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El Efecto del origen social sobre las oportunidades educativas. Una comparación de 52 países (1900-1980)

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THE EFFECT OF SOCIAL ORIGIN ON EDUCATIONAL OPPORTUNITY - A FORTY-TWO COUNTRY COMPARISON (1900-1970)

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The Effect of Social Origin on Educational Opportunity - A Forty-two Country Comparison (1900-1970)

Abstract: In this paper we examine variations in the inequality of educational opportunity (IEO) over cohorts, over countries, over school transitions and between men and women in 42 countries observed in 291 surveys that together cover the 1905-1990 period. The educational career is decomposed into five hierarchically ordered transitions that are comparable between educational systems. Probabilities of surviving a transition from one level to the next are computed, conditional on all previous transitions having been survived. Variations in school continuation probabilities between individuals with a high and a low social background are related to the structure of the educational distribution, the institutionalized timing of each transition within the school system, the level of modernization and the political conditions an individual faces at the moment of a transition. Our results show that the effect of social origin on school continuation probabilities declines over school transitions. Over cohorts, inequalities in school continuation probabilities decline. The level of modernization of a country drives down IEO, but is a less satisfactory explanation for the decline of inequality of educational opportunity over cohorts X. Furthermore, the over-cohort decline is largely offset by an increase of the percentage of students at risk, which causes IEO to grow X. Social-economic development leads to greater equality of school continuation probabilities. State-socialism had a strong negative effect on IEO in the early days of communism, but the effects converge to the situation in market societies later on. Later institutionalized timing of a transition decreases IEO at entry into secondary education, but promotes IEO at the entry into higher education.

INTRODUCTION

In countries around the world, someone's highest level of schooling completed depends in part on the social environment one has grown up into. On average, the offspring of parents with lower status characteristics - often measured by the occupation of the father - attain less schooling than offspring of parents with higher status characteristics. However, although the unequal distribution of educational attainment over social classes seems to be universal in contemporary societies, there may be variations in social background effects across time and space, which can inform us about the mechanisms that generate this highly important dimension of social stratification. In this paper we investigate the variations in social background effects in a large scale comparative analysis across time and space. More specifically, we investigate how such variations have developed for men and women in 42 nations around the globe throughout most of the 20th century and how they are influenced by contextual conditions.

After Boudon (1974) presented his model of educational attainment, the research literature in this field, mainly following Mare's (1980) subsequent analysis of educational attainment in the US, has conceived of the process of educational attainment as a sequence of transitions or decision points. During a student's educational career, he or she faces multiple moments when decisions must be taken as to which path to choose, and leave or remain in education. Early decisions may prevent the attainment of certain educational qualifications later on in that career. Only when an earlier level has been successfully completed, the transition to the next level can take place. A person who attains a higher educational level therefore can be assumed to have successfully completed all previous levels defined by the organization of the school system. A student's social origin may affect all these decisions, but in variable ways. The mechanism which underlies the inequality of final educational level completed is comprised of the inequalities of educational opportunity (IEO) to survive the separate transitions.

The advantages of the transition model over simple analyses of final level completed can argued to be twofold. First, by decomposing the educational career one can hope to uncover differential effects of social background and contextual conditions. The research literature has extensively documented that social background effects are stronger in the earlier

transitions than in the later transitions. Similarly, it has been found that earlier transitions are more sensitive to contextual variation and historical trends than later transitions (Simkus & Andorka 1982; Ganzeboom & De Graaf 1993). To study an individual's final educational outcomes alone, does not show where in the educational system social origin is most important in determining the educational career and where the effect of social origin loses or gains in importance over time. Second, decomposing final level completed by separate transitions has the advantage to boost the historical precision of a comparative design, since it allows us to locate the relevant decisions at a more precise point in time. Only when contextual conditions can be associated with a more or less exact time of transition, we can uncover their influence.

The history of the transition approach traces back to Boudon (1974). Boudon's aim was to provide a theoretical framework for the understanding of differences in the inequality of educational opportunity. His stated aim at the time in fact was to show why inequality in educational *attainment* persists over time despite educational expansion. To explain this, he referred to the pattern of choices made by individuals from different social backgrounds who are about to make a transition. His rational choice model using simulated data led him to conclude that even with similar individual abilities, but taking into account cultural differences between social classes, students of lower social origin choose more often to discontinue schooling than students of higher social origin at all transitions. Boudon went on to conclude that the expansion of education leads to higher rates of inequality of educational attainment, if, as a consequence of expansion, the number of transitions increases (Boudon 1974).

The assumptions Boudon made and the fact that his conclusions were based on computations using simulated data drew much criticism (e.g. Hauser 1975). Mare used empirical data to investigate the effect of social origin and inequality of educational opportunity, first over transitions alone (1980), later also over time (1981). Analyzing data on American white males Mare showed that the effect of social origin on school continuation probabilities (IEO) in fact varies over transitions (Mare 1980). The effect of social origin on school continuation probabilities is strongest for the earliest transitions within the school system and decreases over the successive transitions. One might speculate that this pattern can be attributed to the age of the students who take the decision. As they are older at later decisions, they are likely

more independent of their parents, and less influenced by their family background. If so, educational expansion will lead to declining family background effects on the final education completed, as more and more students decide upon their futures at a ever older age, when they are less influenced by their parents. Moreover, contrary to Boudon's concept of the educational career, Mare's findings point out that educational expansion not necessarily implies an increased number of decision points: as the educational distribution expands, the earlier transition points dwindle in importance and finally disappear.

However, Mare (1980, 1981) points out that the decrease of family background effects during the educational career may also be due to the operation of differential selection mechanisms within the school system. Selection takes place at each transition, based on individual abilities and other unobserved characteristics of students. These characteristics - such as intelligence, motivation and ambition - are likely positively correlated with social class of origin. When the first transition is about to be made, the group of students facing this transition is heterogeneous with respect to these abilities, still containing the brightest and dumbest, the most and least motivated and both ambitious and unambitious children. Those who 'make the grade' are a selection of this group and are as a group more homogeneous with respect to these individual abilities. Since the 'survivors' of this first transition exhibit less variation in individual abilities, the relation between social origin and these abilities is weaker at the next transition. Hence, the total effect of social origin on school continuation probabilities becomes weaker.

After Mare's seminal papers, substantial large scale research has been conducted on trends in the social class-based inequalities of educational opportunity at multiple transitions within many countries (e.g. Dronkers (1993) for the Netherlands; Simkus & Andorka (1982) and Robert (1993) for Hungary; Smith & Cheung (1986) for the Philippines; Pong (1993) for Malaysia; Mikk & Saar (1995) for the Soviet Union; Nieuwbeerta & Rijken (1996) for Bulgaria, Czech Republic, Hungary, Poland and Slovakia; Kreidl (2000) for Czecho-Slovakia). However, large-scale cross-national comparative research on this topic in which the effects of contextual characteristics are explicitly taken into account is still scarce, and has not used the transition model (e.g. Treiman & Yip 1989; Müller & Karle 1993; Ganzeboom & Treiman 1993). Moreover, while researchers have closely studied over-time and over-transition variations in IEO in their countries, none of the results speaks much to a

possible explanation.

Undoubtedly the major attempt at a study of variations in IEO over time and between countries is the large scale research-project initiated by Shavit & Blossfeld (1993). This study assembles effects of social origin on school continuation probabilities at different transitions for thirteen countries, each represented by a set of birth cohorts. Each researcher analyzed a single country. Shavit & Blossfeld compared the results of these thirteen analyses in their qualitative introductory discussion. Their main conclusions are twofold. First, they point out that for all countries the effect of social origin on educational opportunity was smaller for each successive transition within the educational career. Second, Shavit & Blossfeld conclude that the effects of social origin on educational opportunity are stable over cohorts for each transition in almost all countries. Only in the Netherlands and Sweden did IEO decrease, and mainly for the earlier transitions in the educational career. Shavit & Blossfeld attribute this finding to the "aggressive welfare state policies" in these latter two countries. By implication, they discard some of the contextual hypotheses from the literature, in particular on the influence of level of socio-economic development and political intervention.

However, Shavit & Blossfeld were unable to pool the single country data and make a conclusive cross-sectional comparison. It is not clear whether the national differences are real or whether variation in the quality and amount of data, in operationalization of the variables or in inclusion of control variables cause the results to be different from chapter to chapter. From an empirical point of view, therefore, this study amounts to little more than a collection of separate studies for thirteen countries. Their conclusions on the relative lack of over-time variations in IEO in the thirteen countries is a fair summary of the underlying studies, but they have little to say about cross-national differences, as the studies were not truly standardized in this respect.

