Intergenerational mobility after the Mammoth-law of 1968

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The "Mammoth-law" of 1968, a comprehensive Dutch educational reform, laid the foundation for the current Dutch secondary education system. Amongst many other changes, it introduced a more meritocratic transition from primary to secondary education: the level of secondary education would be determined by both standardised tests and teacher recommendation. This thesis investigates whether and to what extent intergenerational educational mobility has changed, by comparing changes in the effect of parental education on child's education for cohorts before and after the reform. If anything, the analysis shows that, on aggregate, intergenerational educational mobility hardly changed. Data from the Central Bureau of Statistics Netherlands indicates a small increase in intergenerational mobility at most, but is not robust for alternative specifications. Surprisingly, data from the Family Survey of the Dutch population even indicates a minor decrease in intergenerational educational mobility, albeit statistically insignificant for almost all specifications. Keywords: Mammoth-law; intergenerational mobility; educational moblity; relative mobility; absolute mobility; education policy

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I. Introduction

In 1968, the Dutch education system has been significantly reformed with the introduction of the Mammoth-law. This reform changed the nature of most facets of secondary education and introduced the system that is currently still largely in place: The lbo (pre-vocational education), mavo (junior general secondary education), havo (senior general secondary education) and vwo (pre-university education). Furthermore, the law introduced a transition year, also known as the "bridge-year", which was more or less the same for most students, to make sure students began their secondary education on an equal footing (Dronkers, 1993). In addition, compulsory testing in combination with a teacher's recommendation at the end of primary school was introduced to determine a student's type of secondary education. Finally, different types of secondary education were bundled in school-communities, in order to facilitate students advancing to higher types of secondary education. The main novelty of this comprehensive reform was its meritocratic emphasis: Student achievement, and not background should matter for educational outcomes (Faasse et al., 1993).

This thesis focusses on this meritocratic assertion and investigates the question, whether and to what extent there has been a change in intergenerational mobility in terms of educational outcomes following the Mammoth-law of 1968. More specifically, the educational outcomes from the transition of primary of secondary education. This directly touches upon an active body of research within both economics and sociology. The various forms of intergenerational mobility and inequality, mostly in terms of income, have received far greater attention over the last decade(s). In order to better understand this form of inequality, it is important to consider the inequality of it's determinants between generations. One important determinant of income is educational attainment (Psacharopoulos & Patrinos, 2004). From an intergenerational income mobility perspective, it is therefore also of interest, to address mobility in terms of educational attainment. Especially education earlier in life, since learning generally begets learning and therefore more strongly affects later-in-life outcomes (Heckman, 2000). Knowing more about intergenerational educational mobility, and therefore the degree of (in)equality of opportunity, can also help us understand changes in intergenerational income mobility and inequality (Bowles, Giants & Groves, 2009).

Previously, changes in intergenerational mobility around the introduction of the Mammoth-law have been studied within Dutch sociological literature. The existing literature reveals mixed evidence on the actual impact of the reform. This thesis builds upon this literature by trying to improve on the estimates, by using data from both the Central Bureau of Statistics Netherlands (CBS) and the Family Survey of the Dutch population. Changes of intergenerational mobility are estimated not only by regressing child education on parental education, but also by using a rank-rank specification.

The remainder of this thesis is organised as follows: The next section gives an overview of the economical literature on intergenerational educational mobility,

followed by a review of the sociological literature specifically dealing with the "Mammoth-law", including both their conclusions and methodology. Section 3 explains the two kind of measures for intergenerational educational mobility employed: relative and absolute mobility. Section 4 describes both the CBS- and Family Survey data and goes into depth on how child's and parental education are operationalised. The methodology is explained in section 5, with a description and justification of the mainline model. The level and distribution of the variables are described in section 6. In section 7, the main results are presented, subjected to a sensitivity analysis in order to assess the robustness of said results. Concluding in section 8, the implications of the results are discussed.

II. Literature review

Within economics, most research on intergenerational mobility has been done in terms of the persistence of incomes over generations. From the end of the 20th century onwards, the consensus in the economical literature has been that parental earnings are indeed a strong predictor of their child's earnings (Solon, 1999). More recently the focus has shifted more towards identifying the causal processes underlying this internationally observed correlation. Whilst it is still an active area of research, evidence from the Nordic countries indicate that educational policy can be an important factor in changes in intergenerational earnings mobility (Jntti et al., 2006; Black & Devereux, 2011). Since this directly involves the educational mechanism, this evidence also suggests that educational policy directly influences intergenerational educational mobility.

However, there have also been studies directly investigating the intergenerational transmission of education, both across countries and over time. Over countries, it seems to correlate negatively with returns to education (Chevalier et al., 2009). Countries like the US have a lower degree of educational mobility across generations than European countries that feature high(er) public spending on education. Moreover, differences in educational policies also seem to drive some of the differences observed between countries (Bauer & Riphahn, 2006). Over time, the evidence is less clear. For a sample of 42 countries, Hertz et al. (2007) show that regressing the child's educational level on parental education generally yields positive regression coefficients, but hardly effects the correlation coefficients. Regarding individual countries, the results are also mixed. For Italy, educational mobility decreased over the 20th century (Checchi & Flabbi., 2007), whilst for the UK and Spain slightly positive trends are identified (Blanden & Machin, 2004; Guell et al., 2007), whereas no time-trend was observed for Germany (Heineck & Riphahn, 2009).

Most of the research done directly on changes in intergenerational educational mobility since the introduction of the Mammoth-law comes from a sizeable body of Dutch sociological literature. Especially from the subfield of what is known as social stratification. Overall, Dutch sociological literature finds a slight positive meritocratic trend in the Dutch educational system, whereas some also find

that an increasing dependence of social background on performance off-sets the meritocratic character of the reform (Peschar, 1978; de Jong, Dronkers & Saris, 1982; Faasse et al, 1987; Dronkers & Bosma, 1990; Dronkers, 1993; Bakker & Schouten, 1991). However, evidence is as of yet mixed when it comes to whether the observed changes in educational intergenerational mobility stem from the Mammoth-law itself, or from already existing trends. Vrooman and Dronkers (1986) and Dronkers (1993) conclude that the results are in large part driven by a trend already started before the introduction of the law. This is confirmed by a study of De Graaf and Ganzeboom (1993) who studied family background and educational attainment in the Netherlands for 1891-1960 birth cohorts, instead of those around the introduction of the Mammoth-law.

Most, if not all, of the direct work done on the meritocratic effects of the Mammoth-law focusses on the transition from primary to secondary school and draws on cohort panel data, following students throughout part of their educational careers (Buis, 2010). Moreover, up until the 1980's these studies mostly used linear models to estimate the effects of parental occupation and/or education on the level of educational attainment. After the 1980's, influenced by work of Mare (1980, 1981), most of the social stratification research done regarding the Mammoth-law moved towards studying the effects of parental occupation and/or education on various transitions during educational careers. In a lot of cases this also meant a move away from the (mostly) linear models that were employed towards the usage of survival ratios and logit models (e.g. Dronkers, 1993; Tieben, de Graaf & de Graaf, 2010). The main idea behind this is that it approximates the change in the meritocratic nature of the transition from primary to secondary school better. For the linear models, where educational levels are regressed on parental occupation and/or education, the change in intergenerational mobility found also includes the effect of the increasing inflow of additional students.

