisons exploit the gradual roll-out and are therefore able to isolate the effects of the reforms in a setting where it is unlikely that other factors confound the results.

The first paper to exploit the gradual implementation in order to study the effects of a comprehensive school reform in the Nordics was Meghir and Palme's (2005) influential study on the Swedish reform.[10] The main findings from their paper are that the reform increased years of schooling and lifetime earnings for children with low-skilled fathers, while there is a tendency to find negative earnings effects for children whose fathers were high-skilled. These results imply that the reform contributed to reducing inequalities in labour market outcomes by family background, and as such, one of Meghir and Palme's conclusions is that the reform increased intergenerational mobility.

The Finnish reform, explored in two papers by Pekkarinen et al. (2009; 2013) provides evidence in line with the study of the Swedish case. Pekkarinen et al. (2009) estimate the intergenerational income elasticity, which is the regression coefficient from a regression of offspring's log life time income on parents' log lifetime income. A high value indicates strong income persistence between generations (i.e., low social mobility) and a low value indicates high social mobility. They find that the reform reduced the intergenerational income elasticity by 23 percent, from 0.30 to 0.23. This is a sizeable effect and is backed up further by the 2013 study which finds that the reform improved the cognitive skills of boys with low educated parents, while not affecting boys whose parents had some education above compulsory level.[11]

Estimates for Norway are in line with the evidence presented above, and lend further support to the conclusion that the comprehensive school reforms contributed to increasing intergenerational mobility. Aavik et al. (2010) find that the effect of family background on educational attainment was lowered as a result of the Norwegian reform. The Danish reform, which was instituted throughout the country at a single point in

[10] Erikson (1996) had previously studied equality of opportunity in the light of the Swedish reform, and found that the introduction of the comprehensive school coincided with reduced inequality in education.

[11] Similar estimations of the reform effect on the intergenerational income elasticity in Sweden can be found in Holmlund (2008), who finds that the Swedish reform reduced the elasticity by 12 percent.

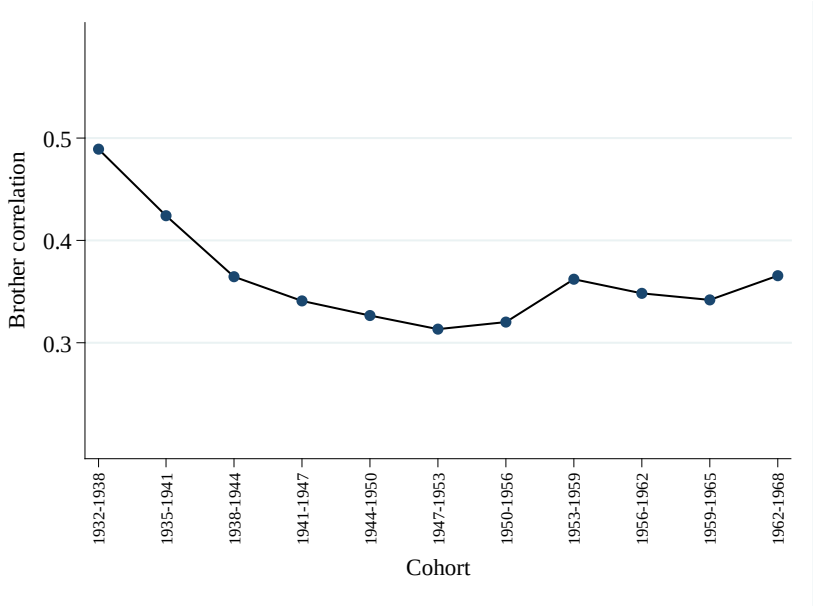
time, does not allow for an evaluation design similar to that of the studies described above. As a consequence there is no published research that can complete the picture with estimates from Denmark.

Before concluding this section, it is worth noting that these studies build on regression models that relate children's education and earnings to their parents' education and earnings. While these observed measures of socio-economic status are highly relevant, alternative empirical methods provide additional evidence to support the findings presented above. Björklund et al. (2009) make use of 'sibling correlations' to capture the importance of family and community background for children's labour market success. The sibling correlation estimates how much of the variation in outcomes, in this case life time income, that can be attributed to the family in *a broad sense*. If siblings are very similar (the sibling correlation is high), shared family background factors, such as socio-economic status, marital stability and parenting skills, as well as shared community factors including the school and the neighbourhood, are important for children's outcomes. If the sibling correlation is low and siblings are not alike in terms of outcomes, family and community background seems to be a less important explanation. The sibling correlation, by virtue of capturing all sorts of shared background factors – also factors that cannot be observed in the data – is considered an important complement to the more traditional regression-based measures that link parents to their children. Figure 1 shows the brother correlation in income, as estimated in Björklund et al. (2009).[12] The figure displays a sharp decline in the brother correlation, from 0.49 for cohorts born 1932–1938 to 0.32 for cohorts born around 1950, thus suggesting that family and other shared background factors became less important determinants of long-run income in adulthood. In additional analyses, it is shown that the decline can be explained by changes in the distribution of years of education. While the early decline pre-dates the comprehensive school reform, these results may reflect earlier expansions of compulsory education (see Fisher et al. 2013

[12] Figure 1 is based on full biological brothers born at most seven years apart. One concern with comparing the sibling correlation over time is that it might be sensitive to trends in child spacing and family structure. Björklund and Jäntti (2012) find that sibling similarities are not much affected by age differences of siblings in the sample and they therefore conclude that shared permanent factors are most important in explaining the sibling correlation. The sibling correlations in Figure 3 are based on siblings with the same mother (i.e. also half siblings on the maternal side) born at least three years apart. The conclusions from Figure 3 are robust also to alternative specifications including only full biological siblings.

for a description of earlier reforms) and are suggestive of the importance of the education system for intergenerational mobility.

Figure 1. Brother correlations in income in Sweden



Source: Björklund et al. (2009).

In the next section, indicators of social mobility will be related to more recent reforms to the education system in Sweden.