The present study aims at building upon the design that the Shavit & Blossfeld project has provided us with. In particular, we bring together a standardized database of much larger scope, in terms of number of countries, period covered and individuals analyzed. Having access to such cross-nationally standardized data, we are able to use a much more powerful comparative design, that draws simultaneously on cross-national and cross-time variations in IEO and its contextual conditions. Finally, we aim at using this data set not only to describe

patterns of IEO, but also to test some of the major comparative hypotheses about it.

THEORY AND HYPOTHESES

What variations of inequality of educational opportunity can be expected? Such variations can occur in a number of different dimensions. Our first interest will be to determine to what extent IEO is indeed constant -- as Boudon asserted –, or displays systematic variations across time and space. Second, to what extent are such variations related to contextual conditions, in particular the economic, political and institutional characteristics of the time and place involved? In order to generalize about such comparative variations, we first need to deal with variations across the educational transitions and take these into account in our models.

As already noted above, the declining effects of social background on continuation probabilities over the career have been explained by two different mechanisms of a quite different nature and with quite different expected consequences of further educational expansion for IEO: the selection argument and the timing argument.

The selection argument was first outlined by Mare (1980) (however, see Cameron & Heckman (1998) for an in-depth criticism) and holds that declining social background effects across the career occur because of increased selectivity with respect to unmeasured characteristics in the group at risk. IEO declines over transitions because of selection of individual abilities which are correlated with social origin. By implication, expansion of education, which is evident in growing enrollments over time, results in a more heterogeneously composed group of students facing each following transition compared to previous cohorts. If the selection argument holds truth, the association between social origin and individual abilities within the group at risk increases due to the increased heterogeneity. Therefore the total effect of social origin on school continuation probabilities at a given transition should increase over time as enrollment and completion rates grow (Mare 1981) and more heterogeneous groups of students enter the higher levels of education. As a result, the effect of social origin on school continuation probabilities at each transition will depend on the relative number of students facing that specific transition. This relative number of

students increases over time at all transitions[1]. This can be expressed in the following hypothesis:

[H1] The larger the relative number of students at risk, the stronger the effect of social origin on school continuation probabilities ***(selection-hypothesis).***

If selection is the only mechanism that drives school continuation probabilities, educational expansion may maintain a balance with IEO: expansion will lead to stronger social background effects at the end of the career, and these replace the dwindling social background effects at the beginning of the career. Educational expansion produces longer careers (and higher educational investment on the parts of individuals and societies), but reproduces the same pattern of educational inequality at a later age.

A quite contrasting explanation for the declining effects of social origin on school continuation probabilities refers to the direct effect of social origin; the contribution of financial, cultural and psychological resources from one's social background, net of unmeasured abilities. Müller (1990) hypothesizes that these transfers should decrease, the higher the age at which a transition is about to be made. Students are less dependent on parental resources when they are older and are better able to make their own choices without having to negotiate the preferences or restraints of their parents. This timing hypothesis (referred to by Shavit & Blossfeld (1993) as the "life course hypothesis"), can be applied at the contextual level by assuming that the timing of a transition, as it is institutionalized in the school system, affects the influence that social origin has on school continuation probabilities. As a hypothesis, it can be formulated as follows:

[1] An exception is the number of students facing the first transition. Since there are no previous transitions, these students are not a selection from a more heterogeneous group. For this reason, the effect of social origin on the probability to survive the first transition must theoretically always be largest and will be time-invariant as long as demographic factors are unchanged, school selection criteria remain unchanged and the distribution of the selection characteristics of social

[H2] The later the timing of a transition within the organization of the school system, the weaker the effect of social origin on school continuation probabilities ***(timing-hypothesis****).*

The implications of the timing explanation of the declining pattern of school continuation probabilities during the career are widely different from the selection hypothesis. If timing is the driving mechanism behind this pattern, educational expansion is likely to produce a lower association between social background and final level completed, as the more selective transition points dwindle and the less selective ones remain and become more important in determining the final educational distribution. Educational expansion will decrease class differences in final education completed. Note however, that the timing-hypothesis has no such implication for historical trends at a given transition: these will remain constant over time. Also note, that the effect of expansion on inequality may be much dependent upon the degree to which earlier decision points are replaced by later ones. If they are not, and later decision point are added to the existing ones, expansion may still lead to greater IEO. Another important implication of the timing hypothesis is of a more policy oriented nature (Ganzeboom & Treiman 1993; Rijken 1999). If timing has the predicted independent effect on selection with respect to social background, it follows that educational policies can counter educational inequality by removing early decision points. Of course, this expectation is generally found among the arguments for comprehensive schooling.

Having specified two potential endogenous mechanisms that generate differential IEO at subsequent transitions, we can now turn to hypotheses on exogenous factors that lead us to expect variations in IEO across time and space. In the stratification literature two important factors have been proposed to explain variations in effects of social origin on achievements in later life: modernization and state-socialism. The respective arguments are well known in the general literature on social stratification and are restated by Shavit & Blossfeld (1993) as they apply to the inequality of educational opportunity.

The first argument is on the effects of the level of **modernization** or more specifically industrialization (Blau & Duncan 1967; Parsons 1970; Treiman 1970; Treiman & Yip 1989). In brief, the argument reads as follows. Increased industrialization over the 20th century has

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classes remain stable.

had the following consequences for patterns of stratification. Work has become more complicated and differentiated and qualifications have therefore become more important for getting a job. Without a diploma it is almost impossible to find a job. A highly industrialized society must be a more meritocratic society and achievement has replaced ascription for both educational and occupational success (Blau & Duncan 1967). Mass education and free education have been established since the beginning of the 20th century, which has made education available and affordable for all social classes. The lower social classes have especially benefitted from this (Treiman 1970). Associated with industrialization is the increase of urbanization which, in turn, has also led to increased availability of education for all social classes (Treiman 1970; Treiman & Yip 1989). Furthermore, the increase of mass media, means of transportation, industrialization, secularization and urbanization - all part of the process of modernization - have caused the aspirations of all social classes to converge and changed norms and values regarding educational attainment (Parsons 1970). Besides better job opportunities, schooling supplies the general knowledge necessary for all to 'survive' in the modernized world.

If this modernization argument is applied to the inequality of educational opportunity, the effect of social origin on school continuation probabilities is predicted to decline with higher levels of modernization. School selection under modernized conditions should be based primarily on achievement and less on ascription compared to school selection under less modernized conditions. With increased modernization, the direct effect of social class will determine less the probability of continuing schooling at every transition. Hence, the total effect of social origin on school continuation probabilities (IEO) should decline over time and be smaller in more modern societies. This can be expressed in the following hypothesis.

[H3] *The higher the level of modernization, the weaker the effect of social origin on school continuation probabilities* ***(modernization-hypothesis).***

The modernization hypothesis leads one to expect that IEO varies systematically across time and space and that such variations are closely connected to the level of modernization that is characteristic of a particular society at a given point in history. Moreover the modernization argument provides a number of clues how to measure modernization.

In the general literature on social stratification, the question often arises of whether stratification patterns are more influenced by policy intervention rather than by the assumed universal trend towards a more modernized society (e.g. Erikson & Goldthorpe, 1979; Heath 1981). In particular, the sudden transformation to totalitarian rule and the radical egalitarian policies consequently introduced in those societies in Eastern Europe and elsewhere which, after the Second World War or earlier, became state-socialist , may have reduced the inequality of educational opportunity (Heath 1981; Simkus & Andorka 1982; Wong 1990, Treiman, 1999). One of the stated aims of the newly established state-socialist regimes was to abolish all kinds of inequality based on class and gender. The educational systems in these state-socialist societies were subject to radical changes in an effort to redistribute educational outcomes. This led to policies aimed at promoting the opportunities of working class children, as well as at discriminating against the offspring of the former bourgeoisie. These policies resulted, for instance, in the quota system where a fixed percentage of lower class children had to be enrolled in all levels of education (Simkus & Andorka 1982). Free education was provided at all educational levels, and comprehensive schools were established to replace the dual educational system at the lower levels of education (Mateju 1993).

Several studies have been conducted to see whether the stated goals of state-socialism were achieved and whether the destratifying policies worked out as planned (e.g. Heath 1981; Meyer et al. 1979; Peschar & Popping 1986; Simkus & Andorka 1982; Wong 1995). Heath (1981) compared the status attainment model of Czechoslovakia, as a state-socialist society, with the status attainment model of England (and Wales) for a single time-period. His comparison showed similar total effects of social origin on educational attainment for both countries. Simkus & Andorka (1982) studied the effect of state-socialism in Hungary on school continuation probabilities. They found no significant differences in the influence of social origin on school continuation probabilities following the implementation of new educational policies, except for the transition to completion of primary education. Mateju, Szelényi & Aschaffenburg and Heyns & Bialecki (all contributors to the Shavit & Blossfeld (1993) volume) were also unable to find substantial effects of state-socialist policy on IEO when they looked at school transitions in Czechoslovakia, Hungary and Poland respectively. However, Treiman (1999) finds dramatic effects of the introduction of communist rule in China. However, using a highly standardized data set collected in post-communist times, Nieuwbeerta & Ganzeboom (1999) and Nieuwbeerta & Rijken (1996) find less decisive

effects of the introduction of communism in five Eastern European countries. X Hanley & McKeever.

