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Parental education, children's performance and the transition to higher secondary education: trends in primary and secondary effects over five Dutch school cohorts (1965–99)

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Abstract

According to Boudon, social background affects educational transitions as a result of differences in children's academic performance (primary effects) and differences in transition probabilities given children's level of academic performance (secondary effects). This study addresses historical changes in both primary and secondary effects on the educational transition from primary school to higher secondary education in the Netherlands. In addition, it considers changes over time in the relative importance of these effects. The study compares five cohorts of Dutch pupils, specifically those enrolling in secondary education in 1965, 1977, 1989, 1993 and 1999, and it employs counterfactual analyses. The main findings are that secondary effects have been stable and primary effects have fluctuated to some extent. As a result, the proportion of the total effect of social background accounted for by primary effects has increased somewhat, from 53 per cent to 58 per cent.

Keywords: Educational inequality; primary and secondary effects; trends; educational transitions

Introduction

The effect of social background on educational transitions has been extensively studied in The Netherlands over the past decades. Several studies have found a rather stable relation between social background and the transition from primary to secondary school, which is the most important branching point in the Dutch educational system. High socio-economic status children

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are still more likely to enrol in higher levels of secondary education than their lower socio-economic status counterparts (e.g. Bakker and Cremers 1994; Bakker and Schouten 1991; Dronkers 1983; Faasse, et al. 1986; Vrooman and Dronkers 1986).

Our aim in this paper is to obtain insight into how social selection in secondary education is preserved. To this end, we make use of Boudon's (1974) distinction between the primary and secondary effects of social background. According to Boudon (1974), differences in educational transitions between children from different social backgrounds emerge due to differences in academic performance (i.e. primary effects) and differences in transition probabilities, independent of the level of academic performance (i.e. secondary effects). The primary effects of social background include all of the influences of social background, whether cultural, financial, psychological or genetic, that reinforce a child's ability to perform well in school (Goldthorpe 1996). In addition, during their educational career pupils make choices that are purely related to their social background; high socio-economic status children opt for higher educational levels than low socio-economic status children, net of their performance levels. These are called the 'secondary effects' of social background. Previous cross-sectional studies have found abundant evidence for the existence of both primary and secondary effects of social background on educational transitions (e.g. Bakker and Cremers 1994 for the Netherlands; Erikson 2007; Erikson, et al. 2005; Erikson and Jonsson 1996 for Sweden; Jackson, et al. 2007 for England and Wales).

In this study, we address long-term developments in both the primary and secondary effects of social background with respect to the transition to higher secondary education in the Netherlands. We analyse data on five cohorts of Dutch pupils who enrolled in secondary education in 1965, 1977, 1989, 1993, and 1999, respectively. Our research questions read as follows: *To what extent have primary and secondary effects of social background on the transition to higher secondary education changed over time, and to what extent has the relative weight of each type of effects changed over time?*

We try to advance historical comparative research on educational inequality in several ways. First, our enquiry contributes to discussions about changes in the inequality of educational opportunities in The Netherlands. Prior Dutch studies have scrutinized trends in the importance of primary and secondary effects for the transition to higher secondary education (e.g. Bakker and Cremers 1994; Bakker and Schouten 1991; Willemse 1987). These studies, however, are either based on local samples (e.g. Faasse, et al. 1986; Meesters, Dronkers and Schijf 1983; Vrooman and Dronkers 1986) or compare only two cohorts, which might lead to a focus on circumstantial peculiarities (e.g. De Jong, Dronkers and Saris 1982; Willemse 1987). The analyses in this study are based on five cohorts of Dutch pupils, ranging from 1965 to 1999. This time

period is fairly long compared to prior Dutch and international trend studies on these primary and secondary effects.

The relative weight of the primary and secondary effects has never been the focal point of Dutch research on educational inequality. Our analysis of the relative weight of the primary and secondary effects for The Netherlands builds on recently published studies on educational inequality elsewhere. Erikson and colleagues (Erikson, et al. 2005) investigated the relative weight of the primary and secondary effects on enrolling in A-level education for British society; the secondary effects turned out to be three times less than the primary effects. Scrutinizing trends in the relative weight of primary and secondary effects, Jackson et al. (2007) found for British society that secondary effects accounted for about 30 to 40 per cent of the class differences in the transition to A-level education in 1974 and 1986. By 2001, this was reduced to about 20 to 25 per cent. For Stockholm, Erikson (2007) demonstrated that the relative importance of the secondary effects on the transition to upper secondary school had decreased from about 51 per cent to about 42 per cent between 1969 and 1990.

Following on these studies, our analyses for The Netherlands can be regarded as an interesting testing ground, since the Dutch has never been much of a 'class society', but more a 'knowledge-based society'. Many Dutch studies have found that the effect of father's and mother's education on educational attainment is larger than the effect of the father's occupation, and while the effect of the father's education on a child's highest educational attainment has declined slightly over time, the effect of father's occupation has virtually vanished (e.g. Bakker and Cremers 1994; De Graaf and Ganzeboom 1993). Consequently, for The Netherlands this study examines primary and secondary effects by looking at parental education and not at social class as was done in the studies by Erikson et al. (2005), Jackson et al. (2007) and Erikson (2007). In order to analyse the relative importance of primary and secondary effects of social background on the transition to higher secondary education, we adopt the method of counterfactual analysis as proposed by Erikson and colleagues (2005).