4 Parental choice and the importance of family background for pupil achievement

The research presented in the previous section shows that raising compulsory schooling and shifting from selective to comprehensive systems, as manifested by the reforms in the Nordic countries in the 1950s–1970s, reduced inequalities in educational attainment and in life time income by family background. In this section, these results will be contrasted with a more recent reform in Sweden that in the early 1990s introduced universal school vouchers and generalized school choice.[13] This reform is very different in nature, and the comparison aims primarily at highlighting how different aspects of the education system are related to equality of opportunity.

4.1 The choice and voucher reform

In 1992, Sweden introduced a nation-wide voucher system, which facilitated public funding of private schools, and introduced school choice. In the pre-reform period, with

[13] For more details on the reform and the current institutional setting, see SOU 2013:56.

institutions dating back to the comprehensive system described above, almost all pupils attended the local school in their catchment area; less than one percent of all pupils attended a private school. The reform was based on two main elements. First, privately maintained 'independent' schools receive public funding through school vouchers after having gained approval by the Swedish National Agency of Education, NAE. Pupils' home municipalities have to provide independent schools with a grant, based on the average per-pupil expenditure in the public school system, for each pupil who chooses to enrol in an independent school. This new law has given rise to a large number of new schools, whose existence depends solely on funding through vouchers. The number of independent schools (at the compulsory level) has increased, from about 170 registered independent schools in 1993 to 800 in 2014. In 2014, about 14 percent of all compulsory school pupils attended an independent school. Independent schools are open to all pupils: by law they are not allowed to charge tuition fees on top of the voucher, nor can they select pupils by ability or family background. If an independent school is oversubscribed, three selection criteria for admission are allowed: proximity to the school; waiting list (by date of application); and priority for children whose older siblings are already enrolled in the school.[14] Second, the voucher reform also introduced choice between public schools, although maintaining priority for pupils residing close to the public school. Slots are first allocated to pupils within the public schools' catchment areas, after which pupils from other areas can be granted admission.

School choice and competition cannot explain the sharp decline in Swedish PISA scores (Böhlmark and Lindahl 2015; Wondratschek et al. 2013). The current Swedish education debate is nevertheless strongly concerned that inequalities in educational outcomes are on the rising, and it is often believed that the importance of family background for educational success has increased as a result of the choice and voucher reform (National Agency for Education 2009). The rationale for these concerns is that the possibility to exert school choice and the probability of gaining access to the preferred school might be related to a pupils' family background, as discussed in

[14] Independent schools were initially allowed to charge moderate tuition fees, but the right to charge fees was abolished in 1997. The funding rules have varied over time: at the outset of the reform, the voucher should amount to 85 percent of per-pupil expenditure in the public schools in the municipality. After 1997, the voucher to independent schools should be determined "on the same grounds as to public schools" (Government bill 1994/95:157). Independent schools can have different types of governing bodies, for example non-profit foundations and for-profit corporations. A majority of pupils attend schools with a general profile, belonging to a for-profit corporation (Swedish Association of Independent Schools 2015).

Section 2. Even though the institutional set-up is designed with the purpose of giving equal access to children from different family backgrounds, socio-economically advantaged families might have better information about school quality and about the waiting list principle at oversubscribed schools, which in turn implies a higher probability of accessing a popular, high-quality, school.

While research based on the Nordic comprehensive school reforms has focused on the relationship between family background and adult outcomes, such as completed education (years of schooling), earnings or income, recent studies of the Swedish choice and voucher reform have limited the analysis to intermediate outcomes such as grade point averages (GPA) and test scores at age 16. The rationale for this is that the cohorts that are included in the analyses have been too young for long-term outcomes to be relevant (cohorts born 1972–1993). Since school results at age 16 are good predictors of long-term labour market outcomes, the results can nevertheless serve as a proxy for intergenerational mobility in the cohorts affected by the choice reform. The next section presents evidence that relates indicators of intergenerational mobility to the choice and voucher reform.

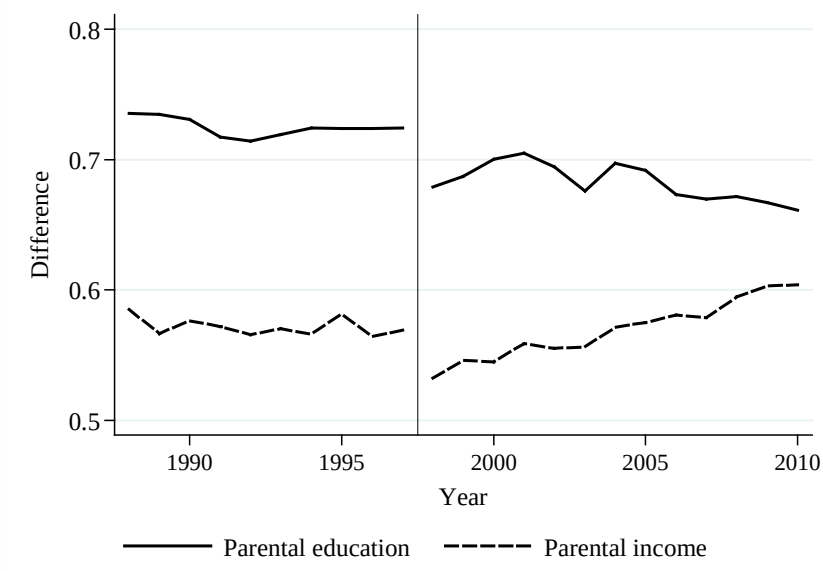
4.2 Parental background and school performance

The first study to assess the family background gradient in school performance, in the wake of the choice reform, was Björklund et al. (2003). Since then, a number of studies have followed suit and reported results on this topic (see for example Gustafsson and Yang-Hansen 2009; Fredriksson and Vlachos 2011; National Agency for Education 2012; Böhlmark and Holmlund 2012). More recently, Holmlund et al. (2014) provide a range of results, based on various data sources, which describe how the importance of family background for school performance at age 16 has evolved in the period 1988–2009. The main results are presented in Figure 2 and Figure 3.