In sum, whether state-socialism has exercised a major influence on the social class-based distribution of school continuation probabilities, remains somewhat undecided to date. However, most studies on effects of state-socialism do not empirically compare state-socialist societies with market societies, but focus on a single state-socialist society only. Most of the comparative studies mentioned here compare only few societies and often in a single time-period or for a limited number of cohorts. By comparing forty-two countries (with a more numerous representation of state socialist countries) over a long time-period, the following hypothesis may yield results different from those previously found:

[H4] *Under state-socialist conditions, the effect of social origin on school continuation probabilities is weaker than under market conditions* ***(state-socialist hypothesis).***

As with the modernization hypothesis, one could speculate whether the state-socialism effect varies across transitions, and in particular whether it has varied across time and countries, depending upon the level of orthodoxy in a country at a given point in time. We will pursue these issues further in our empirical analysis.

It is obvious that these four hypotheses taken together do not constitute a comprehensive theory of IEO and leave much room for further specification. However, we do maintain that these hypotheses constitute the broadest minimal perspective on the field of enquiry and need to be addressed first, before much progress can be made with respect to more detailed accounts of the processes that underlie educational selection.

DATA, VARIABLES AND DESIGN

The individual data used in the analyses are extracted from the International Stratification and Social Mobility File (ISMF). The ISMF is a comparative data file assembled by Ganzeboom & Treiman (2000) that currently contains some 250 X standardized survey data sets from 42 countries. A nationally representative sample of a broad age group and reliable information on father's and respondent's occupation are the selection criteria for including the

surveys in the ISMF[2]. Appendix A list all the individual studies by country and year, with some basic statistical information. Most countries in the ISMF are represented by several studies from different survey years. The ISMF aims at standardizing the studies in such a way that comparisons between countries and cohorts are easily possible (see Ganzeboom & Treiman 1993 for details). All 42 countries currently represented in the ISMF can be included in the analysis. These countries show large variations in the contextual conditions studied. Note in particular that the ISMF covers a wealth of (formerly) communist countries (N=10), with generous individual N from surveys collected both during and after communist rule. Note also, that while the ISMF is certainly biased towards higher developed countries, there is ample representation of developing nations such as India, Nigeria, China, Brazil, Malaysia, Taiwan and Turkey. The number of individual cases in the ISMF is large, as is the time-period it covers. This rich data file is exceptionally suitable for simultaneously cross-sectional comparison over time if only because of its wide coverage.

The effective ISMF samples analyzed in this study are restricted to men and women between 25 and 64 years of age with valid data on father's occupation and final education completed. Respondents younger than 25 years of age in the year of the survey are excluded because they may not yet have completed their education. The selection from age 64 onwards counters effects of selective mortality. The respondents are divided into five-year-wide birth cohorts. Respondents in the oldest cohort analyzed were born between 1898 and 1902 (only available in the USA) and respondents in the youngest cohort were born between 1968 and 1972 (in XX of the countries). Father's occupational status was standardized using the International Socio-Economic Index [ISEI] of occupational status (Ganzeboom et al. 1992, 1996), derived from the International Standardized Classification of Occupation (ILO, 1969, 1990) used to code all occupations in the ISMF.

[2] Note that the ISMF excludes student cohort data.

In reconstructing the successive levels of education completed by the respondent and the corresponding transitions made, documentation was collected on the school system of each country (cfr. Rijken, 1999: Appendix IIIb). All extant levels in each school system were reclassified into five cross-nationally comparable hierarchical levels of education. Historical changes in the school system within countries were also taken into account. All respondents were placed in one of these hierarchical levels by using information on their reported highest grade and/or years of education completed. Each individual, when placed in one of the constructed levels, is coded as having completed all previous levels. In this way, a set of dummy variables is created which indicate whether a respondent has completed the transition from one level to the next. For all but two countries[3], five hierarchical levels could be defined. The timing of the four transitions between these levels differs between countries and cohorts, but they can generally be described as follows:

Transition 0: *No formal education completed* *at least primary education, modally around age 6.*

Transition 1: *Primary education completed* *at least lower secondary education, around age 12.*

Transition 2: *Lower secondary education completed* *at least higher secondary education, most often around age 16.*

Transition 3: *Higher secondary education completed* *at least tertiary education, most often around age 18.*

The distinctions made between primary or elementary, secondary, and tertiary or higher education, and the separation of the secondary level into a lower and a higher level follows partly the common classification of the basic school system applied by the UNESCO (1976).

[3] For Israel before 1970, the year in which the Israeli school system was reformed, only four hierarchical levels of education - on basis of the Israeli data - could be distinguished. Transition 2, from lower secondary to at least higher secondary education, does not exist in Israel before the 1970 school reform and is therefore missing . In this case, transition 1 becomes automatically the transition from primary to at least secondary education. In Brazil, the 1971 educational reform caused the lower secondary level to disappear.

This internationally comparable classification also includes a pre-primary level (e.g. kindergarten) and distinguishes a lower and higher level of tertiary education, distinctions we have found impossible to maintain in many studies.

Dependent Variable: IEO

For all five-year-wide birth-cohorts within each country, and for men and women separately, a logistic regression analysis was estimated with the successful completion of a transition as the dependent variable (0 = did not complete the transition, 1 = complete the transition) and father's occupational status [FISEI] as the independent variable. The coefficients from these logistic regressions indicate the log-odds of making a transition of respondents whose fathers have the highest occupational status (ISEI-score equals 90, rescaled to 1) relative to respondents whose fathers have the lowest occupational status (ISEI-score equals 10, rescaled to 0). These logistic regression coefficients serve as the dependent variable in a OLS and GLS regression analysis at the contextual level.

The potential number of units at the contextual level is equal to the product of the initial number of countries, the number of cohorts within each country and the number of transitions within each cohort times gender (42 countries * 15 cohorts * 4 transitions * 2=5040). However, our design is incomplete for several reasons, but mainly because not all cohorts occur in all countries (and hence not all countries in all cohorts) to begin with. The cohorts born in the beginning of the century are only represented in small number of countries (such as the USA, France and the Netherlands, for which we have 1950's studies), whereas some of the more recently born cohorts are missing in a number of countries for which no data have become available as of yet. The representation of women is slightly less than of men, due to the fact that some of the major surveys that we use, have been held among men only. Furthermore, some transitions cannot be studied in all contexts, because either the transition was not defined in the relevant educational system (this is the case for Israel and Brazil), or a transition is survived by the total group at risk in the cohort or by no-one in the cohort, and consequently no effect of social origin could be computed. Finally, it occasionally happens that the social background variable (father’s occupational status) is a (near) constant in a certain combination of transition/cohort. To avoid those outliers, cohort/transition/gender groups with less than 21 individual cases or where the log-odds has a standard error greater

than 10 are left out of the analysis. The final number of contextual units included in the analysis is 3085. Out of the potential total, X% was left out of the analysis due to insufficient representation of a constant in either independent or dependent variables, the remaining XX% not being materialized due to unavailability of data. Those selected contextual cases still refer to an underlying basis of X individual cases, which is XX% of the total number of individuals in ISMF in the relevant age brackets. Seen at the level of individuals, sample attrition is mostly due to incomplete data on father's occupation (X11%) and only for X% to the further restrictions we imposed in the analyzed sample. The cases at the contextual level are weighted proportional to the precision of the estimated log-odds at the individual level, using the inverse of the sampling variance (1/se2) as the relative weight.

Independent Variables

Four hypotheses were formulated as possible explanations of variation in effects of social origin on school continuation probabilities. The first hypothesis, the ***selection hypothesis***, proposes that educational expansion, or the increase of the relative number of students at risk, enhances the effect of social origin on school continuation probabilities. An 'expansion variable' was constructed which measures the relative number of students facing a transition, expressed as a percentage of the total group at risk at the start of the educational career. This percentage is always 100% at the first transition (transition 0), since the total group of respondents about to start their educational career is at risk to make this transition. The percentage of the total group at risk that completes the first transition is identical to the percentage facing the second transition, and so on. According to the selection hypothesis, this variable is expected to have a positive effect on the effect of social origin on school continuation probabilities: as the percentages at risk increase, the effect of social origin also increases. However, we expect this effect to be non-linear and decrease as the number of students making the grade at a given transition approaches saturation.

