Chapter 1

Introduction

It is common practice to start studies on education with a claim that education is an important determinant of later life chances (for example Mare, 1981; Shavit and Blossfeld, 1993). Instead of repeating this claim I will report the following official statistics for the Netherlands: the unemployment rate in 2006 for persons with only primary education is 12.2% versus 3.7% for persons with a university degree; in 1998 29% of women aged between 34 and 38 with a university degree expected to remain childless versus 16% for women with primary or lower secondary education; men who were born in 2008 are expected to live 50.2 years in good health if they only complete primary education versus 69.0 years if they attain a degree in tertiary education (Statistics Netherlands, 2008). These statistics sufficiently illustrate the importance of education for a wide range of domains in a person's life and the role of education as the primary stratification mechanism in modern societies.

If a resource like education is this important, then the distribution of this resource is certainly worth studying. There is a long list of literature that has done just that, and it shows that educational attainment is unequally distributed among persons with different family backgrounds, in particular that persons from more privileged families tend to obtain more education than persons from less privileged backgrounds (Hout and DiPrete, 2006; Breen and Jonsson, 2005). In this dissertation I will try to contribute to the study of this inequality in access to education. I will focus on two types of inequality of access to education and the relationship between these types. The first type of inequality in access to education is the inequality as it arises during the process of attaining education. This is usually captured by studying the effect of family background on the probabilities of passing from one level of education to the next, and I will call this Inequality of Educational Opportunity or IEOpp[1] The second type of inequality in terms of access to education is the inequality in the end result of the educational selection process. This is usually captured by studying the effect of family background on the highest achieved level of education, and I will call this Inequality of Educational Outcome or IEOut. The dominant issue in this literature is whether or not the IEOpp and IEOut have changed over time, and in particular, whether they

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[1]The term Inequality of Educational Opportunity (usually abbreviated to IEO) was already used by Boudon (1974) and Mare (1981), where it is used as a more generic term for inequality of access to education. However, in the studies by Boudon (1974) and Mare (1981) the effects of family background on the probabilities of passing from one level to next are claimed to be a more "pure" representation of IEO.

have decreased over time. A common finding for the Netherlands has been that for this country there has been a gradual and long-term decline of inequality in both IEOpp and IEOut during the course of the 20ᵗʰ century (De Graaf and Ganzeboom, 1993; Ganzeboom and Luijkx, 2004b). These results have been obtained using a continually extending database of pooled cross-section data, most recently consisting of over 50 surveys held in the Netherlands since 1958 covering cohorts born throughout almost the entire 20ᵗʰ century. The aim of the studies collected in this dissertation is to re-assess and extend the evidence in these earlier studies, primarily from methodological points of view. Overall, the research question guiding the separate studies in this dissertation can be formulated as follows:

> To what extent, how, and when has a trend toward less inequality in educational opportunities and in educational outcomes of persons from different family backgrounds occurred in the Netherlands?

The first step undertaken to elaborate and answer this general research question is to provide an overview of the trends in IEOpp and IEOut following the protocol used in an influential international comparative project headed by Shavit and Blossfeld (1993), but using the most recent data available on the Netherlands. This analysis will be a replication of the Dutch contribution to this project by De Graaf and Ganzeboom (1993). Such a replication is useful in its own right, but will also function as the point of departure to which all results in the subsequent chapters can be compared. This replication will be presented in Chapter 2.

The subsequent chapters in this dissertation will each discuss a way of improving this 'default' method and the consequences of these methodological innovations for the estimated trends. Chapters 3, 4, and 5 discuss various ways of improving the estimates of IEOut. Chapter 3 will introduce a way of improving the scale on which the highest achieved level of education is measured. Chapter 4 will focus on how best to measure any changes in the trend in IEOut. Chapter 5 will investigate the relative influences of different indicators of family socioeconomic status. Chapter 6 will introduce a way to integrate the analysis of IEOpp and IEOut, thus allowing one to make the best use of the complementary nature of these two representations of inequality in access to education. This integration will also provide a substantive interpretation of the effect of educational expansion — the fact that people from more recent cohorts attain, on average, higher levels of education than people from older cohorts — on IEOut. Finally, Chapter 7 will propose a way of dealing with an influential critique by Cameron and Heckman (1998) on the most common method of estimating IEOpps.