Figure 2 shows the GPA difference, expressed in standard deviations, between pupils characterized by high and low parental education and income, respectively. The vertical line in 1998 reflects a grading reform. First, the graph reveals that there are sizeable differences in terms of school performance for pupils of different background. The difference between children of high and low educated parents is about 0.7 standard deviations; slightly below 0.6 comparing high and low income, and the differences remain stable until 1998. The new grading system implied a shift towards smaller

differences between groups: family background has a lower explanatory power of school performance in the new system. The GPA difference by parental education turns out to be relatively stable over time also after the new grading system was introduced: if anything, the gap between pupils with high and low educated parents is shrinking. On the contrary, differences by parental income are increasing throughout 1998–2009. This pattern can be the result of an increasing role for parental income in determining school performance, but it cannot be excluded that the result is explained by compositional effects that are linked to increased income inequality in the population. The group defined as high income (the top 25 percent of the income distribution) is becoming richer in absolute terms during the study period, which can in itself affect the GPA difference presented in Figure 2.

Figure 2. Differences in age-16 GPA by family background

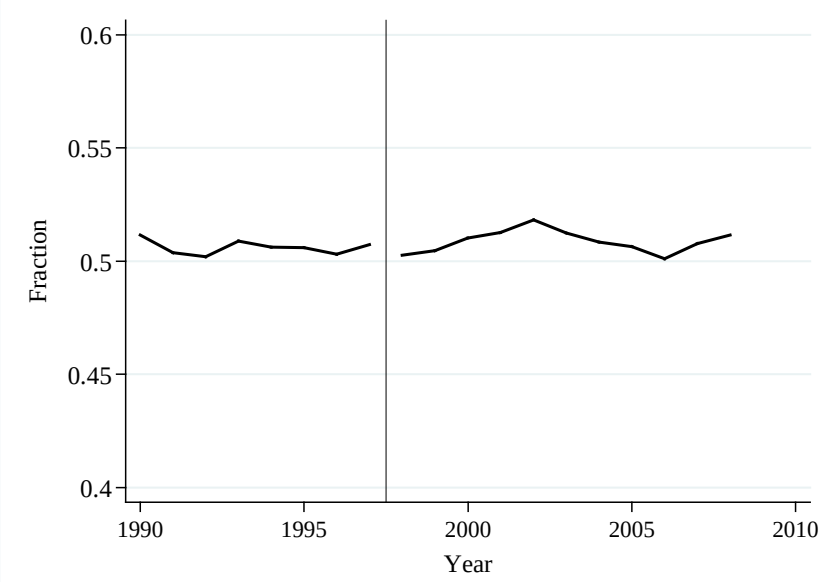


Notes: The figure shows differences in the GPA (based on Swedish, English and mathematics) between pupils with different family background. The lines show the differences between pupils characterized by high/low parental education or income. Highly educated parents are defined as at least one parent belonging to the top 25 percent of the education distribution (by parents' birth year and gender); the rest are defined as low educated. High income parents are defined as at least one parent belonging to the top 25 percent of the income distribution (by parents' birth year and gender), when income is measured in the age range 35–45. Remaining parents are defined as low income parents. The vertical line indicates a change in the grading system.
Source: Holmlund et al. (2014)

Next, Figure 3 presents sibling correlations in GPA at age 16. The correlations reveal that family and community background factors shared by siblings can explain about 50 percent of the variation in school performance, as measured by the GPA. Thus, siblings' shared background explains a large fraction of the variation, especially compared to the

school which explained 11 percent of the variation in 2009.[15] As in the previous graph, the shift to a new grading regime is demonstrated as a break in the time series. Importantly, there appears to be no trend in the sibling correlation over time, which means that family background factors have become neither more nor less important in shaping pupils' age-16 GPA.

Figure 3. Sibling correlations in age-16 GPA



Notes: The figure shows sibling correlations (fraction of variance explained by the family) in 9th grade GPA. Calculations are based on siblings born at most three years apart. The vertical line indicates a change in the grading system.
Source: Holmlund et al. (2014).

The key findings from Figure 2 and Figure 3 are that family background factors are very important for school performance – but their importance is remarkably stable over time. While there is some evidence indicating that differences are increasing by parental income, the other measures adopted do not confirm the notion that family background has become a stronger determinant of educational success in Sweden.[16] Based on these time-series from 1988–2009, it seems like the choice-based system introduced in the 1990s has not affected intergenerational mobility, at least not in the short run. Admittedly, this conclusion is based on the observation of a time series, and does not rely on a solid identification strategy as was the case for the comprehensive school

[15] See Holmlund et al. (2014) for variance decompositions of GPA at the municipality, school and family levels.
[16] Holmlund et al. (2014) show that these conclusions are robust also to using alternative sources of data. Analyses based on PISA data are somewhat inconclusive as to whether parental background has become more important for pupils' results in Sweden. The PISA index for socio-economic status has become a stronger predictor for reading performance between 2000 and 2009, while the same index has not become more important for mathematics between 2003 and 2012 (National Agency for Education 2013).

reforms. It cannot be ruled out that introducing choice has increased the social gradient in school performance, but other changes in society may have had effects going in the opposite direction and therefore cancelled out the effects of choice. As an example, it is possible that the expansion of publicly subsidized pre-school in the 1970s and 1980s has contributed to equalizing opportunities for children from different backgrounds (see Björklund et al. 2003).

5 The Swedish model: lessons learned and challenges for the future

The previous section provided evidence indicating that the growing sector of independent schools and the possibility to opt out of the local public school, have not strengthened the link between parental background and children's outcomes among cohorts that left compulsory education between 1988 and 2009. There are however some striking empirical features, related to the choice and voucher reform, but also to other changes to the Swedish society, that constitute challenges to the future of the school system and to equality of opportunity. In this section, a few of these challenges and their related policies will be discussed.

5.1 Choice and sorting to schools

Swedish independent schools cannot charge tuition fees, nor can they cream-skim the best pupils.[17] However, there is scope for independent schools to influence the pool of applicants indirectly; either by locating in advantaged areas, or by targeting information to specific groups of parents. In addition, anecdotal evidence indicates that independent schools do not always abide by the rules and reject low-performing students with disruptive behaviour (SVT 2013). On the demand side, preferences for schooling and access to information about school quality might differ by family background and affect the decision to opt out of the local public school. The waiting list principle to admit pupils to oversubscribed schools might also discriminate against groups of pupils with less information about how the school choice system works. These mechanisms typically imply that school choice might increase school segregation.