The second hypothesis formulated, the ***timing-hypothesis***, states that the effect of social origin on school continuation probabilities declines as the institutionalized timing of the transition according to the organization of the national school system is made later in the life-cycle. The later the (institutionalized) timing of a transition, the older the students at risk of making the transition are, and the less they depend on parental resources, and the weaker the

effect of social origin on school continuation probabilities. To test this hypothesis, a 'timing variable' is created which indicates the institutionalized age at which a transition is supposed to be made. This indicator varies between countries, between transitions and for some countries also over time. The variable has been coded in such a way that it compares timing variations per transition separately by centering it around the modal age, taken over all countries. This means that the inequality of educational opportunity is analyzed within the age-range that exists at each separate transition over all countries and cohorts. X

The duration of each educational level was determined by using monographs on educational systems of single countries, expert information, and, if no such sources were found, on the basis of the data documentation (cfr. Rijken 1999). Since the constructed levels merely define a hierarchical order, some decisions had to be made on the duration of each level. At secondary and tertiary levels of education, very often there are parallel tracks of variable duration. These parallel tracks are treated as a single level of education, and therefore they have been ascribed the same number of years of duration. This means, for example, that the lower secondary level (LBO, MAVO) of the Dutch educational system is defined as taking four years to complete, while in reality there are some tracks at this level that take (took) only three years to finish. The age boundaries for the lower and higher levels of secondary education were defined on the basis of secondary tracks which, formally, take longest to complete. Timing is expected to influence the effect of social origin on school continuation probabilities negatively. We will explore whether this applies to all transitions identically.

Appendix B presents the timing of each transition identified for all forty-two countries in this study. For transition 0, the age-range is very small and covers ages 5 to 7 (-1 to +1). In Denmark, Finland, Norway, Poland, Sweden and Switzerland, students enter primary education at age 7. In England and Scotland, entry of the primary level takes place at age 5. In all other countries in this study, students enter primary education at age 6. For transition 1, the timing of entry ranges between age 10 and 15 (-2 ..+3) with Brazil (before 1970) and West-Germany at the lower boundary and Poland (after 1961) at the upper boundary. The timing of transition 2 ranges between age 14 and 18 (-2 .. +2). In Brazil, India, Italy, Northern Ireland and Turkey, students enter higher secondary education at a relatively young age (14 years old) compared to Poland (after the1961 school reform) where students enter higher secondary education not before age 18. Finally, the age range of transition 3, into

tertiary education, is between 17 and 21 years (-2 .. +2). In Brazil, Bulgaria, India, Nigeria, Northern Ireland, Philippines and Turkey, tertiary education may be entered at 17, while at the other extreme, tertiary education in Germany (before 1936) and tertiary education for Israeli males does not begin until the age of 21. (Male students in Israel have to serve the army for three years between secondary and tertiary education. Female students also enter the army after secondary education, but they stay for one year less.)

There are some historical changes in the timing of transitions within countries. In Brazil, Germany, Hungary, Ireland, Israel, Japan, Norway, Poland, Sweden and the United States, the timing of some transitions has changed during the period of study (see Figure 1).

- figure 1 -

The ***modernization hypothesis*** is the third hypothesis to be tested. With increasing modernization, achievement becomes more important relative to ascription and the stratifying effect of social origin declines. This hypothesis predicts that the direct effect of social origin on school continuation probabilities should decline with increasing modernization. To measure the level of modernization, a multiple indicator annual index was developed. This index is composed of relevant social and economic indicators from two authorative sources. For 1900-1973, data were taken from the World Handbook of Social and Political Indicators X, collected by Banks (1976). For the 1960-1997 period, similar indicators were taken from the Social Indicators and World Development Indicators collected by the World Bank (1996, 1999). Both sources are fraught with inconsistencies and incompleteness, both within and between countries. In addition, they do not provide information on some of the contexts we distinguish (such as the two linguistic parts of Canada and Belgium X EERDER TOELICHTEN, and other sub-nations such as Northern Ireland and Scotland), are incomplete with respect to non-independent countries (such as Nigeria and India in colonial times, and Taiwan). By combining multiple related indicators into one overall index, we expect to repair some of the deficiencies of the incomplete time-series. The task of combining related indicators in the presence of systematic missing data turned out to be a daunting one, about which details is provided in a separate report (Ganzeboom & Rijken, 2001). For our purposes here it suffices to say that we have selected a number of conceptually and empirically related indicators, that scale countries in a similar way with respect to the

underlying construct, ‘socio-economic level’ or ‘modernization’. Where unexpected and unexplainable interruptions occurred, we have smoothed each of the indicators within countries, usually working from the assumption that newer data are better than older data. Where incomplete, we have interpolated the series by using assumptions on the most plausible development, given trends we observed in similar countries or similar indicators. The <aldus bewerkte> indicators are standardized over countries and summed into a single modernization index. This modernization index is a continuous time series for all nations and can be used for comparisons over time and between countries. For reasons of simple interpretation it is recoded to vary between 0 and 1, which is the range between the context with the lowest level of modernization and the context with the highest level of modernization (i.e. India in 19xx and the US in 19xx respectively). In our analysis, the modernization level of a country is matched to the year in which students in the birth cohort are assumed to make a transition, i.e. *begin* the next level of education. The level of modernization at a transition is expected to have a negative influence on the effect of social origin on school continuation probabilities. We will explore whether this differs between transitions.

Finally, the fourth hypothesis to be tested is the ***state-socialism hypothesis***. This hypothesis predicts that achievement should replace ascription, but not because of modernized circumstances, but because of state-socialist interventions. These interventions are directly aimed at reducing the privileges of social elites and promoting the opportunities of lower classes. To test the state-socialism hypothesis, a simple 0,1 contrast has been constructed. Transitions made under state-socialism are coded state-socialist (1) and transitions made under market conditions are coded market (0). Transitions made in or after the year 1950 in Bulgaria, China, Czech Republic, East Germany, Estonia, Hungary, Poland, Slovenia, Slovakia, complemented with Russia (also before 1950), are considered to have taken place under state-socialist conditions, all other transitions are coded as having taken place under market conditions[4]. Again, this condition is matched to the year in which a transition from one educational level to the next occurred. The effect of social origin on school continuation probabilities is expected to be weaker under state-socialist conditions than under market-regulated conditions. We will explore whether this effect varies over different periods of

[4] Note that no post-communist cohorts are present in our data.

socialism and whether is differs between transitions.

Control Variables

The four explanatory variables - proportion of a cohort at risk, institutional timing of a transition, modernization and state-socialist condition - vary between countries, transitions, cohorts and, as far as the percentage of students at risk is concerned, also between men and women. In addition to these explanatory variables, other specific historical or national characteristics are taken into account that influence the inequality of educational opportunities but are not explicitly measured. Two state-socialist countries, for example, that are equally modernized, in which the timing of the transitions is identical and that have similar percentages of students at risk, may differ widely on other, unmeasured characteristics. It is not known whether and to what extent these characteristics influence the effect of social origin on school continuation probabilities. To account for these country-specific characteristics, country dummies are included in the OLS model. The United States serves as the reference category (X and RC model in XT analyses).

The same argument holds for specific historical factors (e.g. war, oil crisis, natural disaster, economic recession). To account for these unmeasured historical conditions, cohort controls need to be included in our OLS models. When using dummy variables, the 1940 birth cohort is the reference category. Instead of cohort dummies, unmeasured specific circumstances, varying over time, may also be taken into account by including a linear cohort term. How control variables for specific historical conditions (dummies or linear term) are best included depends on whether specific historical circumstances are gradual or catastrophic in nature.

Finally, dummy variables for the four separate transitions and a dichotomous variable for gender are used to condition the OLS analysis. The first transition (transition 0) and men are the reference categories, respectively. X It may be that between transitions, other mechanisms beside selection or timing are responsible for differences in the effect of social origin on school continuation probabilities. Whether differences in IEO between transitions are not systematic or whether they can be represented linearly will be decided by model fit criteria.

Interaction Effects

To account for changes in the effects of the explanatory variables over time and over transitions, multiplicative interaction terms will be used. The first is the interaction between birth cohort and transitions which accounts for the possibility that the effect of social origin on school continuation probabilities shows different trends over time for the transitions identified. This is in fact what the selection hypothesis predicts: that the effect of social origin on school continuation probabilities will be constant at the first transition when the percentage of students at risk equals 100% in all times, and increases at the other transitions.

The interaction between gender and cohort is the second interaction term created. This interaction indicates whether men and women have converged to or diverged from each other with respect to the effect of social origin on school continuation probabilities. When the educational distribution of men and women is observed, the average years of education completed at the beginning of this century is found on average to be lower for women, but this female average later converges to the average for men. In the most recent cohorts, in most Western societies, men and women have roughly the same average of years of education completed. The question here is whether this convergence has also taken place with respect to inequality of educational opportunity.