Theoretical framework

It is generally assumed that social background differences in educational outcomes arise from both primary and secondary effects. To understand the working of the primary effects, it is important to underscore that assessments of children's performance play a significant role in the Dutch educational system. High-performance children have a better chance of surviving the various educational selections than low-performance children.

Parents may employ financial, social and cultural resources to foster their children's academic performance level (Goldthorpe 1996). The cultural capital

argument of Bourdieu (1973) provides an important explanation for primary effects (Barone 2006). According to Bourdieu (1973), cultural resources, in the form of linguistic and cultural skills, are advantageous for children's schooling. Transmission of these resources familiarizes children with the dominant culture in society. As this same culture prevails in schools, children who acquire cultural resources at home are more likely to perform well in school. As a consequence, they have better chances of achieving a high educational level. Kalmijn and Kraaykamp (1996) expound on the way cultural capital is linked to educational success. Children who are often exposed to cultural activities have less difficulty with the subject matter taught in higher levels of education, and they are believed to be more familiar with abstract and intellectual concepts. In general, one might say that parental cultural capital enhances their children's competencies. Since high socio-economic parents have more and superior resources at their disposal than low socio-economic parents, they will probably be more successful in increasing their children's performance level.

We expect that these primary effects of social background have increased over time. Due to technological and organizational developments as well as the increasing importance of quality work, the skills and knowledge required in many occupational sectors has increased (De Grip and Van Loo 2000; Van der Ploeg 1992). Employers prefer hiring the highest educated employees they can get. As a successful educational career largely depends on one's academic performance, parents perceive strengthening the performance level of their children as a way to increase their children's chances of obtaining a high educational qualification, and consequently a high occupational status. Due to the increased educational requirements in many occupational sectors, we expect to find *increasing primary effects of social background on the transition to higher secondary education*.

Rational choice approaches have often been used to understand the secondary effects of social background with regard to educational success (e.g. Boudon 1974; Breen and Goldthorpe 1997; Breen, et al. 2005; Goldthorpe 1996). The fundamental argument is that differences in educational choices emerge as a result of the differences between social status groups in their expectations of the costs and benefits of education and also with regard to their expectations concerning the probability of the educational success of their offspring. Parents' rational considerations then lead to lower aspirations for low-status children and higher aspirations for high-status children. As a result, the latter are more likely to proceed to higher educational levels.

Due to changes in the expected costs and benefits of education, and in the perceived probability of achieving educational success, secondary effects of social background may have altered over time (Breen, et al. 2005). The most significant changes are believed to have occurred with respect to the costs of education, as schooling in The Netherlands has become more affordable and

accessible. In the twentieth century, cost-free compulsory education was expanded and fortified.[1] In addition, the introduction of several family allowance measures (De Jonge 2005) and provision of extra financial aid for parents unable to pay tuition fees for secondary education[2] made the costs of education more bearable for low-income families. Next to these governmental arrangements, the rise in disposable income per employed person[3] and the decline in family size[4] contributed to the fact that parents from all social backgrounds have become better able to pay for their children's education. Simultaneously, schools have become more accessible, because they have increased in number and public transportation has improved. In all likelihood, these developments have altered the educational decisions of low socio-economic status families, as they have reduced the financial difficulties especially for this group. High socio-economic status families have more financial means at their disposal, and as a result they have benefited less from the declining costs of education (Breen, et al. 2005).

Additionally, the aforementioned process of rising educational requirements in many occupational sectors may have led to an increase in the expected benefits of education. Education has become more of a necessity to achieve an occupation, which means that more children from all social backgrounds continue their education to the higher secondary level.

Educational reforms are probably responsible for changes in the perceived probabilities of educational success (Breen, et al. 2005). Part of the so-called 'Mammoth Law', enacted in The Netherlands in 1968, was the introduction of an orientation year in secondary school by which the final choice for a specific track of secondary education is postponed for one or sometimes two years (Dronkers 1993). Traditionally, pupils opted for a particular track at the age of twelve, upon leaving primary education. Introduction of the orientation year ended this early selection. In 1993, an additional attempt was undertaken to prevent early selection by introducing a standardized basic curriculum for secondary education (in Dutch *basisvorming*). The logic was that all pupils should follow more or less the same educational programme in the first years of secondary school, independent of their academic performance. Postponing the point in secondary education when pupils must opt for a particular track of secondary school gives them time to become more aware of their capabilities and what they want in the future. When a choice does have to be made, the idea is that they will opt for the type of secondary education that best fits their abilities and interests. It is likely that the postponement of the first selection mainly affects the educational decisions of the lower status groups, as they are presumably less confident than higher status groups at the start of their children's educational career that their children will be able to manage higher secondary education (Breen, et al. 2005).

Changes in the expected costs and benefits of education, and perceived probabilities of educational success are likely to have made the choice for a high level of secondary education more appealing for low status groups as well.

As a result, we expect *decreasing secondary effects of social background on the transition to higher secondary education*.

In contrast, Raftery and Hout (1993) state in their maximally maintained inequality proposition that in times of educational expansion, social background differences in educational transitions decline only in cases in which the transition rates of the high socio-economic groups are close to 100 per cent. If not, educational expansion does not lead to educational equality, as the participation rate of high socio-economic groups increases faster than that of low socio-economic groups. They argue that not only low-status groups profit from efforts to expand educational participation, such as lowering the costs of education and educational reforms, but high-status groups profit too. Furthermore, the benefits of education are in all likelihood larger for high- status groups, as a high education reduces the risk of ending up in a lower social position than that of the parents. Parents of all backgrounds do not relish the idea of their children ending up in a social position lower than their own (Breen and Goldthorpe 1997). To keep this from happening, children have to achieve an educational level that at least gives access to the social position of the parents. This means that high-status children must obtain a higher educational level than low-status children. As a consequence, high-status children are more likely to pursue higher education than their low-status peers. This leads to the contrasting expectation that *the secondary effects of social background on the transition to higher secondary education have remained stable over time*.