Who are the pupils that opt out of their local public school to attend an independent school? Table 1 shows that native children, as well as children with high-income and

[17] Independent schools cannot charge tuition fees, but schools are allowed to receive donations from parents.

highly educated parents are more likely to attend an independent school, compared to immigrants and children whose parents have lower income and education.

Table 1. Fraction of 9th grade pupils in different demographic groups attending an independent school in 2009

All	10.50
Immigrant	8.45
Native	10.65
Immigrant background	11.28
Swedish background	10.36
High parental education	15.28
Low parental education	6.07
High parental income	16.37
Low parental income	9.27

Source: Own calculations based on the 9th grade register matched with parental background information.
Note: High parental education refers to at least one parent with a three year university degree. Low parental education is defined as both parents holding only compulsory education. High vs. low parental income is defined as having family income (defined during school age) belonging to the top 20 or bottom 20 percentiles of the income distribution.

Figure 4 (adapted from Holmlund et al. 2014) adds to this picture by presenting odds ratios of the probability of attending an independent school, for pupils of different family background, living in different types of neighbourhoods. Neighbourhoods (defined as catchment areas) are characterized as advantaged or disadvantaged based on an index of family background that takes into account parental education, parental income, and migration history. Odds ratios are calculated by comparing only pupils living in the same catchment area, who should be expected to face the same supply of schools to choose from at a reasonable distance. An odds ratio equal to one means that two groups of students, e.g., immigrants and natives, have the same probability to attend an independent school, while an odds ratio below (above) one implies a lower (higher) probability. The figure shows that foreign background pupils have a much lower probability (odds ratio 0.55) than natives to attend an independent school, if they live in a disadvantaged catchment area. That is, children with Swedish background are more likely to attend independent schools if they live in poor neighbourhoods, compared to their immigrant background neighbours. Strikingly, the figure also shows that this is not the case in catchment areas with a more favourable demographic composition, where pupils of Swedish background have a much lower probability to attend independent schools. Similarly, children with highly educated parents have a much higher

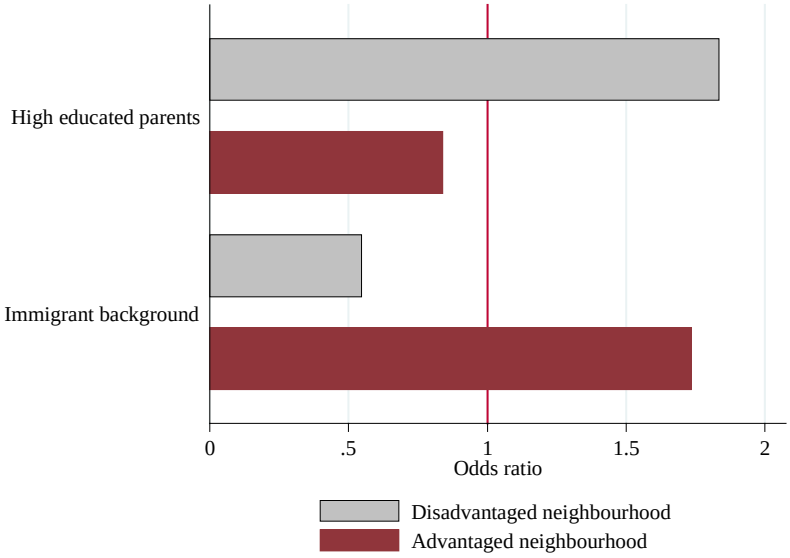
probability (odds ratio 1.83) of attending an independent school compared to children whose parents have lower education, if they live in a catchment area with high proportions of disadvantaged background peers. Instead, the probabilities are reversed for children of different educational background in advantaged catchment areas.

How can these sorting patterns be interpreted? The demographic composition of the catchment area can be seen as a proxy for the expected peer group in the local public school. In disadvantaged areas, pupils with Swedish background or with highly educated parents are more likely to leave the public school to attend an independent school than pupils with immigrant background and low educated parents. In contrast, in socially strong areas, the same pupils have a lower likelihood of attending an independent school than disadvantaged pupils. Advantaged pupils who live in neighbourhoods with similar peers remain in the public school and even attend the public school to a larger extent than more disadvantaged children do.

To sum up, the odds ratios in Figure 4 show that pupils with Swedish background and pupils whose parents have high education sort themselves into school types (public or independent) depending on the demographic composition of the catchment area which they belong to. If the demographic composition is favourable, they are likely to remain in the public school, while they are more likely to opt out and attend an independent school if they expect to find a more disadvantaged peer group in the local public school. To some extent, these sorting patterns reveal that peer group considerations are important when school choice is exercised.[18]

[18] See also Andersson et al. (2012) for similar findings.

Figure 4. Probabilities of attending an independent school, by parental background and neighbourhood demographics



Source: Holmlund et al. (2014).
Notes: Neighbourhoods are defined as advantaged (disadvantaged) if they are above (below) the median in the pupil-weighted distribution of the family background index. The family background index is a measure of expected GPA given by parental background, and is calculated by predicting GPA using the regression coefficients from a regression of GPA on family background factors such as parental education, parental income and immigrant status. High education parents are defined as at least one parent with a three-year university degree. Pupils with foreign background are born abroad to two foreign-born parents, or born in Sweden to two foreign-born parents. Odds ratios are computed by comparing pupils living in the same catchment area.

The sorting to independent schools as displayed in Table 1 and Figure 4 suggests that school choice is related to school segregation. The next section discusses the evolution of school segregation and its causes in more detail.