Note that all variables (except timing) have been rescaled to a 1 unit range to facilitate the interpretation of parameters. The reference categories are chosen to represent existing observations in the data.

Methodology

To analyze the effect of contextual macro characteristics on relationships at the micro level a two-step regression analysis is employed. This two-step strategy is an improvement on a one-step variant which would estimate variations in school continuation probabilities using, on the one hand, contextual variables and, on the other hand, individual variables (Tacq 1986). The disadvantage of such a one-step strategy is that assigning contextual characteristics to individual cases leads to small variations of the contextual variables compared to the individual variables. Problems of multicollinearity between contextual and individual

variables may occur, for instance between the status of father's occupation and the level of modernization. Tacq's (1986) proposed solution to this problem is the two-step analysis. In the first step, the effects on the individual or micro level are estimated within each context. These estimated effects are analyzed as dependent variables in a second step after they have been matched with the contextual variables.

A disadvantage of the two-step analysis procedure is that these estimated individual effects have varying standard errors which influence the second step analysis. To deal with this variation in the standard errors of the effects at the individual level, a weighting procedure is a satisfactory solution. All contextual cases are weighted by the inverse of the variance (the squared standard error) of the logistic regression parameters estimated in the first step.
The contextual data-matrix constructed consists of 3085 cases and has four dimensions: countries, cohorts, transitions and sex. To analyze this complicated pooled time-series model, first a least square dummy variable analysis (LSDV) is applied (Stimson 1985, Sayers 1989). In a LSDV model, dummies are included for every dimension of the data-matrix to account for unmeasured context variations. To estimate a complete LSDV model, it is necessary to include country dummies, cohort dummies, transition dummies and the variable for sex. A baseline model is estimated by replacing dummies by linear terms if possible. The explanatory variables are then added to this baseline model.

While LSDV models are adequate tools to analyse pooled time-series data, they are inefficient because they consume so many parameters. More efficient models can be generated by using the random coefficient assumption, i.e. the idea that the contexts in our design constitute a random sample from an underlying distribution. The peculiar composition of this distribution can be taken into account by introducing statistical moments into a generalized least squares model. We have Stata’s weighted heteroskedastic and XTGLS model with autocorrelation as the most applicable tool for our problem. This model will estimate a set of coefficients like in a simple pooled regression, but using the following specification:

- Weights: units are weighted proportional to the precision found in the first level analyses, i.c. 1/se2.
- Heteroskedasticity: each of the panels (in our analysis constituted by a combination of

country, transition and gender) is characterized by its own variance. This feature partly overlaps with the use of weights (panels generated from smaller underlying N have large variances), but not entirely: some panels have intrinsically more variance than others.

- Autocorrelation: the over-time trends within panels are assumed to follow a first order autoregressive process (AR1), implying that each unit resembles its two neigbours in time more than the other units, over and above the correlation implied by the X-variables in the model. We assume this autocorrelation to be the same in all panels.

Stata provides both a one-step and an iterated estimation of the model. The iterated versions take relatively long to estimate, but gives considerably more stable results.

ANALYSES AND RESULTS

We estimate our models first using a Least Squares Dummy Variables (LSDV) design, a fixed effects model with a cohort term and a set of dummies for the countries to do justice to the XT nature of the data.

We started our LSDV analysis by estimating a baseline model by regressing the logodds (Bfis) which resulted from the first step logistic regression analysis on a complete set of country dummies, cohort dummies, transition dummies, interactions between cohort and the separate transitions, sex and the interaction between sex and cohort. We then trimmed down the modek by replacing dummies with a linear or curvilinear term. This resulted in a model in which the set of country dummies, transition dummies, sex and the interaction between the separate transitions and cohort remain included. The set of cohort dummies could be replaced by a linear term and is represented by the interactions between cohort and transitions. There existed no significant interaction between sex and cohort and therefore is not been taken into account in any of the following analyses, whether it is LSDV or XTGLS regression.

Taken together, this leads to the coefficients of model A in Table 1. Model A is the baseline model which shows how IEO differs between transitions, over time for the separate transitions and between men and women, if no context characteristics are controlled. In model B, the percentage at risk facing the transition to a next educational level and the square of this term are added. Model C includes the timing of a transition to the previous model and

this is investigated in a more detailed way in model D, where the timing of each separate transition is taken into account. In model E, the effects of modernization and state-socialism are computed by adding a dummy for state-socialism and the modernization index to the model. The effect of state-socialism is studied in further detail in model F and G, where first the effect of state-socialism over time (XX this differs between LSDV and GLS regression) is specified and second the effect of state-socialism on each separate transition is included. In model H, the effect of modernization on each separate transition is studied and finally in model I all context characteristics in the most detailed way are added to the baseline model.

Model A of Table 1 (LSDV regression) shows that IEO on the transition to primary education (transition 0) for men (in the USA -- the reference category) in 1940 equaled 3.87 (intercept), which means that men with the highest social background had a 48 ($e^{3.87}$) times higher chance to successfully make this transition than men with the lowest social background. IEO is somewhat smaller for women than for men (-.14) and is much smaller on transition 2 and 3 compared to transition 0 (and 1). Over time (cohorts), IEO decreases fast at transition 1, the transition into (lower) secondary education, but it *increases* over time at transitions 2 and 3. This model explains 28% of the variance.

When the percentage at risk is added (model B) the explained variance increases to 32.5%. The effect of the percentage at risk follows a curvilinear pattern. IEO increases until 93% of the total birth cohort is at risk, and starts to decrease after this percentage is reached. This changes some of the other coefficients dramatically: all trend coefficients are now negative and significant, whereas none the intercepts of these interactions, representing the level of IEO in 1940 differs from one another. In other words: as soon as we control the selection effects in our model, all the transitions start to resemble each other very strongly, in terms of degree of inequality and its historical trends. Most significantly, what appears to be significant trends towards greater inequality at the higher secondary and tertiary entry levels (transitions 2 and 3), turn into significant trends towards more equality once we take into account that the groups at risk here are becoming less selected over time. Controlling expansion also diminishes the male/female difference in IEO to insignificance: once we take in account that women's educational distributions are less expanded than men's, there is no difference anymore in how father's occupation influences men's and women's education.

The institutionalized timing of a transition does not significantly affect IEO as can be seen in model C. Whether students in a given educational system make a transition at an earlier or a later age, does not affect their outcomes in a generic way. To study this in more detail, model D presents the effect of timing for each transition separately. The inclusion of the separate interaction terms shows us the underlying pattern. Despite the negative sign, timing has no effect on the first and second transition within the educational system. At the third and fourth transition, however, timing has a significant positive effect. This means that within school systems where the transition to the higher secondary or tertiary level is made at a higher age, IEO is higher than when these transitions are made at a lower age. This goes contrary to our initial timing hypothesis, which held that later timing decreases IEO. Note that the timing effect at transition 0 is nominally rather large (-.23), but is accompanied by a large standard error. In effect, this means that we have very limited variation in ages of entry into primary school and cannot decide on its effects.
In model E, state-socialism and the level of modernization are added to explain variations of IEO between transitions and over time. State-socialism has a negative effect on IEO as expected. In state-socialist contexts, IEO is 1.4 times smaller than in market regulated contexts. The level of modernization, however, does not affect IEO at all. This may be a statistical artefact which is a consequence of including country dummies and cohort terms to our LSDV models. However, the nominal effect of modernization is rather large, as is its standard error. A random coefficient model, which is a next step in the analysis, may repair possible co-linearity problems.

In model F and model G, the effect of state-socialism is studied in a more detailed way, first, by testing whether IEO declined when state-socialist policy was implemented in 1950 and whether it gradually converged to market regulated circumstances when state-socialism became less rigid over time. Second, we study the effect of state-socialism at the separate transitions. Model F suggests that IEO under state-socialist circumstances definitely converges to market conditions as can be seen at the coefficients of state-socialism and the interaction between state-socialism and cohort (X better between socialism and year??). The convergence of IEO under state-socialist circumstances to market conditions is of such an extent that by 1990 - when extrapolated - IEO is significantly greater in (former) state-socialist societies than in market regulated societies (assuming convergence is equal for all transitions). Model G shows the effects of state-socialism on the separate transitions.

Especially IEO at the transition into primary (transition 0) and into higher secondary education (transition 2) became significantly smaller under state-socialist circumstances.

In model H, the effect of modernization is studied to greater detail by including the effect of modernization at the separate transitions. Although the explained variance increases compared to model F, the interactions between modernization and the transitions display no significant effects at all. Here the same statistical problem may operate as was already mentioned for model E.