The indirect work on the other hand mostly concerns with longer-term analysis of educational intergenerational inequality, of which the earlier mentioned De Graaf & Ganzeboom (1993) study was part of. Those studies generally use retrospective life-time (cross-sectional) survey data instead of individual cohort panel data. Usually these studies used datasets consisting of standardising smaller surveys (Ganzeboom & De Graaf 1989a; Ganzebook & De Graaf 1989b; Ganzeboom, 1996; Wolbers & De Graaf, 1996). They confirm that over the 20th century educational inequality has declined. A notable and more recent study by Tieben, de Graaf & de Graaf (2010) builds upon this literature that is concerned with the long-term trends of educational inequality. They drew on four different waves of the Family Surveys of the Dutch Population, which covers birth cohorts from 1917 to 1987 and differs from previous studies by the combination of timespan covered and similarity of surveys employed. Whilst the changes in the effect of parental characteristics on educational transitions to secondary education due to the Mammoth-law were not the primary focus, their findings suggest that the reforms did not have a noticeable (direct) effect.

A problem with the more recent sociological literature is that they all strictly utilize logit regressions. If handled correctly, this is not necessarily a problem, but this is often not the case, especially in the aforementioned literature. Logit regressions are generally more complex and take more work to produce interpretable output. It lacks the conceptual robustness of OLS that computes marginal effects and is easy to interpret and comparable across studies (Angrist & Pischke, 2008). The added efficiency of logit regressions is easily lost when the strict assumptions in place are violated. When confronted with heteroscedasticity in the error term, which is common in an empirical context, even the sign of the measured effect cannot accurately be determined (Angrist & Pischke, 2008). On the other hand, the older and more often OLS-based literature sometimes suffers from unclear specifications, bad controls and potentially problematic exclusions of certain groups of students from the data. Furthermore, the conceptualisation of both dependent and independent variables is not always done in a similar fashion. This makes it especially difficult to compare the results obtained from studies using a different set of cohorts.

Furthermore, most of the literature on intergenerational educational mobility, both within economics and sociology, regress child's education on parental education (Solon, 1999; Buis, 2010; Black & Devereux, 2011). As Chetty et al. (2014) noted for intergenerational income mobility, this approach is sensitive to the specification used. In the context of education, estimates could potentially vary greatly depending on how values are attributed to the various levels/degrees of educational attainment. The potential problems concerning specification sensitivity can be partially avoided by taking a ranking approach (Dahl & DeLeire, 2008; Chetty et al., 2014). By ranking children and parents by their education relative to their peers within the same cohorts, intergenerational education mobility is then characterized by the correlation between child rank and parental rank.

This thesis attempts to add to the current literature by (1) providing a clear conceptualisation of meritocracy and educational intergenerational mobility, (2) jointly drawing on two of the most promising types of data, (3) utilizing both the traditional and ranking approach and (4) using comparable and where possible identical specifications and operationalisation of variables used for all datasets.

III. Measures of intergenerational educational mobility

When it comes to intergenerational educational mobility, there are various measures that capture the degree in which a child's education depends on parental education. Which one is the most appropriate, depends on one's normative objective (Fields & Ok, 1999). In the following two subsections, the distinction is made between both relative and absolute mobility.

A. *Relative mobility*

In this thesis, we are primarily concerned with relative educational mobility. This type of measure indicates what the educational outcomes of a child are for those that have high- and low-educated parents. Most of the literature on intergenerational educational mobility determines this by regressing child's education on parental education (Solon, 1999; Buis, 2010; Black & Devereux, 2011). This yields the following regression coefficient:

$$\beta_E = \rho_{XY} \frac{SD(Y_i)}{SD(X_i)} \tag{1}$$

where ρ_{XY} denotes the correlation between the child's education (X_i) and the parental education (Y_i) and $SD()$ the standard deviation. The higher the correlation, the lower the relative educational mobility.

Another way of measuring relative intergenerational educational mobility, is by comparing the rank or position of the child's and parental educational attainment in their cohort's respective educational distribution (Dahl & DeLeire, 2008; Chetty et al., 2014). More specifically, it is the correlation between the child's and parental rank and yields the following regression coefficient:

$$RRslope = \rho_{X^R Y^R} \tag{2}$$

where $\rho_{X^R Y^R}$ denotes the correlation between the child's educational rank ($X^R{}_i$) and parental educational rank ($Y^R{}_i$). This coefficient can also be referred to as the rank-rank slope. Whilst the rank-rank slope is a different measure, it is naturally closely related to pXY, as they are both scale-invariant measures of the degree in which the child's education can be explained by parental education. In contrast to the rank-rank slope, B includes the relative standard deviation and therefore inequality of both child's education and parental education. For example, for a higher level of parental educational inequality than the child's educational inequality, an increase in the average level of parental education has a greater effect on the average level of the child's education.

Whilst both measures are employed in this thesis, the main focus goes out the ranking approach, as we are less interested in the consequences of educational expansions around the introduction in the Mammoth-law and more interested in whether the meritocratic aspect of this reform changed the relationship between parental and child's education. Furthermore, as Chetty et al. (2014) noted for intergenerational income mobility, the former approach is sensitive to the specification used. In the context of education, estimates could potentially vary greatly depending on how values are attributed to the various levels/degrees of educational attainment. The potential problems concerning specification sensitivity can be partially avoided by taking the ranking approach (Dahl & DeLeire, 2008; Chetty et al., 2014).

B. Absolute mobility

There is however also a possibility that the reform affected intergenerational educational mobility in a heterogeneous manner. Aside of the main focus on relative measures, absolute mobility is also taken into account. These measures reflect changes in child's educational attainment of those with a specific educational background (Chetty et al., 2014). They give information about specific parts of the educational distribution. More specifically, in order to uncover whether and to what extent the reform impacted children from a more disadvantaged educational background, two measures of absolute upward mobility are used. The first measure reflects the mean child's educational rank of those at the 50th percentile of parental educational attainment.

The second measure of absolute educational mobility is similar and represent the probability of the children with parents at the 50th percentile of parental educational attainment reaching the top quintile of the child's educational distribution within the respective cohort. This is calculated by taking the fraction of children with parents at the 50th percentile that reach the top quintile. It is important to note that these measured are both based on the ranking approach. With level-based measures, like the probability of reaching pre-university with parents that were only enrolled in primary school, it would be difficult to disentangle between changes in the meritocratic aspect of the reform and the consequences of educational expansions.

IV. Data

For this thesis, two types of datasets are used. The first are the two CBS cohort studies: the 1965 "Van Jaar tot Jaar"-cohort and the 1977 SMVO-cohort.These cohorts allow for a comparison of the before and after intergenerational mobility around the introduction of the Mammoth-law. The second type of data stems from the Family Survey of the Dutch Population (de Graaf et al., 2002, 2003, 2004, 2009; Ultee & Ganzeboom, 1993; Wolbers & Ruiter, 2009). The Family Surveys encompass cohorts that entered secondary education between 1916 and 1999 and also allows for a comparison of the before and after intergenerational mobility in terms of secondary education. Tieben, de Graaf and de Graaf (2010) already used this data to explore changes in educational mobility from 1946 to 1996, using multinomial logit regressions with the data up to the third wave. This thesis will also include the fourth wave of the survey.