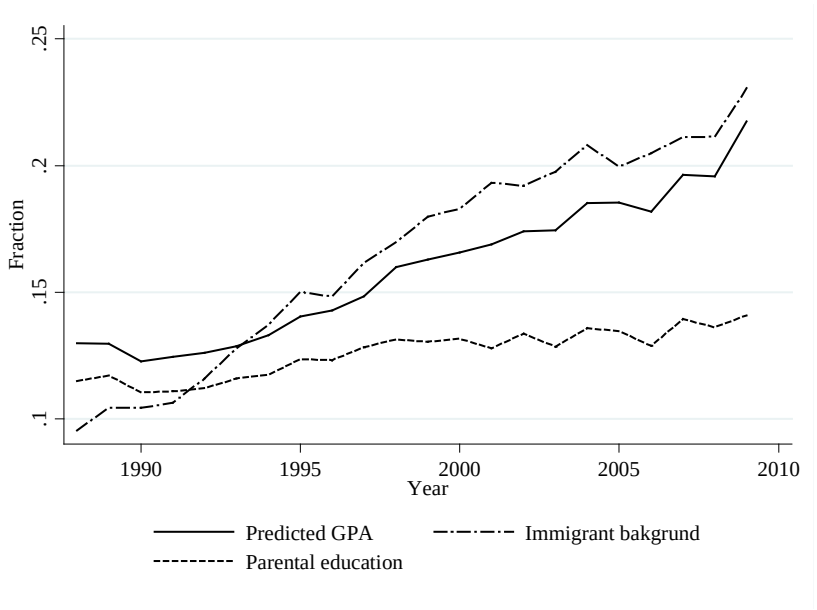
5.2 School segregation

Starting in the mid 1990s, school segregation has increased gradually in Sweden. Figure 5 illustrates this development with one indicator of segregation: the between-school variation in various measures of family background.[19] First, the solid line shows the between-school variation in the family background index 'expected GPA', that is, the GPA predicted by a set of family background characteristics such as parental education, parental earnings and migration history. It is clear from the graph that in terms of this combined measure of family background factors, schools have become more segregated throughout the period 1988–2009. Next, by studying segregation by different family background characteristics separately, it turns out that segregation between pupils of

[19] This pattern is robust also using alternative segregation indices; see for example Böhlmark et al. (2015).

Swedish or immigrant background has increased the most, while the increase in segregation by education background is less dramatic.

Figure 5. Between-school variation in family background

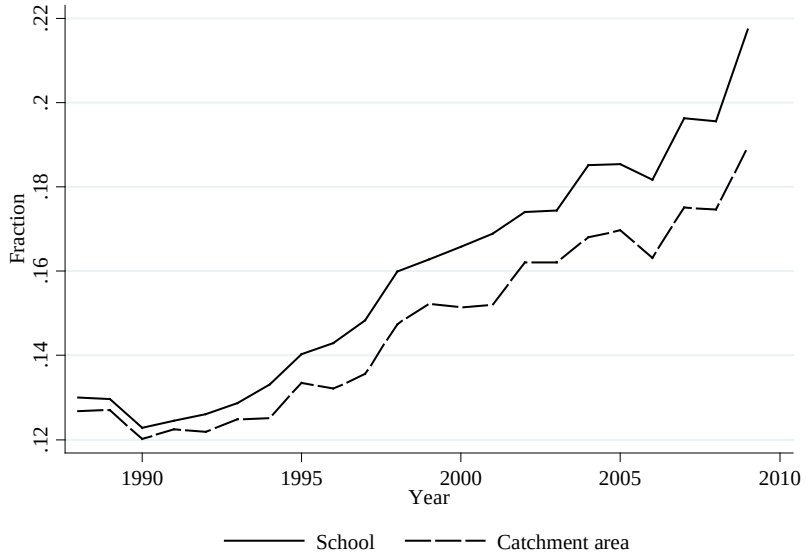


Source: Adapted from Holmlund et al. (2014)
Note: The between-school variation is calculated annually using ANOVA. Parental education refers to the parental average years of schooling. Pupils with immigrant background are born abroad to two foreign-born parents, or born in Sweden to two foreign-born parents. GPA is predicted by parental background factors: education, income and migration background.

Most children attend a school in their local catchment area, which means that school segregation is likely to be explained by residential segregation. However, segregation between schools took off in the early 1990s and has continued to increase as the number of pupils in independent schools has been growing. This empirical correlation has brought attention to the question of whether choice exacerbates school segregation over and above the segregation that is given by residential segregation. To bring clarity on this topic, Böhlmark et al. (2015) and Holmlund et al. (2014) study the association between the fraction of pupils opting out to independent schools, and various indicators of school segregation at the municipality level in Sweden. Their key finding is that the main contributor to school segregation is residential segregation, but segregation between schools has increased more than what is predicted by changes in residential sorting in municipalities where choice has become more prevalent. Figure 6 illustrates this result by graphing the between-school and between-neighbourhood (defined as catchment areas) variation in the family background index ‘expected GPA’ over time. Around 1990, before the choice reform when almost all pupils attended the local public

school, segregation between schools and residential neighbourhoods was virtually identical. Over time, both residential segregation and school segregation has increased, but as the number of pupils enrolled in independent schools has grown larger, segregation between schools has increased more than segregation between neighbourhoods. Nevertheless, residential segregation remains the main explanation to the development over time, and as seen in Figure 5, segregation between children with different migration histories has increased the most. Holmlund et al. (2014) show that municipalities and residential neighbourhoods with a large immigrant population host disproportionate numbers of new immigrants, as the share of immigrants in the population is growing. This has undoubtedly increased residential segregation in the country, and has naturally also affected school segregation.

Figure 6. Between-school and between-catchment area variation in family background (predicted GPA)



Source: Holmlund et al. (2014)
Note: The between-school variation is calculated annually using ANOVA. GPA is predicted by parental background factors: education, income and migration background.

5.3 Policy considerations of choice and sorting

This section discusses policy considerations related to the social gradient in enrolment at independent schools and to increasing school segregation, in relation to equality of opportunity. Its purpose is to highlight policy areas that are relevant for the future development of the school system with regards to segregation and sorting.

As Section 5.1 has shown, the choice to opt out is not equally distributed across different socioeconomic groups. This has not implied large changes to school segrega-

tion at the aggregate level, but the social gradient in independent school attendance is nevertheless relevant from the perspective of equality of opportunity. This social gradient can be the result of differences in preferences, differences in access to information (and abilities to interpret information), and may also result from the waiting list principle which benefits parents who are forward-looking, well informed and do not move. To date, there is no research using data on parents' revealed preferences for schools – most research builds on the school attended by the pupils. As a consequence, we know little about whether the sorting to independent schools is due to families ranking schools differently (i.e., differences in preferences and/or information), or due to the assignment mechanism (i.e., families rank schools similarly, but the waiting list leads to sorting). However, from the perspective of equal life chances – and the notion that children do not choose their parents – one can argue that it is irrelevant which mechanism is at stake as long as it leads to sorting. Even in the extreme case where there are no quality differences between schools and the sorting of pupils has no consequences for pupils' learning, one might still argue that families derive utility from the consumption value of school choice, and that the allocation of this consumption value across families is a policy issue.