Combining our expectations on historical changes in the primary and secondary effects of social background, we derive a hypothesis on the development of the relative importance of these effects over time. Since we expect increasing primary effects and decreasing or stable secondary effects, *the relative importance of the primary effects of social background should have increased over time*. In other words, we hypothesize that over the years, primary effects of social background have come to account for a greater part of educational inequality in higher secondary education in The Netherlands.

Data and measurements

Data

To answer our research questions, we use data from five cohorts of pupils in The Netherlands. The first Dutch cohort is the 'From Year to Year' cohort. This is a sample of 1,845 pupils who entered secondary education in 1965.[5] The second cohort, that of pupils entering secondary education in 1977, is derived from the sample 'School Career and Background of Pupils in Secondary Education' (N = 37,242). Three waves of the 'Cohort Survey of Secondary School Pupils' provide the data for the generations entering secondary education in 1989

(N = 19,524), 1993 (N = 20,331) and 1999 (N = 19,310). The total number of respondents is 98,333. In each data set, pupils were followed from their first year in secondary education. Each year, schools were approached by Statistics Netherlands to provide information about the level of secondary education, the school year of the pupils and pupils' exam results. Further, when the pupils entered their first year of secondary school, their parents provided background information on the family's social characteristics by means of self-completion questionnaires.

Measurements

Our dependent variable *transition to higher secondary education* refers to the transition from primary school to higher general education (havo) or pre-university education (vwo). A problem in constructing this variable is that first-year pupils often opt for a so-called 'orientation year' (or two) which combines different educational levels. This saves pupils from having to choose a particular educational track right away. We decided to focus on the educational level ultimately chosen after this orientation period. Pupils who proceeded to higher general education (havo) or pre-university education (vwo) score a (1) on the variable *transition to higher secondary education*; pupils who proceeded to lower vocational education (lbo) or lower general education (mavo) score a (0) on this variable. An exception to this rule are the children who entered the havo/vwo orientation class, after which they proceeded to lower secondary education. They score a (1) on the dependent variable as their initial choice was higher secondary education.

Children's academic performance is estimated by the score on a scholastic aptitude test consisting of a verbal and mathematical component and taken in the first months of secondary school. The fact that these tests were taken at the beginning of the first year of secondary education could cause some bias in our research findings. Where pupils did not attend an orientation year, the chronological order of their taking the test and their school choice is upset. This may lead to some overestimation of the effect of academic performance on the transition to higher secondary education. The aptitude test was identical from cohort 1989 onwards. In cohort 1977, a comparable verbal and mathematical test was administered. For cohort 1965, we constructed children's academic performance in a somewhat different manner, using test results and report grades on the subjects verbal skills, mathematics, geography and history. De Jong et al. (1982) point out that this measure is an appropriate approximation for the score on a verbal and mathematical aptitude test. The measurement difference between the youngest and older cohorts should be kept in mind when interpreting the results. However, for the counterfactual models, test scores must be standardized for each cohort, which, we trust, is also a satisfactory solution to this measurement problem.

Parental education is measured as the maximum level of the father's or mother's educational attainment. The educational categories are: (1) low education (primary school or lower secondary education), (2) middle education (higher secondary education) and (3) high education (higher vocational education or university). The proportion of parents with a high education rose over time, from about 6 per cent in cohort 1965 to about 27 per cent in cohort 1999.

To account for missing values on the variables of interest, we used a multiple imputation procedure from STATA to generate multiply-imputed data sets without missing values.[6] As such, we were able to use all of the information on all pupils. We carried out separate imputations for each cohort. Most missing values were found in cohort 1993 for *parental education*. For 18 per cent of the pupils, the educational level of their parents was unknown. In cohort 1977, *academic performance* was unknown for almost 17 per cent. Even in the face of this many missing values, Rubin (1987: 114) states that only a few imputations are required to obtain estimates with a relatively high efficiency. Therefore, we constructed five multiply-imputed data sets for each cohort. Analyses are performed on each dataset separately, and then the average of the estimated parameters is taken. Next to the variables of interest we included the dummy variable for sex in the imputation procedure and also the continuous variables birth year and the secondary school type recommended by the pupil's primary school. After performing the multiple imputation procedure, we deleted cases which initially had a missing value on the dependent variable 'transition to higher secondary education' as suggested by Von Hippel (2007). The total number of cases left was 96,639. Table I presents the descriptive statistics of the variables per cohort.

Figure I presents the distribution of pupils' choices regarding type of secondary education over time by parental educational level. We observe educational expansion: in cohort 1965 around 16 per cent of the pupils who finished primary school entered a higher level of secondary education; in cohort 1999 this was almost 48 per cent. Between 1965 and 1999 the percentage of pupils proceeding to higher secondary education was rather stable. Despite the fact that more pupils from all backgrounds entered higher secondary education over time, social background differences did not disappear. Pupils with highly educated parents were always more likely to proceed to higher secondary education than pupils with middle or low-educated parents.