The following two subsections explain the characteristics of the datasets and surveys of the two types of data. Due to the fact that seven datasets are employed, which, to a certain degree, differ in terms of population, variables, categorisation, conceptualisation and operationalisation, they had to be harmonised and transformed. The details of this process can be found in Appendix 1 and 2.

A. CBS cohorts

The oldest CBS cohort used is the so called 1965 year-to-year-cohort. It consists of a national sample of 11170 students in the final year of their primary education, of which 9970 from the school year 1964/65 and 1200 from the school year 1963/64. This also implies most of these students were born around 1953. The students were selected on the basis of cluster sampling, with the school served as a sampling unit. Schools were sorted in accordance with the following characteristics: number of sixth graders in 1963/64, degree of urbanisation of the municipality of where the school is located and the school district. From this list, 405 primary schools were systematically selected, from a randomly selected number onwards. In other words, a stratified cluster sample was drawn, where school size, degree of urbanisation and region are more of less equally represented. All the sixth graders of these selected schools are in the sample. From all these students, the CBS collected data concerning the students' educational attainment and (social) background through surveys. The fact that CBS followed this cohort for multiple years enabled the collection of data on educational attainment from primary school onwards.

A disadvantage of this dataset, especially in comparison to the other datasets employed, is the relatively low amount of background information collected. This thesis therefore also uses a more thoroughly interviewed subsample of this cohort. In an attempt to gather more data, the Institute of Applied Sociology of the University of Nijmegen drew a subsample of 3240 students and their parents (Collaris & Kropman, 1978; Diederen 1981; Diederen, 1983). From this pool, 1948 students were drawn as a proportional sample, whereas 919 students are an oversample of students that chose the ulo or vhmo after their primary education, and 373 are all the students that switched educational levels. Sample selection based on dependent variables will however lead to bias and inconsistency in the estimators, therefore only the proportional part of the subsample will be considered (Wooldridge, 2010).

The second CBS cohort employed is the 1977 SMVO-cohort consisting of students born around 1965. This cohort also happens to be composed and sampled in a slightly different manner than the former. Here, the population does not necessarily consist of the students in sixth grade, but the students who in 1977 entered secondary education for the first time. The initial national sample drawn from this population consists of 37280 students. For this cohort cluster sampling was deployed as well with secondary school as the sampling unit of which a random number of classes were drawn (Smulders, 1979). This means that the 1965 and 1977 cohorts slightly differ in terms of both their population and sampling size. In the 1965-cohort, there are also students included who did not enrol in secondary education, whereas these are missing for the 1977-cohort. Whilst it is not ideal, this category of students will be excluded from the 1965-cohort in order to make both cohorts comparable. Given that the number of children enrolled in secondary education has sharply increased over this time-period, from about

1/3rd to 4/5th of children that enjoyed primary education (CBS, 2018). This is in due to both a secular trend of higher secondary education enrolment and a one-time increase in 1968, as a direct consequence of the reform. This in turn can contribute to an underestimation of intergenerational educational mobility of the national population as a whole. For the purpose of measuring changes in intergenerational educational mobility in terms of the meritocratic character of the transition from primary to secondary education, this should pose no problem.

Another inconvenience is the fact that the 1977-cohort is only representative for the national population, when the data is corrected for the national distribution of school-types (CBS, 1988). This is due to the fact that not all school types had the same sampling probability. A common method in the literature to solve this is by utilising the inverse sampling probability as a weighting factor, or, as commonly seen in the sociological literature by drawing a random sample from this national cohort, stratified on school type. This is also known as post-stratification, and allows for correction potential over- or under-sampling. The disadvantage of this latter procedure is that potentially useful data is being thrown away. The CBS (1984) also advices in favour of this for making the data representative for the actual population by using weights.[1]

B. Family Survey cohorts

The family survey data consists of five separate but similar (1992/3, 1998, 2000, 2003 and 2009) cross-sectional retrospective life-course surveys, with individuals born between 1916 and 1999. The datasets constructed from all these cross-sections contain a total of 11473 respondents, of which 7104 primary and 4369 secondary respondents. The secondary respondents are the partners of the primary respondents, who are surveyed independently. Across the five waves, first cluster sampling was employed with municipalities as clusters. As a second step, a random sample of individuals, the primary respondents, was drawn and surveyed. When it comes to the last step, never-married individuals are underrepresented by .5. Given that the exact factor of under-sampling is known, this can be corrected for by attributing more weight to those individuals. More generally, across all waves weighting factors are included, which, with the use of CBS-population statistics, reweighs the sample with respect to marital status, gender, age, region and degree of urbanisation.[2] For the purpose of the analysis, only the primary respondents are considered, given that the sample of primary respondents with the inclusion of these weights is considered to be representative for the national population (Wolbers & Ruiter, 2009). Moreover, in order to achieve populations comparable to the one used for the CBS-data, only those individuals are considered that underwent the transition from primary to secondary education.

The surveys are considered retrospective due to the broad range of questions

[1]For a more detailed discussion, see the methodology section
[2]Using an iterative weighting procedure.

the respondents had to answer with respect to mobility, relationships, religion, education and occupation. The detail of the incorporated questions results in a good overview of the respondents' educational careers. The nature of this set of surveys is however also prone to what is known as recall bias. Especially for older individuals, this might present problems regarding the accuracy or completeness of the responses and therefore the data. On the other hand, especially when it comes to information such as parental occupation, education and especially the type of secondary education one started with can reasonably be considered as important enough for an individual to recall. In support of this, De Vries and De Graaf (2008) looked into this potential pitfall for the 2000 wave and found no significant and systematic measurement bias. Nevertheless, this does not directly prove that recall bias is also absent in the other waves. Especially when first enjoyed secondary education is unclear due to difficulties in attributing it to a certain category, or when one switched educational levels early on, there might be a tendency to overstate the educational level. Over time, these specific recall effects could be stronger. It is therefore important to bear in mind that educational levels found on the basis of the Family Surveys can be overestimated, especially for older respondents and the answered level of parental education.

Moreover, the Family Surveys generally have non-response rates varying between 30 and 40 percent, whereas the CBS-surveys hardly have problems regarding non-reponse. Whilst, as Wolbers and Ruiter (2009) have noted, the weighted sample is considered representative for the national population, those that did not respond likely still have common unobservables not dealt with by the weighting procedure. Whilst the CBS-surveys are not without their problems, these two shortcomings of the Family Surveys make the CBS-data slightly more reliable. Nevertheless, the Family Survey data provides the possibility to consider changes in intergenerational educational mobility for various bandwidths of years around the introduction of the Mammoth-law".