Finally, model I includes all contextual characteristics to their fullest detail. Almost 34% of the variance in IEO is explained. The effect of the percentage at risk follows a curvilinear pattern which does not reach its maximum within the 0 to 100% range (102%). Timing significantly affects only the transition to higher secondary education. The higher the age at which this transition is made, the higher IEO. State-socialism decreases IEO at transition 0 and transition 2, but over time, IEO under state-socialist circumstances rapidly increases and at the end of the 20th century is higher than under market circumstances. The level of modernization does not significantly affect IEO at any transition.

Table 2 presents the results of an XTGLS analysis on the same dependent variable, the logodds of successfully making a transition by students with the highest possible social background (i.e. father's occupation) relative to students with the lowest possible social background. XTGLS is a more parsimonious way to model the data because it considers countries and time units as selected from a random distribution and they need not to be taken into account by including dummies. Furthermore, XTGLS allows to adjust for autocorrelation (between the time units) and heteroskedasticity (differences in variation between the countries). One can expect autocorrelation because adjacent cohorts from the same country are likely to resemble each other more than other cohorts due to unmeasured historical influence. Cross-sectional heteroskedasticity may appear because unmeasured contextual conditions of IEO may differ between countries, making the variations between observations larger in one country than the other. Both autocorrelation and heteroskedasticity turn out to be significant in our data and are included in our estimation procedures. The same models as with the LSDV procedure are estimated.

Model A shows that compared to transition 0, IEO is weaker at transition 2 and transition 3. In other words, after the transition into lower secondary education has been made (transition 1), IEO declines over transitions. (Estimated at 3.87 in 1940, which in these models refers to the situation in the average of the 42 countries.) IEO declines rapidly over time for the transition into lower secondary education, and *increases* for the transition into tertiary education. IEO is not significantly higher for men than for women. Compared to the LSDV regression analysis in Table 1, the coefficients roughly display the same pattern, except for the decrease of IEO over time for transition 2, which disappears when the XTGLS procedure is applied. The model has also changed with respect to the difference in IEO between men and women, which loses its significance in the XTGLS model. A modest autocorrelation of .298 is estimated for model A in the XTGLS analysis.

In model B, the percentage at risk and its square are added to the baseline model (model A). As shown by the coefficients, the effect of the percentage at risk follows a curvilinear pattern which reaches its maximum if 67% of all students of a cohort are at risk to make a transition. Including this selection criteria diminishes the initial increase of IEO over time at transition 3. Since the maximum of the curvilinear effect of percentage at risk is at a earlier point compared to the LSDV analysis, the regular pattern of decreasing IEO over cohorts for all transitions which was found in Table 1 is less visible here. In our data, for transition 1 and also for transition 2, the percentages at risk mostly exceed the 67% breaking point, especially at the later time units for most countries. This worked differently in the LSDV analysis, where a much later inflection point was found. Another difference compared to model A is the now significant difference in IEO between men and women. On average, the percentage at risk for men is greater than for women, but it exceeds the 67% breaking point for both.

In model C, the variable for institutionalized timing of the transitions is included. This has no significant effect on IEO and does not affect the other parameters in the model compared to the previous model. The standard errors of the separate transition dummies double or even triple, which may indicate xxx. To further investigate the effect of timing, the timing at the separate transitions is included in model D. These interaction effects show that timing does matter, but only at transition 1 and transition 2. According to these coefficients, educational systems with a *late* transition into lower secondary education (i.e. extension of the primary

level) or an *early* transition into higher secondary education (with no or short length of lower secondary education) have relatively low levels of IEO at those transitions. Another way of interpreting this finding is that educational systems with a separate and extended lower secondary part (that starts early and ends late) enhance IEO. These findings partly contrast with earlier results from the LSDV analysis where timing affected the last two transitions (transition 2 and transition 3). The significant negative effect at transition 1 in this analysis is a most important finding, as it bears on issues hotly debated in educational policies, such as early versus late selection of teenagers and the effects of comprehensive secondary schooling. Our result speak in favor of those who argue that later selection and extended primary (and comprehensive) schooling drives down IEO.

In model E the effect of state-socialism and modernization are investigated by adding the dummy for state-socialism and the modernization index to model D. In this model, the largest deviations from the LSDV regression analysis appear. First, state-socialism does not affect IEO when measured as a over-all difference. Second, the level of modernization has a significant and huge effect on IEO in the predicted direction. The higher the level of modernization, the lower IEO. Going from the lowest developed context (scaled at 0) to the most modern (scaled at 1), takes away more than 90% of the multiplicative effect (exp(-2.38)=.09). More importantly, the level of modernization partly accounts for the decrease of IEO over time as can be seen at the interactions between the separate transitions and cohort. Furthermore, the intercepts of IEO at the separate transitions (referring to cohorts in 1940 in countries at average level of modernization) change compared to the previous model, and become more similar to one another. Controlling modernization brings out the fact that IEO at the different transitions behaves in much the same way, once they are observed in a similar setting.

In model F and G the effect of state-socialism is further examined by including an interaction between state-socialism and transition-entry-year in model F and adding the effect of state-socialism for the separate transitions in model G. The state-socialism coefficients in model F resemble those of the LSDV regression analysis. State-socialism initially decreases IEO but over time bounces back to an even higher level of IEO than found for market societies with similar values of the control-variables. Model G further shows that state-socialism mainly affected IEO at the first and third transition (into primary and into higher secondary

education, respectively), as was already found earlier in the LSDV regression analyses. At those transitions, IEO is weaker under state-socialist conditions than under market regulated conditions.

In model H, the effect of the level of modernization is further specified for each separate transition. This has major implications for the other coefficients in the model. It appears that modernization drives down IEO at all transitions, but most strongly at transitions 0 and 1. Furthermore, controlling the effect of modernization for each separate transition causes the curvilinear effect of the percentage at risk to shift. The maximum of IEO is now shifted to 94% at risk, meaning that only after this maximum has been reached, IEO starts to decline again. Of course, this will be the case in considerably less countries and time periods than for the critical value of 67% found in model B. The value of 94% resembles the value found in the LSDV analysis. Another striking observation can be made by comparing the decrease of IEO over cohorts with previous models. With the exception of the first transition, IEO now decreases significantly over time for all transitions. The fact that this over-time decrease of IEO becomes larger for the last two transitions compared to all previous models is due to the change of the maximum for the effect of the percentage at risk and is not directly caused by controlling the level of modernization at the separate transitions. Thus: modernization and a higher percentage of students at risk have offsetting effects on IEO. IEO is smallest when the percentage at risk approaches zero and the level of modernization is highest, a combination which is not likely to exist in reality.

Finally, in model I all context characteristics are added to model A in the most detailed manner. Controlling all specified context characteristics results in a decrease over cohorts of IEO at transition 1 and transition 3; the negative trend at transition 2 is not statistically significant. IEO is significantly smaller for women than for men. An increase of the percentage at risk increases IEO until a maximum of 94% has been reached. If 94% or more students are at risk, IEO declines. Timing negatively affects IEO at the transition into lower secondary education, as expected, but positively affects IEO at the transition into higher secondary education. For students who were at risk of a transition in the early days of socialism, IEO is smaller at the transition into primary and at the transition into higher secondary education. Over time, however, IEO under state-socialist conditions increases to such an extent that it finally exceeds IEO under market conditions. A high level of

modernization, especially at the transitions 0 and 1, diminishes IEO. Most of these findings reflect coefficients in the earlier models with only minor changes. The XTGLS model has a remarkable capability to disentangle the complicated contextual and institutional conditions of IEO.

CONCLUSIONS AND DISCUSSION

In this paper, the effect of social origin - measured by father's occupation - on school continuation probabilities (Inequality of Educational Opportunity: IEO) is analyzed in a comparative perspective. Variations of IEO between four successive transitions within the school system are compared over five-year-wide birth cohorts (1900 to 1970), between 42 nations and between men and women. Our aim was to establish which contextual conditions explain variations in the inequality of educational opportunity. The contextual conditions investigated are (1) educational expansion, measured as the percentage of students at risk at a transition, (2) the institutionalized timing of a transition within the organization of the school system, (3) the level of modernization and (4) political conditions measured as differences between state-socialism and market regulation.

When the results of the contextual analyses are evaluated, the following conclusions can be drawn. As already anticipated in earlier studies (Mare 1981), an increasing percentage of students at risk strongly enhances the effects of father's occupation on school continuation probabilities (*selection-hypothesis*). In other words, educational expansion by itself leads to an increase of inequality of educational opportunity at the higher level transitions over cohorts[5]. However, this increase levels off when the group at risk approaches the maximum of 100%. In fact, out final estimates suggest that it begins to decline once 93% or more students face a transition. A higher percentage of students at risk indicates more heterogeneity of individual abilities of students about to be selected. Since these individual abilities and social origin are correlated, a growing percentage of students at risk leads to an increase in IEO. The fact that IEO begins to decline once the maximum heterogeneity is approached may be explained by the mechanism proposed by Raftery & Hout (1993). They

[5] Note, however, that this over transition and over time increase of IEO does not necessarily result in an increase of inequality of final level of education attained.

argue that if, and only if 100% of the elite class completes a transition, the IEO will decline. When almost 100% of the students face a transition, it is likely that, from this group, at least all the students from the elite class (100%) successfully complete the transition.