Methods and results

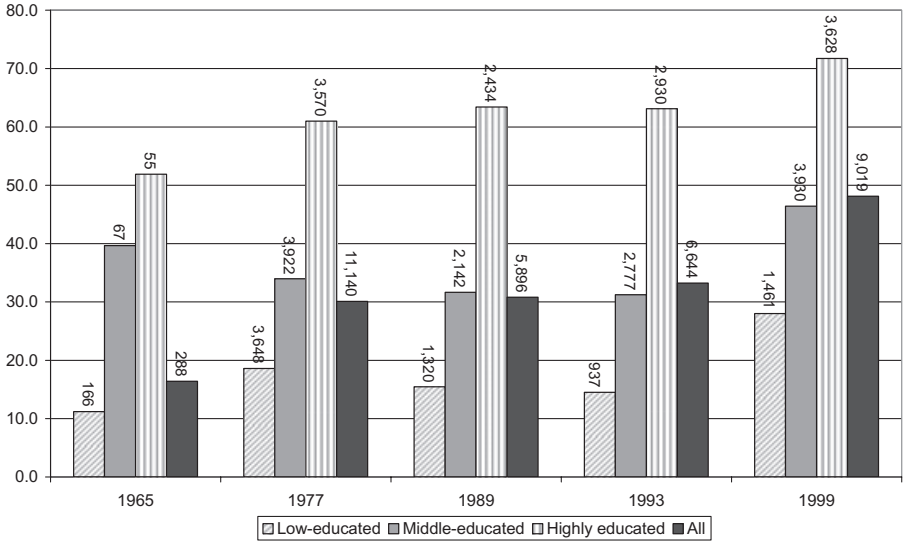
Primary and secondary effects of social background

Primary effects of social background, that is, the effects of social background differences on children's academic performance, are determined by estimating

Table I: *Descriptive statistics of dependent and independent variables, per cohort*

	1965 (N = 1756)				**1977** (N = 37026)				**1989** (N = 19135)				**1993** (N = 19981)				**1999** (N = 18741)			
	Min	Max	Mean	Sd	Min	Max	Mean	Sd	Min	Max	Mean	Sd	Min	Max	Mean	Sd	Min	Max	Mean	Sd
Transition	0.00	1.00	0.16		0.00	1.00	0.30		0.00	1.00	0.31		0.00	1.00	0.33		0.00	1.00	0.48	
Parental education																				
Low	0.00	1.00	0.84		0.00	1.00	0.53		0.00	1.00	0.45		0.00	1.00	0.32		0.00	1.00	0.28	
Middle	0.00	1.00	0.10		0.00	1.00	0.31		0.00	1.00	0.35		0.00	1.00	0.44		0.00	1.00	0.45	
High	0.00	1.00	0.06		0.00	1.00	0.16		0.00	1.00	0.20		0.00	1.00	0.23		0.00	1.00	0.27	
Academic performance	–2.10	2.05	0.00	1.00	–3.62	3.59	0.00	1.00	–3.59	3.37	0.00	1.00	–3.64	3.14	0.00	1.00	–3.64	3.71	0.00	1.00

Figure I: *Percentage of pupils making the transition to higher secondary education, by cohort and parental educational level (N above each bar)*



the mean ($\tilde{\mu}$) and the standard deviation ($\tilde{\sigma}$) of the standardized performance score separately for each parental educational level. These figures are shown in the upper part of Table II. We assume that pupils' academic performance has a normal distribution for each level of parental educational. The distribution of the transition to higher secondary education follows a logistic curve. Therefore, to represent the secondary effects of social background, we perform binary logistic regression analyses. This procedure yields both the effect of each parental educational level on the transition to higher secondary education, controlled for the performance score ($\tilde{\alpha}$), as well as the effect of academic performance on the transition to higher secondary education for each parental educational level ($\tilde{\beta}$). These estimated parameters for the transition to higher secondary education are presented in the lower part of Table II. Note that the formula $-\tilde{\alpha}/\tilde{\beta}$ produces the value of academic performance at which pupils have a 50 per cent chance to enter higher secondary education.

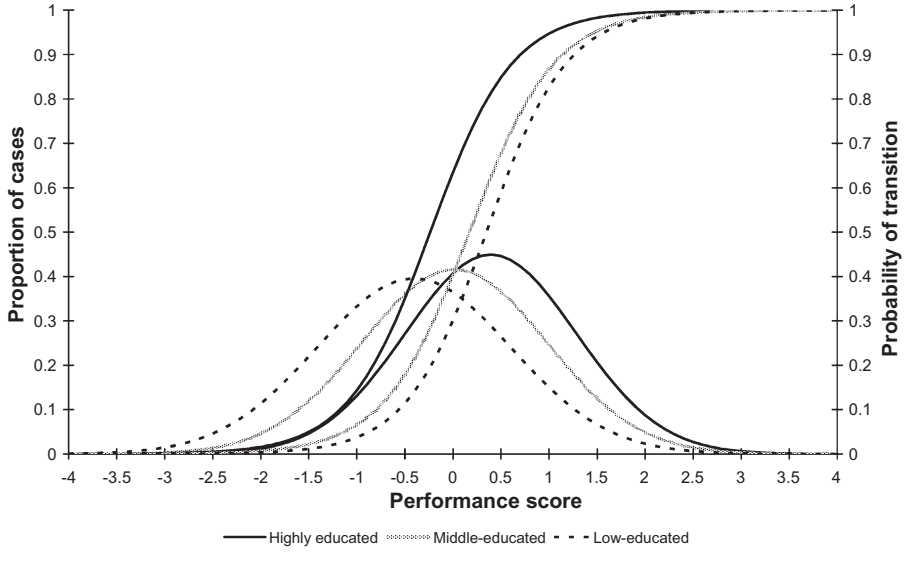
We used these estimated parameters for performance and transition to higher secondary education to create graphs which provide insight into the primary and secondary effects of social background. Figure II shows the differences between social background groups for cohort 1999. The normal curves represent, for each parental educational level, the academic performance score distribution of pupils. There are clear background differences in pupils' performance distribution, which indicates the existence of primary effects. The performance curve of children with highly educated parents is