C. Variables

Given that the datasets differ in terms of the comprehensiveness of their categorization of both the education of the child and the parents, an attempt is made to operationalize on the basis of the lowest common denominator. This way, we keep the measures for intergenerational educational mobility comparable across the various datasets and cohorts. In the following two sub-sections, the child's secondary education and parental education are operationalized for both measures of intergenerational educational mobility.

Child's secondary education. — Regarding educational outcomes, the first level of secondary education obtained is considered. The main reason for this, is that we are interested in the change in intergenerational inequality as a proxy for the meritocratic impact of the reform, which is centred at the introduction of

Table 1—: Levels of child's secondary education.

	Nominal	Adjusted
Junior vocational	3/4	3
Junior general secondary	3/4	4
Senior general secondary	5	5
Pre-university	6	6

ability testing for the determination of one's secondary school type. The aim of this thesis is to operationalise this variable as similar as possible for both types of data. This is done by first making a common set of educational categories, and set up conditions for which certain categories not used in this research are transformed into the most similar used category. The four categories used are (1) junior vocational: lbo, lhno and vbo, (2) junior general secondary: mavo, ulo and mulo, (3) senior general secondary: havo, mms and (4) pre-university: vwo, hbs, lyceum and gymnasium. See figure 1 and 2 for an overview of the Dutch educational system and its tracks before and after the introduction of the reform. Whilst a more specific categorisation would be possible on the basis of the CBS-data, the Family Survey-data is less specified in terms of reported first level of secondary education. Advanced primary education (vglo and lavo) and middle school are therefore not considered secondary education in this thesis.[3] Respondents that reported other categories, like forms of primary and tertiary education as their secondary education, were excluded from the analysis, as this is likely unreliable information.

These categories are then operationalised in a way that reflects the differences between the tracks of secondary education. In the economic literature on the returns to education, a common approach is to operationalise level of education in terms of nominal amount of years necessary to achieve that level. Whilst a good starting point, it is too limited for the purpose of this study, because this does not properly reflect the ordinality in terms of difficulty or required test scores for a certain track. With the help of the ISCED classification, some adjustments were made. Junior vocational education, which in general took three to four years to complete, was adjusted to three years, whereas junior general secondary education was adjusted to four years (UNESCO, 1997; Ganzeboom & Treiman, 2008). It is thus assumed that those tracks in the first category can be completed in three years by those from the higher levels of secondary education.

For the students of the CBS 1965 cohort, it is clear which level of education students followed directly after primary school. However, for the CBS 1977 cohort this is not immediately clear, due to almost 40 percent of the students being

[3]This group amounts to 7 percent of the sample for the CBS 1965 cohort and less than 0.1 percent of the sample for the CBS 1977 cohort. In the Family Survey data, this group is also not considered as secondary education.

categorised in the newly introduced bridge year. The main idea behind the bridge year is that the student's definitive level of secondary education is postponed, ensuring a better match between a student's abilities and educational track. This bridge year was usually, but not exclusively, a combined class of the senior general secondary and pre-university level tracks.[4] For the purpose of determining changes in educational intergenerational inequality, these students are attributed the track they eventually followed in the one to two years thereafter. In effect, this means that the comparison in level of education between the first year level of education and second year level of education for those before and after the reform. This should however not be a problem for the purpose of this thesis, given that the introduction of a bridge year serves the meritocratic working of the educational system.

For determining the rank of a child's secondary education, as long as the ordinality of the educational tracks is known, the values attached to the various categories do not matter. In determining the educational rank of a child, we take the average percentile of its educational level within their own cohort. This approach is therefore by construction less to different operationalisations.

Parental education. — When it comes to the level of parental education, all of the employed datasets have variables representing the achieved educational level of both the mother and father. The seven categories used in this thesis are: (1) primary: lo, vglo, (2) Junior vocational: lts, lhno, lbo, (3) Junior general secondary: ulo, mulo, mavo, (4) Senior general secondary and pre-university: havo, mms, vwo, hbs, lyceum, gymnasium, (5) Senior secondary vocational: mts, mbo, (6) Higher professional: hts, hbo and (7) University: wo, universiteit. Senior general secondary- and pre-university education are combined due to limitations in the CBS 1965 survey. For the CBS 1977 cohort, parental education was not explicitly expressed in the aforementioned educational tracks, but in standardised educational levels (Standaard Onderwijsindeling) developed by the CBS in 1978. These standardised levels therefore had to be transformed into these seven categories.[5]

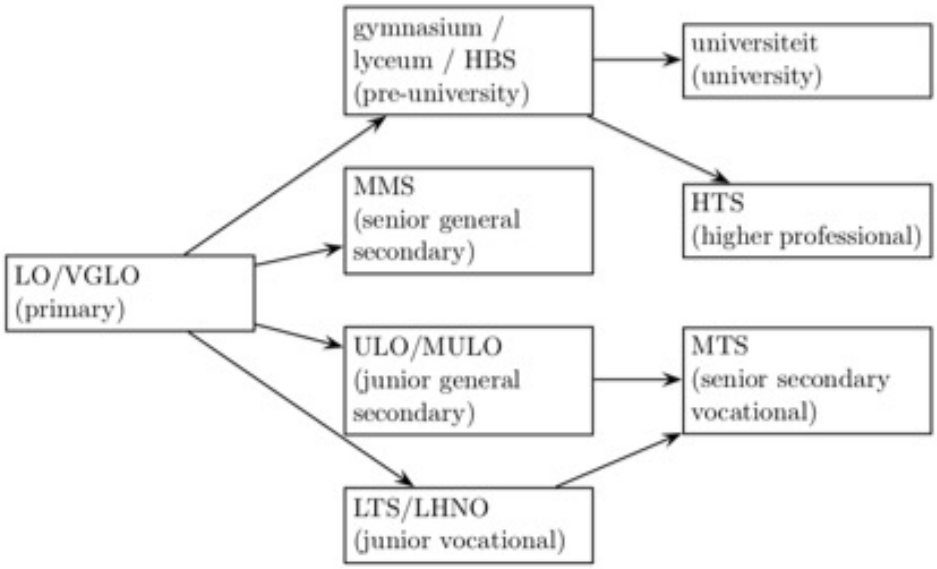
Similar to the level of secondary education achieved by the students, the operationalisation is again following a two-step procedure. First, the nominal amount of years needed to reach the respective level of education serves as a point of departure. This slightly differs from what is done for the level of secondary education in the sense that the amount of years needed for primary school is added to the previous nominal durations. Second, these values are again adjusted to better reflect the ordinality in the various tracks. The two main adjustments here are with regards to the senior secondary vocational- and university-level. If one would use the nominal duration for senior secondary vocational education, it

[4]There were also bridge year classes consisting of different combinations of the junior general secondary, senior general secondary and pre-university level tracks.

[5]See Appendix II for the transformation of the SOI coding to the seven categories used in this analysis.