*The **timing-hypothesis***, holding that students become less dependent of parental resources as they grow older and therefore experience less effect of social origin on their school continuation probability if comparable transitions are made at an older age, is not fully supported by our results. While timing has significant effects, they are more complicated then anticipated. The timing hypothesis pans out for the second transition we studied, the transition between primary and secondary school. This is a most relevant finding, as the timing of this transition is most variable between educational systems and probably the most focussed on in discussions about educational reforms. That timing has no effect on IEO at the earliest transition (on whether one completes primary school or not), should perhaps be no surprise, as this transition is not well represented in our data (and neither in educational distributions of modern societies). Also important is our finding that educational systems in which the transition from lower secondary to higher secondary education is made at a younger age, show less inequality of educational opportunity at this transition than if this transition is made at a later age. This finding is contrary to the prediction of the timing-hypothesis. One plausible interpretation is that educational systems with extended (lower) secondary education drive up family background effects. In such systems, lower secondary exams will often be regarded as final qualifications, and entry into higher levels is highly selective.

While the dominant effect of educational expansion is to increase the inequality of educational opportunity at the separate transitions within the school system, we observe at the same time a general historical trend towards less inequality of educational opportunity. Given this trend, we can predict that inequality of educational attainment, as measured by ***final level obtained***, will decrease over time, in particular when the dispersion in the educational distribution declines, as has been found in other studies using the ISMF (Ganzeboom & Treiman 1993; Rijken 1999). This trend towards less IEO is partly offset by the expansion of education and occurs at all four transitions, but most prominently in the middle of the educational distribution, the secondary level. Also this downward historical trend in IEO can be explained to a some extent by variations in the level of modernization

(*modernization-hypothesis*). Differences between countries in their level of IEO and a decline of IEO over time do seem to coincide with their level of modernization.

Finally, it was found that state-socialist conditions in some respects favor the offspring of lower class parents relative to those of higher social origin, compared to market regulated conditions **(*state-socialism hypothesis*)**. This is the case for two of the four transitions, namely the completion of primary education and the completion of higher secondary levels. The influence of state-socialism is most visible when we allow for changes in it over time: socialism started with an acute disruption of existing patterns, but during the later parts of the 20th century IEO in these countries bounced back and is found to be even higher than in similar market societies.

If these results are compared with results from previous research and specifically those in the Shavit & Blossfeld (1993) volume, certain differences can be pointed out and perhaps explained. First of all, the present results strongly favor Mare's hypothesis of differential selection. It would therefore be interesting in subsequent research to include measurements of individual abilities - such as intelligence - to more deeply disentangle the mechanisms of selection processes. The lack of comparative data on individual abilities unfortunately makes this approach, so far, a difficult one to undertake.

A second interesting observation that can be derived by comparison of this and previous studies is the finding of two trends that offset each other: a general downward trend of IEO over cohorts caused by modernization, and an upward trend of IEO due to educational expansion. In the Shavit & Blossfeld volume, all countries but two experienced stable effects of social origin on educational opportunities over time at all transitions. This stability may be produced by the fact that overall the IEO declines historically, but at the same time the global trend of educational expansion operates in the reverse direction, as is demonstrated by our analyses. If the percentage of students at risk is taken into account, it is convincingly clear that inequality of educational opportunity decreases over cohorts. This result strongly supports pooled country comparative research and the inclusion of contextual characteristics in order to test contextual hypotheses.

Thirdly, the present analyses demonstrate a large effect of state-socialist conditions. In

former research - the Shavit & Blossfeld volume and other - no substantial effect of state-socialist conditions was detected. Only Simkus & Andorka (1982) found state-socialism to affect the IEO at the transition from primary schooling to at least secondary education (but see Treiman (1999) for similar findings on China). When recalling that state-socialist policy was specifically aimed at abolishing class inequality by intervening in the allocation process of work and schooling, the present results appear to confirm the effects of this policy. The fact that our analyses are conducted over countries and over time simultaneously, rather than over time only, may help to understand the significance of the effect of state-socialism.

Finally, we point to some shortcomings of our study and discuss directions of potential improvements. First, our study -- like most of the existing literature -- uses highest level of education completed to reconstruct educational careers. There are several potential pitfalls to this methodology. The model of the educational career that we (re)construct is a highly stylized one, and skips over actual transitions made during the life-course. Moreover, most of the calculated years of transition are indeed reconstructions, and necessarily rather imprecise. A second, and somewhat related problem, is that we conceive of the educational distribution as a singular hierarchy. It has sometimes been argued that this conception fits best the American context in which it originated, and is not applicable to the more European educational systems that use parallel tracks to educate students of differential ability. Some recent research has indeed given up on the hierarchy assumption and has resorted to models that treat tracks as parallel choices (Breen & Jonsson 2000, Kreidl 2000). While we think that such a multinomial treatment of different tracks denies the very essence of educational selection, it must be admitted that our hierarchical treatment of such systems is not without problems either.

An interesting way to extend the present study would be to use full educational career data to test the hypotheses. In such data, the relative (rank) order of tracks and the exact timing of decisions can be better resolved, and they would provide additional testing ground for the timing-hypothesis, because not only the institutional age, but also the actual age of transition varies. Preliminary work on the Netherlands by Fischer (1998) suggests modest confirmation of the timing hypothesis in this respect.

Of course, apart from the design used, some reservations can be held with respect to the data

used, general population sample surveys as standardized in the ISMF. In constructing and using this data-set, as a rule it was decided to err on the conservative side and be as liberal as possible with respect to data variability and quality. In further analysis, we hope to be able to bring in control variables that measure and correct problems and deficiencies in our data. This seems in particular relevant for educational distributions that we have equalized across surveys from the same countries. In the present version of paper, we use a simple selection measure (the percentage at risk) to forge comparability between transitions. Including more details on the particular selection involved may further help to compare the incomparable.

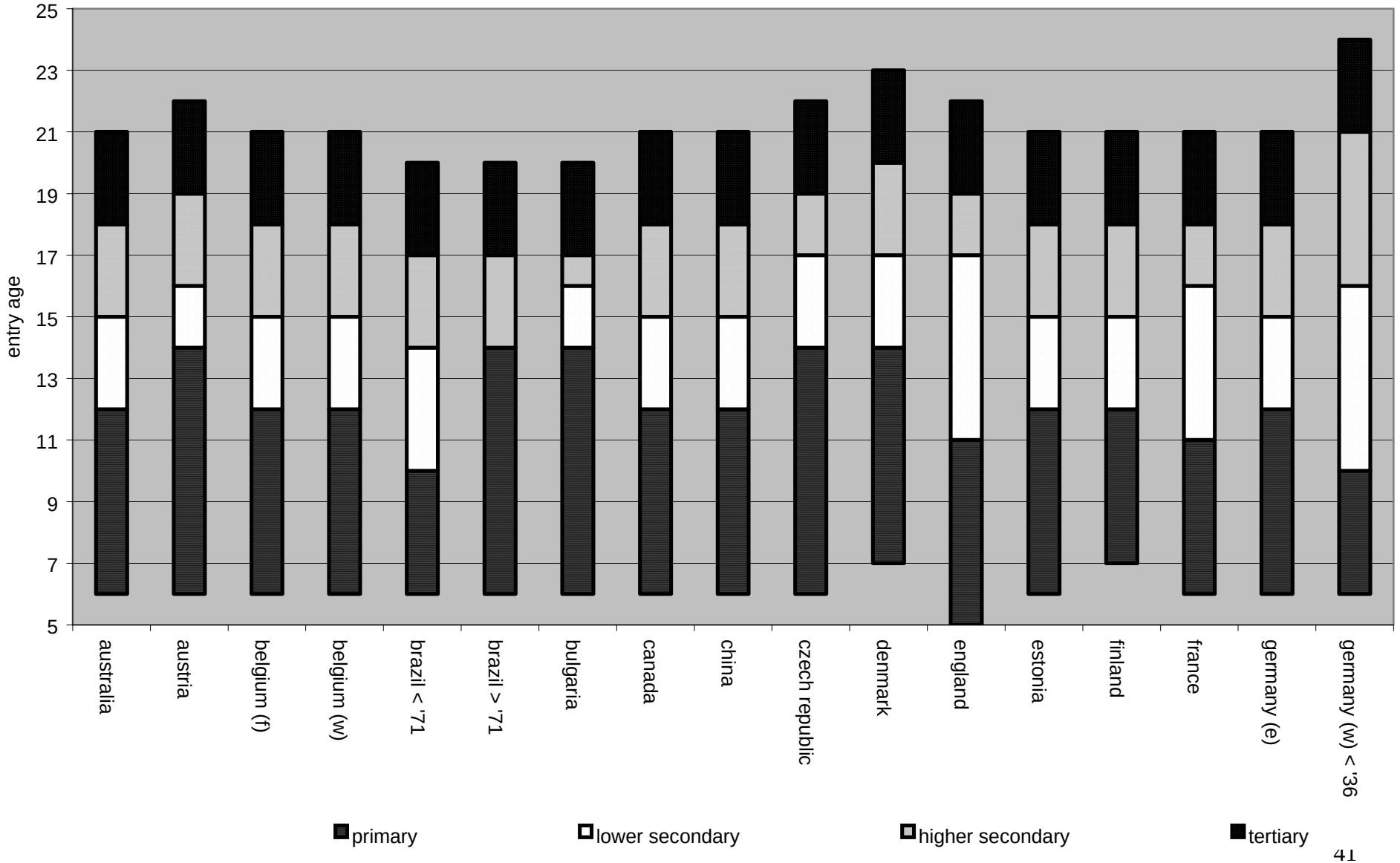
Finally, at the theoretical level, we have only begun to look at potential conditions and mechanisms of IEO. The effects of selection, timing, modernization and state-socialism are important factors to be studied, but certainly not the only and maybe not even the dominant ones. Both the modernization and state-socialism hypotheses can be further differentiated and their empirical measures further specified. Of even more relevance may be to go beyond the level of global characteristics and relate IEO to characteristics of the educational institutions and policies in a given country.