Table II: *Estimated parameters for performance ($\tilde{\mu}$, $\tilde{\sigma}$) and for transition ($\tilde{\alpha}$, $\tilde{\beta}$)*

Performance	**1965**		**1977**		**1989**		**1993**		**1999**	
	$\tilde{\mu}$	$\tilde{\sigma}$	$\tilde{\mu}$	$\tilde{\sigma}$	$\tilde{\mu}$	$\tilde{\sigma}$	$\tilde{\mu}$	$\tilde{\sigma}$	$\tilde{\mu}$	$\tilde{\sigma}$
Parental education										
Low	–0.114	0.969	–0.251	0.969	–0.346	0.960	–0.441	0.948	–0.406	1.009
Middle	0.534	0.958	0.130	0.950	0.097	0.932	0.025	0.940	0.015	0.960
High	0.735	0.896	0.585	0.900	0.599	0.874	0.564	0.879	0.394	0.888
Transition	$\tilde{\alpha}$	$\tilde{\beta}$	$\tilde{\alpha}$	$\tilde{\beta}$	$\tilde{\alpha}$	$\tilde{\beta}$	$\tilde{\alpha}$	$\tilde{\beta}$	$\tilde{\alpha}$	$\tilde{\beta}$
Parental education										
Low	**–3.334**	2.386	**–2.032**	2.308	**–2.159**	2.276	**–2.044**	2.314	–0.844	2.410
Middle	*–1.631***	1.768	–1.518**	2.288	–1.609**	2.280	–1.558**	2.409	–0.392**	2.268
High	–1.755[a]**	2.456	–0.669**	2.282	–0.629**	2.444	–0.573**	2.371	0.552**	2.341

Notes:
1. ** $p < 0.01$; * $p < 0.05$
2. **bold** = significantly different from $\tilde{\alpha}$ 1999 ($p < 0.01$)
3. *italic* = difference in $\tilde{\alpha}$ between middle and low-educated significantly different between 1965 and 1999 ($p < 0.01$)
4. [a] = 1965: $\tilde{\alpha}$ not significantly different between highly and middle-educated. In the oldest cohort, middle-educated were probably relatively high educated.

Figure II: *Graphical representation of regression of transition to higher secondary education on performance score, cohort 1999*



positioned to the right, the performance curve of children with low-educated parents is positioned more to the left, with the performance curve of children with middle-educated parents positioned in-between. This demonstrates that, as expected, children with highly educated parents have on average the highest performance score, followed by children with middle-educated parents and then children with low-educated parents. This sequence is also observed in the other cohorts.[7]

The logistic curves in Figure II represent, for cohort 1999, the estimated proportion of pupils that make the transition to higher secondary education at a certain performance score. The graph demonstrates that, given a certain performance score, children with highly educated parents are most likely to proceed to higher secondary education and children with low-educated parents least likely; children with middle-educated parents are again positioned in-between. Comparable results are found for the other cohorts. Jackson et al. (2007) demonstrated for British society that secondary effects are mostly at work at the intermediate performance levels; the distances between the transition curves of pupils with different backgrounds are at their widest at these intermediate levels. This indicates that, independent of social background, children with low performance levels hardly ever proceed to higher secondary education, in contrast to children with high performance levels who almost always make this transition. Figure II shows similar results for cohort 1999; the distance of 15 to 35 percentage points between the curve of the highly educated parents and the curve of the lower educated ones lies between –0.8 and 0.8 on the performance score axis. However, for the other Dutch cohorts, secondary effects are mostly found somewhat above the intermediate performance level. This is especially true for the oldest cohort, that of 1965. Performing the same control as Jackson et al. (2007), i.e. examining background differences in observed transition probabilities at different performance scores, does not alter our results.

Changes in the primary and secondary effects across cohorts can be derived from Table II. First, we consider changes in the primary effects of social background, or differences in performance scores between the children from different backgrounds. The difference in average performance score between children with low-educated parents and children with middle-educated parents was 0.648 (0.114 + 0.534) in 1965. This difference diminished over time; in 1999 it was 0.421 (0.406 + 0.015). The difference in average performance score between children with middle-educated parents and children with highly educated parents shows a different development. It increased between 1965 and 1993 from 0.201 (0.735 – 0.534) to 0.539 (0.564 – 0.025), and after 1993 it decreased again; in 1999 the performance score difference was 0.379 (0.394 – 0.015). The development in the average performance score between children with low educated parents and children with highly educated parents follows a similar pattern. It increased between 1965 and 1993 from 0.849 (0.114 +

0.735) to 1.005 (0.441 + 0.564) and then decreased; in 1999 the performance score difference was about the same as in 1965, namely 0.800 (0.406 + 0.394). The increasing gap in the average performance score between children with highly educated parents and children with middle or low-educated parents supports our expectation of increasing primary effects. The fact that these background differences in performance score diminished after 1993 and also the decreasing performance score difference between children with middle-educated parents and those with low-educated parents contradicts this expectation.