Figure 1. : Dutch secondary education system

(a) before 1968



(b) after 1968

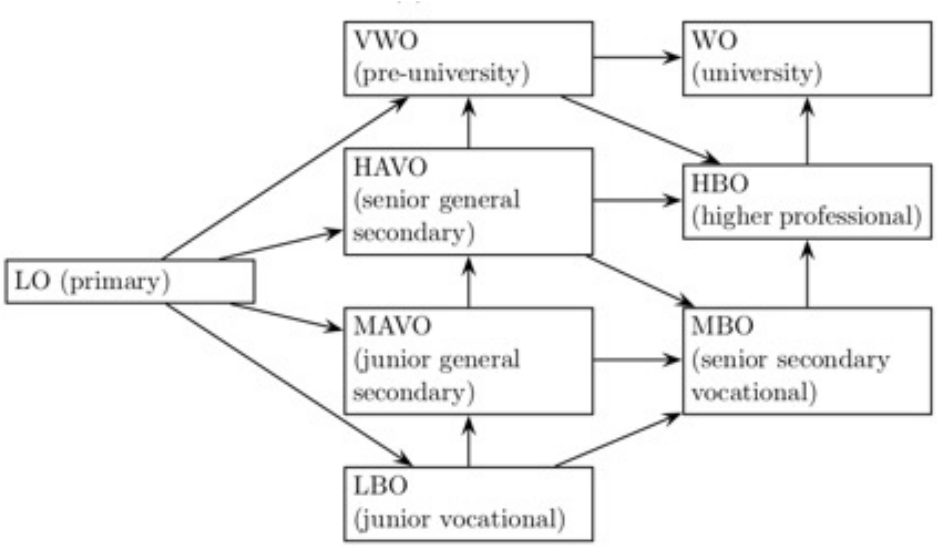


Table 2—: Levels of parental education

	Nominal	Adjusted	ISCED
Primary	6	6	1
Junior vocational	9/10	9	2C
Junior general secondary	9/10	10	2B
Senior general secondary & pre-university	11/12	11.5	3B
Senior secondary vocational	12/14	10.5	3A
Higher professional	15	15	5B
University	16/17	17	5A

would be valued higher than both senior general secondary- and pre-university education. This would be a misrepresentation of the actual ordinality in Dutch education, since the former usually leads to a blue-collar job, whereas the latter more likely leads to a white-collar job (Ganzeboom & Treiman, 2008; Buis, 2010). The second adjustment is raising the university level, which usually takes 16 to 17 years nominally depending on the specific track chosen, to 17 years, as an adjusted-years difference of two would better represent the difference in the required intellectual capacity (Ganzeboom & Treiman, 2008).

Moreover, the level of parental education can be operationalised in various ways. First, the parent with the highest achieved level of education could determine the value of parental education. Second, it is also possible to use the midpoint between the level of education of the father and mother. Thirdly, the sum of values of level of father's and mother's education can be used. In the context of determining changes in the meritocratic character of the transition to secondary school, parental education serves as a proxy for social economic status. Due to the major developments throughout the 20th century regarding women's education, the highest level of education in a household would better resemble actual social economic status. Therefore, the former operationalisation is preferred. When level of education for either of the parents is unknown, the other parent determines the value of parental education.

Finally, the rank of parental education is determined in the same way as the child's secondary educational rank. The rank represents the average percentile of its highest achieved educational level within their own cohort. As long as the ordinality of the educational tracks is known, the values attached to the various categories do not matter.

V. Methodology

In order to estimate the measures of relative educational intergenerational mobility, I will run the two following OLS/WLS estimation on the two CBS cohorts and the Family Survey-data concerning (primary) respondents that entered sec-

ondary education from four years prior to four years after the 1968 reform:

$$Y_{it} = \beta_0 + \beta_1 T_i + \beta_2 X_{it} + \beta_3 X_{it} T_i + \epsilon_{it} \tag{3}$$

$$Y_{it}^R = \beta_0 + \beta_1 T_i + \beta_2 X_{it}^R + \beta_3 X_{it} T_i + \epsilon_{it} \tag{4}$$

where equation 3 is the estimation on the basis on the levels of education and equation 4 is the estimation on the basis of the educational ranks. Variable T is the time-variable which represents whether the Mammoth-law is introduced. Y_{it} and Y_{it}^R represent the child's level and rank of secondary education directly after primary school. X_{it} and X_{it}^R represent the parent's level and rank of educational attainment. In equation 3, β_2 is identical to β_E from equation 1, the conventional measure for relative educational mobility as described in section 3. In equation 4, β_2 is also identical to the rank-rank slope from equation 2, since using ranks ensures $\frac{SD(Y_i)}{SD(X_i)}$ to be equal to one.

In contrast to the existing literature, with the exception of gender, no additional controls will be employed in the aforementioned baseline models. Many of the variables included as controls in the specifications in the Dutch sociological literature can be considered to be bad controls. The most common type of bad control in the existing literature, are the intermediate outcomes. Good controls would be variables that can be thought of to be fixed at the time the regressor of interest was determined (Angrist & Pischke, 2008). For instance, a lot of papers use degree of urbanisation, province and/or family size in their specification when regressing educational level of the child on the parent's educational level. This while the educational level of the parents in part determines where they are more likely to live, both in terms of province and degree of urbanisation. It also influences the family size, since lower-educated individuals tend to have more children on than higher-educated individuals (Cochrane, 1979).

As briefly mentioned before, both for the CBS 1977 and Family Survey data, weighting is applied to achieve both nationally representative descriptives and accurate estimates. Usually this would not be necessary and perhaps even harmful for precision of the estimation (Angrist & Pischke, 2008). If sampling probabilities vary exogenously, the error term is unrelated to the sampling (Wooldridge, 2002; Solon, Haider & Wooldridge, 2015). However, for the Family Surveys and the 1977 cohort, the error term is likely related to the sampling, given that nonresponse could be correlated with educational level. In other words, there might be endogenous sampling, which justify the use of a weighted least squares regression (Solon, Haider & Wooldridge, 2015). Furthermore, even if the sampling probabilities would vary along the exogenous variables, such as gender, age, region and degree of urbanisation, they are not incorporated in the used specification due to those being bad controls. The estimates will thus be weighted by the inverse

probability of selection. These are determined by an iterative weighting procedure with respect to marital status, gender, age, region and degree of urbanisation.

Estimating the change in educational intergenerational inequality between the 1965 and 1977 CBS cohorts will be primarily done on the basis of a Weighted Least Squares regression, in accordance with the earlier specification. Normalised inverse probability of selection weights are included for the 1977 cohort. Given that the 1965 cohort data is nationally representative, weights of 1 are attributed to these observations. In contrast to the CBS cohorts, the Family survey data allows for an estimation of the change of educational intergenerational inequality between years of our choosing. The earlier specification will be estimated for individuals that entered secondary education of the five years before, and the five years after the introduction of the Mammoth-law. This is done as a Weighted Least Squares regression, using weights which represent the normalised inverse probability of selection.