Should policy makers be worried about increasing school segregation? To answer this question, it is important to consider what consequences segregation may have for pupil achievement – on average and for different groups of pupils – and for society at large. Taken together, the evidence in Böhlmark and Lindahl (2015) and Böhlmark et al. (2015) indicate that if segregation induced by choice has had negative effects on pupil performance on average – these have been offset by positive effects from school competition, indicating that the net effect of the choice reform on pupil performance is slightly positive. But because of residential sorting, school segregation has increased much more than what can be explained by the choice reform, and it is therefore important to consider its potential effects for the education system, and for society at large.

First, how does growing up in a segregated neighbourhood affect children's life chances? How does a segregated school affect the learning environment, how does it affect inequality in pupils' outcomes and are there effects on other life outcomes, such as criminal involvement? As already mentioned in Section 3.2, recent experimental

evidence has shown that sorting pupils by ability can improve outcomes, and that the positive effect of tracking can be larger than the positive peer effect for low-ability students in a mixed peer group. However, it is unclear to what extent the evidence from these studies can be generalised to the Swedish compulsory education system and to a setting where pupils are segregated by family background, into different schools. Grouping pupils by ability is not the same as grouping by socioeconomic background, and within-school ability sorting is different than between-school segregation (see Betts (2011) for a discussion on the differences between tracking within and between schools).

Research focusing on segregation per se is perhaps more informative for the Swedish case. Billings et al. (2014) present evidence that increased racial segregation in a U.S. school district, as a result of ending a de-segregating busing scheme, led to lower test scores for both white and minority pupils who were assigned to schools with larger numbers of minority pupils. In addition, the study finds that while compensatory resource allocation was able to efficiently remedy the negative effects on test scores, crime increased substantially among minority males who were assigned to schools with large proportions of other minority students. These findings align with earlier studies on peer racial composition and school segregation (see for example Deming 2011). The key insights from these studies is that high concentrations of disadvantaged youth in segregated schools might increase test score inequality between children of different family backgrounds, and affect behaviour also in other dimensions such as crime. The conclusions are further corroborated by evidence from the Moving to opportunity-programme (MTO) that offered randomly selected families, living in disadvantaged neighbourhoods in the U.S., financial help to move to a better neighbourhood. Children who were able to move out of poor neighbourhoods at a young age turn out to be more likely to attend college and to live in better residential areas as adults, compared to children who were not able to move (Chetty et al. *forthcoming*).

The conclusions from the U.S. literature on racial segregation are suggestive of the consequences of segregation also in other settings, but the Swedish case of segregation between refugee immigrants and natives also has its unique features. Refugee families might have gone through traumatic events in their home countries; they come from many different nations, speak different languages, have varying educational histories

and have arrived in Sweden at different times. Research on the outcomes of refugee children in the Nordic countries shows that characteristics of the neighbourhood in which refugees are placed may be important for future outcomes. Damm and Dustmann (2014) show that refugee children growing up in high crime neighbourhoods are more likely to themselves commit crimes later in life, and research from Sweden indicates that growing up in a neighbourhood with a large immigrant population increases the probability of engaging in some types of crime (Grönqvist et al. 2015). As such, the findings of the effects of segregation in Sweden are in line with those of Billings et al. (2014). Neighbourhood exposure to refugee peers does not seem to be negative in all respects, however. Åslund et al. (2011) find that although segregation per se is negative for educational performance, a larger ethnic community, that is, a larger community of individuals from the same country (or region) of origin, is beneficial for school performance. In addition, the positive effect of the ethnic community is increasing the more highly skilled are its members. One way of interpreting these results is therefore that high concentrations of the most disadvantaged groups in general is detrimental and implies lower educational achievement and increased risks for criminal activity, while sorting specifically by ethnic groups might be beneficial for refugees.[20]

Second, moving beyond the effects of segregation on individual outcomes, there is also a general concern that social cohesion in society is adversely affected if interactions between children from different backgrounds are limited (Levin 1998). This argument is discussed further in Blomqvist and Rothstein (2000) who argue that that integration of different groups is beneficial to foster tolerance and solidarity, and to discourage discrimination, inequality and violence in society.

If the policy aim is to provide equal access to the independent school sector for all children regardless of their family background, and to limit school segregation in order to avoid highly disadvantaged clusters, what are the consequences for policy?

To begin with, it is a challenge to design a school choice mechanism that allows for parental choice but at the same time limits sorting and quality differences across schools. The Swedish model has explicitly aimed at equal access for all pupils: independent schools cannot charge tuition fees, nor can they cherry-pick the best pupils.

[20] Segregation and differentiation may also affect what pupils learn in school through other mechanisms. For example, if achievement targets and teachers' expectations are adjusted to the group average, differentiation may increase inequality in educational performance (Figlio and Stone 2004; Bonnesrönning 2008).

However, an international outlook shows that there are other models than using date of application, as in Sweden, to allocate pupils to oversubscribed schools. In this regard, there is room for a policy debate that opens up to alternatives. International examples show that school choice can be combined with re-distributive vouchers, such as in the Netherlands, and that the mechanism to assign pupils to schools can include minority quotas or lotteries, such as in the U.S.

Next, the overall trends in residential segregation show that if the policy objective is to limit sorting and to create more heterogeneity by parental background, admissions criteria to public schools are also relevant. Examples of de-segregation policies in the U.S. that aim to counterbalance residential segregation include busing and minority quotas. Recent experiences of failing schools in disadvantaged areas in Sweden have lead to similar actions: the closing of a school in Rosengård (Malmö) and busing of its pupils to a number of other schools in the city. Ultimately, residential segregation, refugee placements and catchment area boundaries constitute policy areas that are all relevant for school segregation.