To scrutinize changes over time in the secondary effects of social background, we look at the lower part of Table II. Overall, one might say that it looks as if the secondary effects of social background have remained rather stable over the years. Only the difference between children with low-educated parents and children with middle-educated parents in their transition probabilities decreased between 1965 and 1999. This finding corroborates the hypothesis derived from the maximum maintained inequality proposition.

Counterfactual analysis

To quantify the importance of the primary and secondary effects of social background and the relative weight of these two types of effects, Erikson et al. (2005) proposed an elegant approach for which it is necessary to determine the expected proportion of pupils of parental educational level *i* that makes the transition to higher secondary education. This proportion depends on the distribution of the average performance score, *x*, in parental educational level *i* (component A) and the probability of attending higher secondary education among pupils whose parents have this educational level, with an average performance score of *x* (component B). Assuming that component A follows a normal curve and component B a logistic curve, the proportion of pupils who make the transition to higher secondary education for each parental educational level can be written as follows (Jackson, et al. 2007):

$$\underset{\textit{Component A}}{\phantom{\frac{1}{\tilde{\sigma}\sqrt{2\pi}}}} \qquad \underset{\textit{Component B}}{\phantom{\frac{e^{(\tilde{\alpha}+\tilde{\beta}x)}}{1+e^{(\tilde{\alpha}+\tilde{\beta}x)}}}}$$

$$\int_{-4}^{+4} \left(\frac{1}{\tilde{\sigma}\sqrt{2\pi}} e^{-(x-\tilde{\mu})^2/2\tilde{\sigma}^2} \right) \left(\frac{e^{(\tilde{\alpha}+\tilde{\beta}x)}}{1+e^{(\tilde{\alpha}+\tilde{\beta}x)}} \right) dx$$

By inserting the estimated parameters for performance ($\tilde{\mu}$, $\tilde{\sigma}$) and transition ($\tilde{\alpha}$, $\tilde{\beta}$) into this integral, the estimated proportion of pupils proceeding to higher secondary education is determined.[8] Since this integral consists of two components, we are able to perform counterfactual analyses. By combining the estimated performance distribution of pupils whose parents have a certain educational level with the performance-related transition

probabilities of pupils whose parents have another educational level, and vice versa, we are able to estimate the expected counterfactual proportion of pupils proceeding to higher secondary education. These counterfactuals are represented in Table III. The rows represent the parental educational level of the children whose performance distribution is used, and the columns represent the parental educational level of the children whose performance-related transition probabilities are used. Note that the estimated diagonal cells of each cohort are nearly the same as the observed transition rates in Figure I.

What can be learnt from Table III? For example, in 1989 the proportion of pupils with low-educated parents making the transition to higher secondary education was 15 per cent in comparison to about 62 per cent of pupils with highly educated parents. If the pupils with low-educated parents retained their performance distribution but had the same performance-related transition probabilities as children with highly educated parents, the estimated proportion of pupils with low-educated parents making this transition would be about 31 per cent. The other way around, if they had the same performance distribution as the children with highly educated parents but retained their performance-related transition probabilities, the estimated transition proportion of these pupils would be about 38 per cent. It turns out that in this case the performance distribution is more important for making the transition to higher secondary education than the performance-related transition probabilities. In other words, primary effects are more important for this transition than secondary effects.

Table III gives an indication of the relative importance of the primary and secondary effects of social background on the transition to higher secondary education. It is, however, preferable to obtain estimates for the relative importance of both effects. For this reason, we first make use of log odds ratios, as has been done in prior research (Erikson 2007; Erikson, et al. 2005; Jackson, et al. 2007). By determining the logarithm of the actual and counterfactual odds ratios, we are able to estimate the relative importance of the primary and secondary effects for the different social background contrasts.[9] Table IV and the accompanying figure present these. Values above 0.5 indicate that the performance distribution, or primary effects, are more important for the transition to higher secondary education. Values below 0.5 indicate that the performance-related transition probabilities, or the secondary effects, are more important for this transition. Overall, values exceeding 0.5 indicate that the primary effects of parental education are more important for the transition to higher secondary education than the secondary effects.

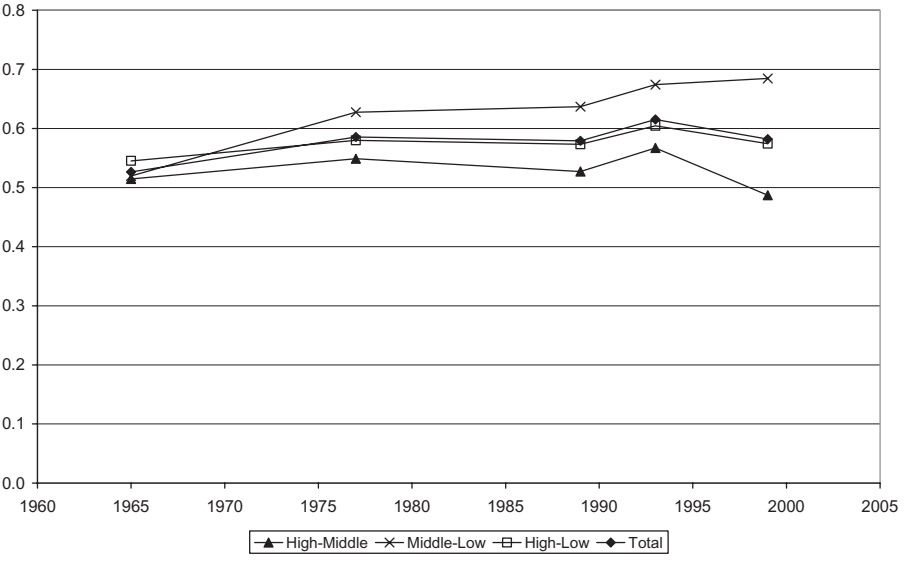
Across cohorts, the relative importance of the primary effects increased when children from middle-educated parents were compared to children from low-educated parents. For the other two social background contrasts, the