A. Absolute mobility

Additional to the relative mobility-based estimations, the two measures of absolute educational intergenerational mobility are estimated on the basis of the following OLS/WLS and weighted LPM estimations:

$$Y_{it}^{R} = \beta_0 + \beta_1 T_i + \epsilon_{it} \tag{5}$$

$$Pr(Y_{it}^{QR}|T) = \beta_0 + \beta_1 T_i + \epsilon_{it} \tag{6}$$

where equation 5 is the estimation of the difference in child's mean educational ranks and equation 6 is the estimation of reaching the top quintile in terms of mean educational ranks. In contrast to the relative mobility based estimations, here the population are the children with parents up to the 50th percentile of the distribution of parental educational ranks. As before, variable T is the time-variable which represents whether the Mammoth-law is introduced. Y_{it}^{R} represents the child's rank of secondary education directly after primary school and β_1 represents the change in the used measure of absolute educational mobility. In contrast to the previous measure of mobility, here the coefficients of T represent the measure of educational intergenerational mobility.

Similar to the estimation of relative mobility, normalised inverse probability of selection weights are included for the CBS- and Family Survey cohorts. However, given that the parental educational ranks are not continuously distributed, additional weighting has to be applied. To illustrate why additional weighting is needed, consider the CBS 1965 cohort. In 1965, 49.46 percent of the parents received no secondary education, which means if one would compare the educational attainment of children of the lowest 50 percent educated parents before and

after the reform, only 0.56 percent of those at the second-lowest level of parental education should be included in this sub-population. This lack of a continuous distribution makes it difficult to use deciles, quartiles and/or quintiles rank-based measures without further adjustments. Because it is known for each cohort how large the oversampling for these groups at the cut-off points are, utilising probability weights, would allow for acquiring better estimates. Despite these corrections, it is still important to keep in mind that these measures are by no means perfect, and that the measures of relative mobility remain the focal point of this thesis.

VI. Descriptives

Regardless of the data used, table 3 indicates that the enrolment into junior vocational directly after primary education has decreased since 1968. Also, the enrolment into senior general secondary and pre-university education have increased. For junior general secondary education enrolment changed in opposite direction for the CBS-cohorts and the selected Family Survey respondents, with an increase in the former and a decrease for the latter. Given that the CBS-data is weighted to reflect the national enrolment rates per track of secondary education, these percentages provide a more representative indication of changes in enrolment.

Table 3—: Distribution child's secondary education after primary school

	CBS 1965	CBS 1977	FS 1963-67	FS 1968-72
Junior vocational	47.37%	35.48%	41.36%	33.20%
Junior general secondary	33.84%	38.49%	37.99%	35.21%
Senior general secondary	8.78%	11.20%	5.58%	13.92%
Pre-university	10.01%	14.83%	15.08%	17.67%

Note: For CBS 1965 N=1792 & for CBS 1977-cohort N=33484. For FS 1963-67 N=656 & for FS 1968-72 N=746.Sampling weights as described in the previous section are used

Table 4—: Means of child's and parental education

	CBS 1965	CBS 1977	FS 1963-67	FS 1968-72
Child's sec. education	3.81	4.09	3.94	4.18
Father's education	7.79	9.25	8.82	9.35
Mother's education	7.11	8.06	7.88	8.38
Parental education	8.22	9.68	9.09	9.78

Note: Expressed in terms of (adjusted) nominal duration of educational level. For CBS 1965 N=1792 & for CBS 1977-cohort N=33484. For FS 1963-67 N=656 & for FS 1968-72 N=746.Sampling weights as described in the previous section are used

Despite the differences between both data-sources, table 4 shows that, on average, child's secondary educational level on enrolment has increased in terms of adjusted nominal years required. This is also the case for parental education, both for the earlier operationalised variable and the father and mother separately. The observed increase in child's secondary education is relatively similar between both data-sources, but especially parental education has increases only half as much in the Family Survey as opposed to the CBS cohorts. Differences between the two types of data are however not necessarily reflective of differences in terms of the quality of the data, but also naturally arise from differences in time-span covered. For the Family Survey data, means over the four years before and after were taken, whereas the CBS-cohorts represent single-year means.

VII. Results

A. Baseline estimates

From the estimation of the earlier specified Weighted Least Squares baseline model on the basis of the CBS-data follows that parental education is positively correlated with the first level of secondary education attended. The coefficient is estimated to be 0.151 and is significant at the 1 percent level. Moreover, as can be seen in table 5, the baseline model estimates a negative, albeit non-significant, coefficient of -0.009 for the interaction between cohort and parental education. Also with the ranking-approach, child's and parental education are correlated, with an estimated coefficient of 0.393. The interaction estimate, the rank-rank coefficient, is estimated at -0.032 and is also not statistically different from 0.

As the case with the estimation with the CBS-data, the estimated Weighted Least Square regression of the Family Survey data also indicates a statistical significant positive correlation between parental educational outcomes and the first level of secondary school enjoyed. The estimated effect is however slightly smaller: 0.117 as opposed to 0.151. As can be seen in table 6, the estimated coefficient of the baseline model is, in contrast to the same estimate on the basis of the CBS-data, positive. However, also this estimate is not statistically significant. The estimated rank-rank slope of 0.134 is on the other hand statistically significant at the 1 percent level.

B. Sensitivity analysis

The question is whether and to what extent these results are sensitive the specifications used. First of all, across both datasets the estimates for both measures of intergenerational educational mobility hardly changed when they are also conditional on gender. Furthermore, including a control for the years in which the Family Surveys took place does not alter both the magnitude and statistical significance of the estimated coefficients. Moreover, for reasons stated before in the methodology section, parental education was operationalised as the maximum

Table 5—: Estimates baseline model of CBS cohorts

	(1) Child's education level	(2) Child's education rank
T	0.134*	5.066***
	(0.0662)	(1.208)
Parental education level	0.154***	
	(0.00804)	
T*Parental education level	-0.00904	
	(0.00823)	
Parental education rank		0.393***
		(0.0213)
T*Parental education rank		-0.0318
		(0.0218)
Constant	2.544***	30.39***
	(0.0639)	(1.175)
N	36992	36992

Note: Standard errors in parentheses. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. Column (1) is the output of the OLS/WLS regression specified in equation (3). Column (2) is the output of the OLS/WLS regression specified in equation (4). Mean ranks differ between cohorts sampling weights used in the ranking procedure. Outcomes robust controlling for gender.

level of education attained by either parent. As shown in table 7, operationalising parental education as the midpoint of the father's and mother's level of educational attainment increases the interaction estimate on the basis of the CBS-data to -0.030, which is statistically significant at the 5 percent level. The CBS-based estimate of the rank-rank slope is not sensitive to an alternative specification and remains largely unchanged. The Family Survey-based estimates also remain unchanged under this specification, irrespective of whether the ranking measure of intergenerational educational mobility was used.