Chapter 3 will focus on the scaling of education. In order to study IEOut — that is, the effect of family background on the highest achieved level of education

— one needs to assign values to each level of education[2]. In Chapter 3 these values will be empirically estimated such that education optimally predicts the respondent's occupational status. Most previous studies of IEOut use an *a priori* scale of education that is loosely based on the number of years it should take a 'standard' student to finish that level. Such a scale conflates two related but distinct concepts: the duration and the value of education. Another issue is that such an *a priori* scale assumes that the values are constant over time, while there is an influential hypothesis that states that the value of the higher educational categories have declined, so-called diploma inflation. This hypothesis is based on the fact that people born more recently on average achieve much higher levels of education than people born longer ago. As a consequence the number of higher educated persons has increased, which has led to the prediction that the value of their education has declined. Chapter 3 will test whether the estimated values of the levels of education have actually changed over time, and compare the estimated values with commonly used *a priori* values.

Chapter 4 will focus on the question of whether or not the trend in the effect of family background on educational outcomes has changed over time. Existing literature has occasionally tested for the presence of curvilinear (accelerated of decelerated) trends, but found little or no supporting evidence (De Graaf and Ganzeboom, 1990; De Graaf and Luijkx, 1992; De Graaf and Ganzeboom, 1993; De Graaf and Luijkx, 1995; Ganzeboom, 1996). This is implausible: if the long-term trend is towards lower association between social background and educational achievement, one would expect a slow-down of this trend at some point, as otherwise a continuing linear trend would lead to a negative association between social background and educational achievement. In Chapter 4 I examine whether such a non-linear development has already occurred, using local regression models that appear to be new to this field.

Chapter 5 will focus on the relative importance of different types of family background, in particular, the education and occupational status of both parents. It is probable that the relative contributions of these resources have changed over time. Two such changes are expected from the literature: First, economic resources (parental occupational status) are predicted to have become less important relative to cultural resources (parental education). The effect of economic resources are expected to decline, because the combination of economic growth and an increase in government subsidies is likely to have decreased the negative influence of poverty on attaining education. A similar decline in effect of the cultural resources is not expected, leading to the expectation of a increase of importance of the cultural resources relative to economic resources (De Graaf and Ganzeboom, 1993). Second, the resources contributed by the mother are likely to have increased in importance relative to the resources con-

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[2]In studies of IEOpp, a similar issue arises with respect to the rank order of the transitions analysed, but this presents less of a puzzle as this order is usually institutionally determined.

tributed by the father due to the changing roles of men and women in society (Korupp et al., 2002). These hypotheses are of substantive interest in their own right, but they also have an important practical consequence for social stratification research. Studies in this field often use only one of these resources, most typically father's occupational status, as in indicator of family socioeconomic status. If the relative contributions of the different resources have changed over time, then trends in IEOpp or IEOut found in these studies could in part be an artefact, as the quality of the single indicator used in these studies has in that case changed over time. Chapter 5 will test whether or not the relative contributions of the different resources have changed over time.

Chapter 6 will investigate the relationship between inequality during the process through which education is attained (IEOpp) and inequality in the outcome of that process (IEOut). These two types of inequality provide complementary information, but the current literature fails to take this into account. In order to make the best use of this complementarity, one would need to move beyond separately presenting estimates of IEOpp and IEOut and towards an integrated analysis of the two. Chapter 6 will present such an integrated analysis by showing that a method commonly used for estimating IEOpps proposed by Mare (1981) also implies a decomposition of IEOut as a weighted sum of IEOpps, where the weights are a substantively meaningful function of the probabilities of passing the different transitions between levels of education. This decomposition also makes it possible to study the effect of educational expansion on IEOut.

Chapter 7 will present a way to deal with an influential critique by Cameron and Heckman (1998) on the estimates of IEOpp proposed by Mare (1981). Cameron and Heckman (1998) argued that these estimates measure the effect on the average probabilities of passing from one educational level to the next within groups defined by the observed variables rather than the causal effects of these variables on an individual's probability of passing. Moreover, they showed that these group level effects are different from the individual level effects, but that in the literature the group level effects are often interpreted as individual level causal effects. The easiest solution to this discrepancy is to interpret the results of the model proposed by Mare (1981) as group level effects. Alternatively, one could try to estimate individual-level effects. This is, however, much more difficult, as one would also need to control for the heterogeneity between respondents due to unobserved variables (Cameron and Heckman, 1998; Allison, 1999; Mare, 1993). In this chapter I will propose one possible solution, which is to perform a sensitivity analysis by formulating a set of scenarios that vary in the amount of heterogeneity between respondents due to unobserved variables, and estimate the individual-level effects within each of these scenarios. Such a sensitivity analysis will give an idea of the plausible range of individual-level effects.

The final chapter will discuss the extent to which the original research question

can be answered and what each of the chapters contribute to what was already known about the trend in the inequality of access to education in the Netherlands. Some of the limitations of the studies collected in this dissertation will also be discussed and some of the areas where this type of analysis can be further improved will be identified.