Table III: *Estimated probabilities of the transition to higher secondary education for actual and counterfactual combinations of estimated distributions of performance (rows) and transition probabilities (columns)*

Parental education	**1965**			**1977**			**1989**			**1993**			**1999**		
	High	Middle	Low	High	Middle	Low	High	Middle	Low	High	Middle	Low	High	Middle	Low
High	0.507	0.443	0.283	0.598	0.473	0.400	0.619	0.463	0.381	0.611	0.471	0.391	0.707	0.575	0.515
Middle	0.440	0.387	0.237	0.446	0.330	0.268	0.445	0.306	0.240	0.428	0.300	0.238	0.582	0.449	0.390
Low	0.245	0.225	0.108	0.329	0.229	0.179	0.307	0.196	0.146	0.284	0.181	0.138	0.446	0.324	0.271

Table IV: *The relative importance of the primary effects of social background on the transition to higher secondary education*

	1965	1977	1989	1993	1999
Highly educated/Middle-educated	0.515	0.549	0.527	0.567	0.487
Middle-educated/Low-educated	0.520	0.628	0.637	0.674	0.685
Highly educated/Low-educated	0.545	0.580	0.573	0.605	0.574
Total	0.526	0.585	0.579	0.615	0.582



relative importance of the primary effects shows limited change until 1989. In the relatively short period between 1989 and 1993, an increase in the relative importance of primary effects is observed which might be attributable to the introduction in 1993 of a standardized basic curriculum for secondary education (in Dutch *basisvorming*). After 1993, a decline in the relative importance of the primary effects is observed; this is particularly noticeable when comparing children from highly educated parents with those from middle-educated parents. The introduction of pre-vocational secondary education (vmbo) is probably responsible for this development. We return to these explanations in the conclusion.

To examine trends in the total relative importance of the primary effects, we calculated the average of the three social background contrasts per cohort.[10] Table IV and the accompanying figure present the results. We find no strong evidence for our expectation of increasing importance of the primary effects of social background. In 1965, primary effects accounted for about 53 per cent of the selection for higher secondary education; in 1999, this was about 58 per cent.

Conclusion and discussion

Prior research has shown that social selection in Dutch secondary education has far from disappeared. Children from high socio-economic status family backgrounds still proceed to higher secondary education more often than low socio-economic status children (Bakker and Cremers 1994). Employing Boudon's (1974) distinction between primary and secondary effects of social background, we set out to obtain insight into how social selection is preserved in Dutch secondary education. First, we investigated the existence of and changes in the primary and secondary effects of social background on the transition to higher secondary education in The Netherlands. Second, we looked at trends in the relative weights of these two types of effects. Our analyses are based on five cohorts of Dutch pupils, specifically, those entering secondary education in 1965, 1977, 1989, 1993 and 1999.

Over the years, considerably more pupils have gained access to higher secondary education. In line with results of prior research (Bakker and Cremers 1994), we find that social background differences are still influential in determining transition probabilities to higher secondary education. Both primary and secondary effects of social background account for these differences. High-status children have a higher academic performance level than low-status children (i.e. primary effects), which is in line with the cultural capital argument of Bourdieu (1973). Also, independent of academic performance, high-status children are more likely than low-status children to proceed to higher secondary education (i.e. secondary effects). Did the primary and secondary effects change over time? We expected the effect of social background on children's performance level to have increased over time, given the increased educational requirements in many occupational sectors and the superior resources highly educated parents have to influence their offspring's performance level. Indeed, we found that between 1965 and 1993, the gaps in performance scores between children with highly educated parents and those with low-educated or middle-educated parents increased, although they decreased again between 1993 and 1999. Furthermore, we observed decreasing performance score differences between children with low-educated parents and those with middle-educated parents. The secondary effects of social background have been rather stable over time. Our analyses provide no support for the expectation that the effect of social background on the transition to higher secondary education, independent of academic performance, diminished between 1965 and 1999. Developments in the costs and benefits of education, and in children's success probabilities did not have the expected effect. Our results corroborate the maximum maintained inequality proposition of Raftery and Hout (1993). Social background differences in the transition to higher secondary education probably decline only if the transition rate of the children with highly educated parents has reached its ceiling.