It is also possible to investigate whether the age a child starts with secondary education affects these results. Incorporating these in a regression of child's secondary education on parental education drastically increases the significance of the estimates on the basis of the CBS-data. However, one must be cautious accepting these estimates at face value, given that the starting age of secondary education can be endogenous, as it can partly be considered an outcome of the educational level of the parents. An alternative way of looking into the relation between educational starting age and the earlier results, is by regressing the earlier specifications on children that started secondary education between the years of 11 and 13. For the CBS-data, the estimates for this group of children indeed indicate an increase in intergenerational educational mobility, regardless of its measure and specification. The estimates for the ranking approach are both higher and statistically significant. When considering educational levels, this is

Table 6—: Estimates baseline model of Family Survey cohorts

	(1) Child's education level	(2) Child's education rank
T	-0.104	-4.217
	(0.180)	(2.739)
Parental education level	0.117***	
	(0.0142)	
T*Parental education level	0.0265	
	(0.0189)	
Parental education rank		0.295***
		(0.0369)
T*Parental education rank		0.0870
		(0.0486)
Constant	2.879***	35.35***
	(0.129)	(2.080)
N	1423	1423

Note: Standard errors in parentheses. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. Column (1) is the output of the OLS/WLS regression specified in equation (3). Column (2) is the output of the OLS/WLS regression specified in equation (4). Mean ranks differ between cohorts sampling weights used in the ranking procedure. Outcomes robust controlling for gender.

however less the case. For the Family Survey data, the estimates remain mostly unchanged either non-different from 0 or positive, if the ranking approach is considered. Lastly, in line with Chetty et al. (2014), the ranking approach estimates are indeed less sensitive to differences in specifications.

C. Absolute mobility

The estimations of the two measures for absolute intergenerational educational mobility, based on the (sub)populations of children with the 50 percent lowest educated parents, are in line with the previous estimates in the sense that they are not statistically significant. As can be seen in table 8, the estimated change in mean secondary educational rank is -1.119 on the basis of the CBS-cohorts and -2.825 on the basis of the Family Survey-cohorts. The estimated change in probability of children reaching the upper quintile of secondary educational rank is also negative for both strands of data, with -0.012 for the CBS-data and -0.029 for the Family Survey data. However, whilst all these estimates are negative, they do not appear to be statistically different from zero.

VIII. Discussion and conclusion

This thesis set out to determine whether the introduction of the "Mammoth-law" in 1968 coincided with a change in the intergenerational educational mobil-

Table 7—: Estimated changes in relative intergenerational educational mobility

Child	Parents	(1) CBS	(2) CBS (age 11-13)	(3) FS	(4) FS (age 11-13)
Level	Level (max)	-0.009	-0.016	0.026	0.029
		(0.0082)	(0.0085)	(0.0189)	(0.0199)
Level	Level (mid)	-0.030*	-0.038**	0.036	0.039
		(0.0117)	(0.0122)	(0.0240)	(0.0256)
Rank	Rank (max)	-0.032	-0.054*	0.087	0.097
		(0.0218)	(0.0223)	(0.0486)	(0.0508)
Rank	Rank (mid)	-0.030	-0.049*	0.106*	0.120*
		(0.0219)	(0.0225)	(0.0480)	(0.0502)

Note: Standard errors in parentheses. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. Outcomes robust controlling for gender.

Table 8—: Estimated changes in absolute intergenerational educational mobility

	(1) Mean (CBS)	(2) Top (CBS)	(3) Mean (FS)	(4) Top (FS)
T	-1.119	-0.012	-2.825	-0.029
	(0.8085)	(0.0092)	(2.0746)	(0.0249)
Constant	41.944***	0.078***	44.139***	0.10***
	(0.7778)	(0.0090)	(0.0240)	(0.0256)

Note: Standard errors in parentheses. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. Column (1) is the output of the OLS/WLS regression specified in equation (5). Column (2) is the output of the PLM/WLS regression specified in equation (6). Difference in constants between data sources stem partially from inherent difference in the underlying surveys, collection and weighting, as well as different timespans. Outcomes robust controlling for gender.

ity in the Netherlands. Not only was the structure of Dutch secondary education changed, but more notably, the transition from primary to secondary education was to be more dependent on ability. In expectation, this implies that the reform would coincide with an increase in intergenerational educational mobility. The consensus in the existing literature is that there was only a slight increase in relative intergenerational mobility. In contrast to previous research, not only the level of education, but an educational ranking approach is used. This allows for abstracting from changes in the variability of child's and parental education over time and generally gives estimates which are less sensitive to alternative specifications. Moreover, much of the existing literature on the "Mammoth-law" focuses

on only one type of data, either the CBS-survey(s) or retrospective surveys. In this thesis, these important strands of data are analysed using one same specification, which allows for a better assessment of the robustness of the estimates for the intergenerational educational mobility. Furthermore, this supplemented with measures for absolute upward educational mobility.

The analysis in this thesis shows that, if we assume the CBS-data to be more trustworthy, there has been an increase in relative intergenerational mobility for children transitioning into secondary education between the age of 11 and 13. This increase is however small and does not hold when children of all ages are considered. Given that the age where a child transitions from primary to secondary education could very well be endogenous, it cannot be confidently concluded that intergenerational educational mobility has increased around the introduction of the reform. Interestingly, the Family Survey data even indicates a decrease of intergenerational educational mobility between the four years prior and after the reform, with an higher magnitude than the found decreases for some of the estimates based on the CBS-data. Potential explanations for this difference in results could be the presence of measurement errors due to for example recall bias and the higher non-response rates. The presence of recall bias could result in an underestimation of the observed time-trend in educational levels, due to answers on (parental) educational attainment are likely to be more positively biased when you go back further in time.

Moreover, the two measures of absolute educational mobility indicate that for those children with lower educated parents, educational intergenerational mobility has not changed. This confirms the findings based on the relative measures of intergenerational educational mobility and might be an indication that there is not a strong heterogeneity in the (lack of) aggregate changes in educational mobility. It is nevertheless surprising given that one would expect that children with lower educated parents would benefit most from this reform.

All in all, it is most likely the case that on aggregate intergenerational educational mobility hardly changed after the "Mammoth-law" of 1968. Even if we would be able to conclude it would have increased, it would only be a small change. Nevertheless, this does not mean that the "Mammoth-law" had no intergenerational educational effects. It is possible that the effects of the increased meritocracy of the Dutch educational system has been off-set by opposing effects, such as dependence of performance on parental background. Future research can help determine the underlying mechanisms for the aggregate lack of change in the intergenerational educational mobility.

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Appendix I. Original variable categories

A1. Level of education across datasets

- CBS1965complete: ss1 5 categories (VGLO, MULO, VHMO, HAVO MMS HDS, LBO)
- CBS1965partial: var0180 of(?) var0351 Eerste schooltype na LO 5 main categories (VGLO, ULO, VHMO, LBO/huishoudschool, geen dagonderwijs, in total 15 subcategories (Clean up for categories not in CBS1977)
- CBS1977: var181 voor onderwijselement 1977/78 (14 categorieen) voor brugklas toewijzing var184 (onderwijselement 78/79) en evt. var187 (onderwijselement 79/80)
- FS1993: v40a_2a 9 categories (LO-, LO, LBO, MAVO, MBO, HAVO, VWO, HBO, WO) drop out those w/o further schooling after primary school
- FS1998: e7_1 10 categories (lagere school, vglo; lbo, huishoudschool, vbo; mavo, ulo, mulo; havo, mms; vwo, hbs, athenaeum, gymnasium; kort mbo; volledig mbo; hbo, kandidaatsexamen; universiteit; missing) drop out those w/o further schooling after primary school (e6)
- FS2000: d14_1 9 categories (lbo, huishoudschool, vbo; mavo, ulo, mulo; havo, mms; vwo, hbs, athenaeum, gymnasium; kort mbo; volledig mbo; hbo, kandidaatsexamen; universiteit; missing) drop out those w/o further schooling after primary school (d11)
- FS2003: e9_1 9 categories (lbo, huishoudschool, vbo; mavo, ulo, mulo; havo, mms; vwo, hbs, athenaeum, gymnasium; kort mbo; volledig mbo; hbo, kandidaatsexamen; universiteit; missing) drop out those w/o further schooling after primary school (e7)
- FS2009: d10_1 10 categories (not applicable; missing; lbo, huishoudschool, vbo, vmbo (kader); mavo, ulo, mulo, vmbo (theoretisch); havo, mms; vwo, hbs, athenaeum, gymnasium; kort mbo; volledig mbo; hbo, kandidaatsexamen; universiteit; missing drop out those w/o further schooling after primary school (d8)