Needless to say, policies that limit parental choice within the public school system might come at a cost if parents put a high value to exerting influence of their children's education. As highlighted in Section 2, this may in the end result in a higher demand for fully private solutions.

6 Discussion

This paper has summarised evidence from the Nordic countries on the role of the education system for equality of opportunity. The comprehensive school reforms that were rolled out in the Nordic countries in the 1950s–1970s aimed to reduce inequalities in educational outcomes, and the research evidence shows that the reforms were successful in this regard: parental background became less important for labour market outcomes for the cohorts that went to the comprehensive school.

More recently, Sweden has undertaken reforms to introduce parental choice and a universal voucher scheme, and as a result many new independent voucher-funded schools have opened. These schools have pedagogical, religious or general profiles, and can be run as a non-profit foundation or a for-profit corporation. While the comprehensive school reforms aimed to unify the curriculum and the length of compulsory

schooling, the choice and voucher reform can be considered as a step towards more heterogeneity in educational provision. Although this heterogeneity does not resemble the selective, early tracking system pre-dating the comprehensive school, it will potentially imply that pupils are exposed to different 'types' of schools and to differences in pedagogical profiles and school governance. It has been hypothesised that this educational variety, in combination with parental choice, provides a setting where parental background will become more important for school performance. The recent studies on this topic show that there is little evidence to support this argument: family background factors remain strong predictors for school performance, but have not become more important as school choice has grown more common. Using school performance as a proxy for future labour market outcomes, there is no indication that social mobility is declining for the cohorts that left compulsory education up to 15 years after the choice reform was introduced. In addition, there is no evidence supporting the notion that school choice and competition can explain the plummeting Swedish PISA scores (Böhlmark and Lindahl 2015; Wondratschek et al. 2013).

Equality of opportunity in education is nevertheless a concern in the education debate in Sweden today. The Swedish example shows that segregation has been increasing for a long time, and recent migration flows have highlighted the existence of high concentrations of foreign-born pupils in some schools. It is also evident that enrolment in independent schools is not equal for pupils of different family background. Future education policy will have to consider these developments and their possible consequences for equity and efficiency in the education system.

References

Aakvik, A., K. G. Salvanes and K. Vaage (2010) “Measuring heterogeneity in the returns to education using an education reform”, *European Economic Review*, 54, pp. 483–500.

Amermüller, A. (2005), “Educational opportunities and the role of institutions”, Centre for European Economic Research, Discussion paper 05–44.

Andersson, E., B. Malmberg and J. Östh (2012), “Travel-to-school distances in Sweden 2000–2006: Changing school geography with equality implications”, *Journal of Transport Geography*, 23, pp. 35–13.

Arendt, J. N. (2005), “Does education cause better health? A panel data analysis using school reforms for identification”, *Economics of Education Review*, 25, pp. 149–160.

Åslund, O., P.–A. Edin, P. Fredriksson and H. Grönqvist (2011), ”Peers, neighbourhoods, and immigrant student achievement: Evidence from a placement policy”, *American Economic Journal: Applied Economics*, 3, pp. 67–95.

Becker, G. S. and N. Tomes (1979), “An equilibrium theory of the distribution of income and intergenerational mobility”, *Journal of Political Economy*, 87(6), pp. 1153–1189.

Betts, J. R. (2011), “The economics of tracking in education”, in Hanushek E. A., S. Machin and L. Woessmann (eds.) *Handbook of the Economics of Education*, vol 3, Elseveier.

Billings, S. B., D. J. Deming and J. E. Rockoff (2014), “School segregation, educational attainment and crime: Evidence from the end of busing in Charlotte-Mecklenburg”, *Quarterly Journal of Economics*, 129(1), pp. 435–476.

Björklund, A. and M. Jäntti (1997), “Intergenerational income mobility in Sweden compared to the United States”, *American Economic Review*, 87(5), pp. 1009–1018.

Björklund, A., T. Eriksson, M. Jäntti, O. Raaum and E. Österbacka (2002), ”Brother correlations in earnings in Denmark, Finland, Norway and Sweden compared to the United States”, *Journal of Population Economics*, 15, pp. 757–772.

Björklund, A., M. Lindahl and K. Sund (2003), ”Family background and school performance during a turbulent era of school reforms”, *Swedish Economic Policy Review*, 10, pp. 111–136.

Björklund, A. M. Jäntti and M. J. Lindquist (2009), ”Family background and income during the rise of the welfare state: Brother correlations in income for Swedish men born 1932–1968”, *Journal of Public Economics*, 93, pp. 671–680.

Björklund, A. and K. G. Salvanes (2011), “Education and family background: Mechanisms and policies” in Hanushek E. A., S. Machin and L. Woessmann (eds.) *Handbook of the Economics of Education*, vol 3, Elseveier.

Björklund, A. and M. Jäntti (2012), “How important is family background for labour-economic outcomes?”, *Labour Economics* 19, pp. 465–474.

Blanden, J. (2013), “Cross-country rankings in intergenerational mobility: A comparison of approaches from Economics and Sociology”, *Journal of Economic Surveys*, 27(1), pp. 38–73.

Blomqvist, P. och B. Rothstein (2000), *Välfärdsstatens nya ansikte – demokrati och marknadsreformer inom den offentliga sektorn*, Agora förlag, Stockholm.

Bonesrönning, H. (2008), “The effect of grading practices on gender differences in academic performance”, Bulletin of Economic Research, 60(3), pp. 245–264.

Booij, A. S., E. Leuven, and H. Oosterbeek (2015), “Ability peer effects in university: Evidence from a randomized experiment”, IZA Working paper No. 8769.

Brunello, G. and D. Checchi, D. (2007), “Does school tracking affect equality of opportunity? New international evidence”, *Economic Policy*, 22(52), pp. 781–861.

Böhlmark, A. and H. Holmlund (2012), “Lika möjligheter? Familjebakgrund och skolprestationer 1988–2010”, IFAU report 2012:14.

Böhlmark, A., H. Holmlund and M. Lindahl (2015), “School choice and segregation: Evidence from Sweden”, IFAU working paper 2015:8.