Estimating the relative size of primary and secondary effects reveals that across cohorts, primary effects have accounted for a somewhat greater part of the inequality in higher secondary education: in 1965 it was about 53 per cent and in 1999 about 58 per cent. For both Stockholm and British society, a larger growth in the relative importance of the primary effects was observed (Erikson 2007; Jackson, et al. 2007). In the Stockholm samples, the proportion of primary effects in the transition to upper levels of secondary education increased between 1969 and 1990 from about 49 per cent to about 58 per cent. In the British samples, the proportion increased from about 60 to 70 per cent in 1974 and 1986 to about 75 to 80 per cent in 2001. It is interesting that although we studied a more extensive time period for The Netherlands, the relative importance of the primary effects increased less compared with Stockholm and British society. It is important to note, however, that Jackson et al. (2007) and Erikson (2007) take social class as their indicator of social background and not parental education. Perhaps if they had focused on parental education instead of social class, the growth in the relative importance of the primary effects might have been smaller. Nevertheless, we believe that differences between our results and those of Jackson et al. (2007) and Erikson (2007) are large enough to claim that they cannot be solely attributed to differences in research design.

Jackson and colleagues (2007) are correct in arguing that outcomes should be interpreted cautiously. All of these studies assume that pupils decide whether to proceed to higher levels of secondary education after school tests have been taken at the end of primary school or compulsory education. This is how the process officially works. But pupils can of course decide at an earlier point in time what type of secondary education they will pursue. Social background might play a role in this decision-making process; for children from high socio-economic backgrounds it might be clear from the start that they should attend higher secondary education and after that a university. Jackson et al. (2007) point out these anticipatory decisions of pupils and their parents. These anticipatory decisions might result in children being more strongly motivated by their parents and also being keen to acquire a high academic performance level. Unfortunately, our data sets include no information on children's early-life performance level or educational aspirations. Thus, we are unable to examine the existence and effect of anticipatory decisions for Dutch society. As a result, primary effects in this study may be somewhat overestimated and secondary effects underestimated. It is safest to interpret our results as the lower limits of the relative importance of the secondary effects, or the upper limits of the relative importance of the primary effects (Jackson, et al. 2007). Despite the fact that we were only able to establish the upper limits of the relative importance of the primary effects, we have clearly shown that social background plays a significant role in the selection and allocation of pupils in higher secondary education. Both primary and

secondary effects create social background differences in the transition to higher secondary education.

In the past decennia, the Dutch government has challenged the differences in educational opportunities for pupils of different social backgrounds. The government aimed at creating a school system that works according to meritocratic principles. To this end it introduced activistic educational policy. As both primary and secondary effects of social background are still present with respect to the transition to higher secondary education, high socio-economic parents have apparently the means to keep their lead in education. Furthermore, introduced educational measures have probably unintentionally led to changes in the relative importance of the primary and secondary effects. The introduction in 1993 of a standardized basic curriculum for secondary education (in Dutch *basisvorming*), aimed to prevent early selection, has increased the significance of scores on the scholastic aptitude tests administered at the end of primary school for pupils' school career in secondary education (Research Centre for Education and the Labour Market 2008). This is the most likely explanation for the increase in share of the primary effects in the social inequality in higher secondary education between 1989 and 1993. The introduction of pre-vocational secondary education (vmbo) is probably the reason for the decline in the relative importance of the primary effects after 1993. In 1999, the two types of lower secondary education, lower vocational education (lbo) and lower general education (mavo) were integrated into this new secondary educational type, which has been poorly received by parents. The negative image of this track of secondary education has led especially highly educated parents to try to prevent their children from being assigned to this educational type. This means that the relative importance of the secondary effects increases, and vice versa, the relative importance of the primary effects diminishes. In general, educational reforms are an important factor for changes in the primary and secondary effects and changes in the relative importance of these effects.

(Date accepted: November 2008)

Notes

1. The first compulsory education law in The Netherlands took effect in 1901, and obliged children between six and twelve years of age to attend school. From 1985, this was expanded to children aged five to sixteen.

2. In August 2005, tuition fees for secondary school were abolished for all school-age pupils, though parents still have to pay for learning materials and excursions. In the school year 2008–09, learning materials will also be free of charge.

3. In The Netherlands, the annual disposable income per employed person increased from €9,900 in 1959 to €17,100 in 1998. These

figures are relative to the purchasing power in 1996 (Statistics Netherlands 2008a).

4. In The Netherlands, the average number of children per family declined from 3.1 in 1960 to 1.7 in 2000 (Statistics Netherlands 2008b).

5. These pupils enrolled in secondary education before the 1968 introduction of the Mammoth Law.

6. Multiple imputation is like other missing-data methods based on certain assumptions. The most important assumption is that missing values are 'missing at random' (MAR), or missing values are ignorable. The likelihood of a missing value for a particular variable is not random but is not related to its particular value. Therefore, missing values for a particular variable are similar to non-missing values for this variable for cases with similar values for other variables. We believe that the variables children's academic performance and parental education are missing at random with respect to the transition to higher secondary education. Furthermore, we performed the analyses with and without the multiple imputation procedure. The results are substantially similar.

7. For space reasons, we present the within-cohort results only for cohort 1999. The results for the other cohorts are largely the same (available on request from the authors).

8. The integral has no closed form solution. Therefore, we used a numerical integration procedure in *R*. To obtain the code, please contact the authors.

9. For detailed information on the research procedure, refer to Erikson et al. (2005), Jackson et al. (2007) and Erikson (2007).

10. For each cohort, we used the six counterfactual transition probabilities that are reported in Table III to determine the estimates of the relative importance of the primary effects. This procedure results in two estimates for each social background contrast. The average of these two estimates is the relative importance of the primary effects for a specific social background contrast, as is shown in Table IV. The total relative importance of the primary effects is the average of all, that is six (three background contrasts x two estimates), estimates, which is also shown in Table IV.

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