A2. Level of parental education across datasets

- CBS1965complete: Secondary education level parent v3 (onbekend, VHMO of hoger, ULO, LNO, GLO), however 1126 missing.
- CBS1965partial: Secondary education level father var0205 Secondary education level mother var0210, see Table A1 and A2 for categories

Table A1—: **Father 1965**

Item	Number	Per cent
ONBEKEND,GA	37	1
LO	1,091	36
VGLO	6	0
ULO,MULO	262	9
VHMO	131	4
LBO	558	18
MBO	161	5
HBO	132	4
WO	74	2
ALLEEN VAKKURS	590	19
Total	3,042	100

Source: CBS 1965 partial.dta

Table A2—: **Mother 1965**

Item	Number	Per cent
ONBEKEND,GA	22	1
LO	1,878	62
VGLO	8	0
ULO,MULO	276	9
VHMO	73	2
LBO	471	15
MBO	94	3
HBO	41	1
WO	6	0
ALLEEN VAKKURS	173	6
Total	3,042	100

Source: CBS 1965 partial.dta

- CBS1977: Standaard Onderwijs Indeling (voltooid) Man var040 Standaard Onderwijs Indeling (voltooid) Vrouw var048. This concerns a three-digit classification of educational track, with the first digit representing the level and the 2nd and 3rd representing the subject. These are transformed into the cateogries specified in the variables section.

- FS1993: education level vader v4_v education level moeder v4_m

Table A3—: **Father 1993**

Item	Number	Per cent
lo-	61	6
lo	384	39
lbo	183	19
mavo	86	9
mbo	92	9
havo	19	2
vwo	34	3
hbo	81	8
wo	32	3
wo+	12	1
Total	984	100

Source: FS1993primary.dta

Table A4—: **Mother 1993**

Item	Number	Per cent
lo-	69	7
lo	466	47
lbo	222	23
mavo	110	11
mbo	42	4
havo	20	2
vwo	17	2
hbo	38	4
wo	1	0
wo+	1	0
Total	986	100

Source: FS1993primary.dta

- FS1998: level education father b16_v level education mother b16_m

Table A5—: **Father 1998**

Item	Number	Per cent
lagere school, vglo	406	36
lbo, hs, vbo	223	20
mavo, ulo, mulo	120	11
havo, mms	9	1
vwo, hbs, ath, gymn	55	5
kort mbo (kmbo)	14	1
volledig mbo	93	8
hbo, kandidaatex	131	11
universiteit	47	4
postacademisch	12	1
99	30	3
Total	1,140	100

Source: FS1998primary.dta

Table A6—: **Mother 1998**

Item	Number	Per cent
lagere school, vglo	470	41
lbo, hs, vbo	296	26
mavo, ulo, mulo	172	15
havo, mms	21	2
vwo, hbs, ath, gymn	36	3
kort mbo (kmbo)	17	1
volledig mbo	45	4
hbo, kandidaatex	53	5
universiteit	9	1
postacademisch	2	0
99	19	2
Total	1,140	100

Source: FS1998primary.dta

- FS2000: level of education father b14 level of education mother b16

Table A7—: **Father 2000**

Item	Number	Per cent
lagere school, vglo	333	39
lbo, hs, vbo	173	20
mavo, ulo, mulo	88	10
havo, mms	8	1
vwo, hbs, ath, gymn	32	4
kort mbo (kmbo)	21	2
volledig mbo	66	8
hbo, kandidaatex	75	9
universiteit	28	3
postacademisch	6	1
99	6	1
Total	852	100

Source: FS2000primary.dta

Table A8—: **Mother 2000**

Item	Number	Per cent
lagere school, vglo	395	46
lbo, hs, vbo	201	24
mavo, ulo, mulo	118	14
havo, mms	15	2
vwo, hbs, ath, gymn	20	2
kort mbo (kmbo)	8	1
volledig mbo	31	4
hbo, kandidaatex	37	4
universiteit	8	1
postacademisch	0	0
99	19	2
Total	852	100

Source: FS2000primary.dta

- FS2003: level of education father b14 level of education mother b16

Table A9—: **Father 2003**

Item	Number	Per cent
lagere school, vglo	365	30
lbo, hs, vbo	277	23
mavo, ulo, mulo	167	14
havo, mms	9	1
vwo, hbs, ath, gymn	55	5
kort mbo (kmbo)	16	1
volledig mbo	94	8
hbo, kandidaatex	109	9
universiteit	44	4
postacademisch	8	1
99	73	6
Total	1,217	100

Source: FS2003primary.dta

Table A10—: **Mother 2003**

Item	Number	Per cent
lagere school, vglo	438	36
lbo, hs, vbo	339	28
mavo, ulo, mulo	181	15
havo, mms	33	3
vwo, hbs, ath, gymn	27	2
kort mbo (kmbo)	7	1
volledig mbo	69	6
hbo, kandidaatex	51	4
universiteit	17	1
postacademisch	4	0
99	51	4
Total	1,217	100

Source: FS2003primary.dta

- FS2009: level of education father b14 level of education mother b16

Table A11—: **Father 2009**

Item	Number	Per cent
lagere school, vglo	529	28
lbo, hs, vbo	432	23
mavo, ulo, mulo	227	12
havo, mms	26	1
vwo, hbs, ath, gymn	68	4
kort mbo (kmbo)	55	3
volledig mbo	143	8
hbo, kandidaatex	189	10
universiteit	85	5
postacademisch	13	1
99	107	6
Total	1,874	100

Source: FS2009primary.dta

Table A12—: **Mother 2009**

Item	Number	Per cent
lagere school, vglo	653	35
lbo, hs, vbo	530	28
mavo, ulo, mulo	278	15
havo, mms	36	2
vwo, hbs, ath, gymn	42	2
kort mbo (kmbo)	36	2
volledig mbo	89	5
hbo, kandidaatex	101	5
universiteit	18	1
postacademisch	2	0
99	89 5	
Total	1,874	100

Source: FS2009primary.dta

Appendix II. Data transformation and harmonisation

A complete overview of the modifications made in the various datasets can be found in the following Stata do-file:

`https://www.dropbox.com/s/osi4gs6u1px6uig/dofile.do?dl=0`