Böhlmark, A. and M. Lindahl (2015), ”Independent schools and long-run educational outcomes – evidence from Sweden’s large scale voucher reform”, *Economica* 82, pp. 508–551.

Chetty, R., N. Hendren and L. Katz (forthcoming), “The effects of exposure to better neighbourhoods on children: New evidence from the moving to opportunity experiment”, *American Economic Review.*

Damm, A. P. and C. Dustmann (2014), “Does growing up in a high crime neighbourhood affect youth criminal behaviour?”, *American Economic Review*, 104(6), pp. 1806–1832.

Deming, D. J. (2011), “Better schools, less crime?”, *Quarterly Journal of Economics*, 126, pp. 2063–2115.

Duflo, E., P. Dupas and M. Kremer (2011), “Peer effects, teacher incentives and the impact of tracking: Evidence from a randomized evaluation in Kenya”, *American Economic Review*, 101, pp. 1739–1774.

Epple, D., E. Newlon and R. Romano (2002), “Ability tracking, school competition, and the distribution of educational benefits”, *Journal of Public Economics*, 83, pp. 1–48.

Erikson, R. and J.H. Goldthorpe (1992), *The constant flux – A study of class mobility in industrial societies*, Clarendon, Oxford, England.

Erikson, R. (1996), “Explaining Change in Educational Inequality – Economic Security and School Reforms”, in Robert Erikson and Jan O. Jonsson (eds.), Can Education Be Equalized?, Westview Press.

Figlio, D. N. and Lucas, M. E., (2004), “Do high grading standards affect student performance?”, Journal of Public Economics, 88(9–10), pp. 1815–1834.

Fisher, M., M. Karlsson and T. Nilsson (2013), “Effects of compulsory schooling on mortality: Evidence from Sweden”, *International Journal of Environmental Research and Public Health*, 10, pp. 3596–3618.

Fredriksson, P. and J. Vlachos (2011), “Reformer och resultat: Kommer regeringens utbildningsreformer att ha någon betydelse?”, Report to the Swedish Fiscal Policy Council 2013/3.

Government Bill 1991/92:95, *Om valfrihet och fristående skolor*.

Government Bill 1994/95:157, *Ändring av bidragsbestämmelserna för fristående skolor godkända för vanlig skolplikt m.m.*

Grönqvist, H., S. Niknami and P.–O. Robling (2015), “Childhood exposure to segregation and long-run criminal involvement”, SOFI Working paper 1/2015.

Gustafsson, J. E. and K. Yang-Hansen (2009)

Hanushek, E. A. and L. Woessmann (2006), “Does educational tracking affect performance and inequality? Differences-in-differences evidence across countries”, *Economic Journal*, 116, pp. C63–C76.

Havnes, T. and M. Mogstad (2011), “No child left behind: Subsidized child care and children’s long run coutcomes”, *American Economic Journal: Economic Policy* 3, pp. 97–129.

Holmlund, H. (2007), ”A researcher’s guide to the Swedish compulsory school reform”, SOFI Working paper 9/2007.

Holmlund, H. (2008), “Intergenerational mobility and assortative mating: Effects of an educational reform”, CEE Discussion paper 91.

Holmlund, H., M. Lindahl and E. Plug (2011), “The causal effect of parents’ schooling on children’s schooling: A comparison of estimation methods”, *Journal of Economic Literature*, 49(3), pp. 615–651.

Holmlund, H., J. Hägglund, E. Lindahl, S. Martinson, A. Sjögren, U. Vikman and B. Öckert (2014), ”Decentralisering, skolval och fristående skolor: resultat och likvärdighet i svensk skola”, IFAU report 2014:25.

Levin, H. (1988), ”Educational vouchers: Effectiveness, choice and costs”, *Journal of Policy Analysis and Management*, 17(3), pp. 373–392.

Meghir, C. and M. Palme (2005), ”Educational reform, ability and family background”, *American Economic Review*, 95:1, pp. 414–424.

National Agency for Education (Skolöverstyrelsen) (1969), *Läroplan för grundskolan Lgr69*, Skolöverstyrelsen, Stockholm.

National Agency for Education (Skolverket) (2003), ”Valfrihet och dess effekter inom skolområdet”, Report 230.

National Agency for Education (Skolverket) (2009), *Vad påverkar resultaten i svensk grundskola?*, Skolverket, Stockholm.

National Agency for Education (Skolverket) (2012), ”Likvärdig utbildning i svensk grundskola? – En kvantitativ analys av likvärdighet över tid”, Report 374.

National Agency for Education (Skolverket) (2013), “PISA 2012. 15-åringars kunskaper i matematik, läsförståelse och naturvetenskap”, Report 398.

Opposition bill 1991/92: Ub62, *Motion med anledning av prop. 1991/92:95 Om valfrihet och fristående skolor*.

Pekkarinen, T., R. Uusitalo and S. Kerr (2009), “School tracking and intergenerational income mobility: Evidence from the Finnish comprehensive school reform”, *Journal of Public Economics*, 93, pp. 965–973.

Pekkarinen, T., R. Uusitalo and S. Kerr (2013), “School tracking and the development of cognitive skills”, *Journal of Labor Economics*, 31:3, pp. 577–602.

Solon, G. (2004), “A model of intergenerational mobility variation over time and place”, in M. Corak (ed.), *Generational income mobility in North America and Europe*, Cambridge University Press, Cambridge.

SOU 2013:56, *Friskolorna i samhället*, Fritzes, Stockholm.

SVT (2013), “Friskolor väljer bort besvärliga elever”. Downloaded from http://www.svt.se/ug/friskolor-valjer-bort-besvarliga-elever. Published 28 oktober 2013. Downloaded 28 January 2013.

Swedish Association of Independent Schools (Friskolornas riksförbund) (2015), *Fakta om friskolor*.

Waldinger, F. (2007), “Does ability tracking exacerbate the role of family background for students’ test scores?”, unpublished manuscript.

Wondratschek, V., K. Edmark and M. Frölich (2013), “The short and long-term effects of school choice on student outcomes – Evidence from a school choice reform in Sweden”, Annals of Economics and Statistics, 111–112, pp. 71–102.

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