Table 1 OLS LSDV regression analysis

Model:	A	B	C	D	E	F	G	H	I
Coefficients of country dummies not shown here (N=41, USA=reference)									
transition 0 (to primary)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
transition 1 (to lower secondary)	.06(.09)	.30(.10)	-.06(.23)	.35(.10)	.31(.11)	.39(.11)	.28(.12)	.34(.33)	.17(.34)
transition 2 (to higher secondary)	-.93(.09)	-.16(.15)	-.71(.35)	-.06(.15)	-.12(.17)	.02(.17)	.02(.17)	-1.19(.41)	-1.09(.43)
transition 3 (to tertiary)	-1.72(.09)	-.22(.18)	-.91(.44)	-.21(.18)	-.28(.20)	-.10(.21)	-.27(.21)	-1.14(.47)	-1.54(.49)
cohort * transition 0	-.45(.44)	-.91(.43)	-.92(.43)	-.94(.43)	-1.22(.57)	-.57(.59)	-.16(.61)	-.46(.59)	.06(.62)
cohort * transition 1	-2.26(.32)	-2.92(.32)	-2.99(.32)	-2.95(.32)	-3.28(.53)	-2.56(.54)	-2.72(.55)	-2.47(.55)	-2.59(.56)
cohort * transition 2	.68(.33)	-1.76(.39)	-1.81(.39)	-1.90(.39)	-2.28(.59)	-1.60(.60)	-1.22(.60)	-2.11(.62)	-1.65(.63)
cohort * transition 3	1.21(.36)	-1.40(.39)	-1.40(.39)	-1.42(.40)	-1.83(.62)	-1.15(.63)	-1.28(.63)	-1.36(.65)	-1.62(.66)
male	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
female	-.14(.06)	-.08(.05)	-.08(.05)	-.07(.05)	-.08(.05)	-.07(.05)	-.07(.05)	-.09(.05)	-.09(.05)
percentage at risk		1.70(.25)	1.76(.25)	1.84(.25)	1.80(.25)	1.82(.25)	1.78(.25)	1.69(.29)	1.67(.29)
(percentage at risk)^2		-3.81(.49)	-3.75(.49)	-3.58(.50)	-3.65(.50)	-3.73(.50)	-3.67(.50)	-2.81(.60)	-2.66(.61)
timing			.06(.04)						
timing * transition 0				-.23(.26)	-.26(.26)	-.28(.26)	-.27(.26)	-.35(.26)	-.34(.26)
timing * transition 1				-.02(.04)	-.03(.05)	-.01(.05)	-.06(.05)	-.04(.05)	-.07(.05)
timing * transition 2				.14(.06)	.14(.06)	.15(.06)	.22(.07)	.11(.06)	.17(.07)
timing * transition 3				.20(.07)	.19(.07)	.20(.07)	.22(.07)	.13(.08)	.13(.08)
state-socialism							-.36(.15)	-.56(.16)	-.46(.16)
state-socialism * cohort						3.86(.77)	3.87(.77)	3.58(.77)	3.63(.77)
state-socialism * transition 0							-1.05(.27)	-1.06(.27)	
state-socialism * transition 1							-.24(.21)	-.22(.21)	
state-socialism * transition 2							-.98(.20)	-.80(.21)	
state-socialism * transition 3							-.26(.20)	-.12(.20)	
modernization						.84(.76)	-.91(.83)	-.99(.83)	
modernization * transition 0							-1.40(.87)	-1.58(.87)	
modernization * transition 1							-1.19(.88)	-1.26(.88)	
modernization * transition 2							.48(.91)	.14(.91)	
modernization * transition 3							.09(.95)	.26(.95)	
intercept	3.87(.13)	2.85(.19)	3.24(.30)	2.81(.19)	2.16(.63)	3.52(.68)	3.70(.68)	3.68(.70)	3.92(.71)
adjusted R^2	.2783	.3253	.3258	.3273	.3281	.3334	.3375	.3363	.3398
degrees of freedom	49	51	52	55	57	58	61	61	64

Table 2 XTGLS regression analysis

Model:	A	B	C	D	E	F	G	H	I
transition 0 (to primary)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
transition 1 (to lower secondary)	.14(.09)	-.01(.09)	-.06(.18)	.02(.09)	.39(.10)	.39(.10)	.23(.10)	.47(.10)	.32(.11)
transition 2 (to higher secondary)	-1.08(.09)	-1.37(.10)	-1.44(.26)	-1.19(.11)	-.36(.14)	-.37(.13)	-.42(.14)	-.40(.14)	-.43(.15)
transition 3 (to tertiary)	-1.79(.09)	-1.79(.11)	-1.87(.32)	-1.69(.11)	-.61(.16)	-.64(.16)	-.84(.16)	-.79(.17)	-1.08(.17)
cohort * transition 0	-.79(.48)	-.72(.48)	-.71(.48)	-.72(.47)	.24(.49)	.14(.48)	.56(.49)	.51(.52)	1.07(.52)
cohort * transition 1	-2.44(.27)	-2.46(.26)	-2.46(.26)	-2.38(.26)	-1.67(.26)	-1.73(.26)	-1.91(.26)	-1.43(.27)	-1.56(.28)
cohort * transition 2	-.03(.22)	.03(.24)	-.04(.24)	-.24(.24)	-.18(.23)	-.27(.23)	-.15(.23)	-.55(.26)	-.37(.26)
cohort * transition 3	.81(.26)	-.23(.24)	-.25(.24)	-.23(.24)	.02(.24)	-.31(.24)	-.40(.25)	-.68(.26)	-.98(.27)
male	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
female	-.08(.05)	-.20(.05)	-.20(.05)	-.22(.05)	-.19(.04)	-.18(.04)	-.17(.04)	-.21(.04)	-.21(.04)
percentage at risk	-.27(.15)	-.24(.15)	-.11(.15)	1.14(.19)	1.15(.18)	1.11(.18)	1.20(.20)	1.15(.18)	
(percentage at risk)^2	-3.86(.38)	-3.82(.38)	-3.45(.38)	-3.59(.37)	-3.43(.36)	-3.43(.36)	-2.59(.43)	-2.40(.43)	
timing	.01(.02)								
timing * transition 0	.49(.61)	.11(.59)	.17(.58)	.22(.59)	.03(.58)	.06(.59)			
timing * transition 1	-.11(.03)	-.08(.03)	-.08(.03)	-.13(.03)	-.07(.03)	-.11(.03)			
timing * transition 2	.26(.04)	.20(.04)	.18(.04)	.27(.05)	.19(.04)	.29(.05)			
timing * transition 3	-.07(.06)	.07(.06)	.06(.06)	.06(.06)	.01(.06)	-.00(.06)			
state-socialism	.09(.08)	-.58(.12)	-.50(.12)						
state-socialism * entry year	4.26(.59)	3.70(.59)	4.33(.59)	3.65(.58)					
state-socialism * transition 0	-1.42(.23)	-1.46(.23)							
state-socialism * transition 1	.07(.18)	.06(.18)							
state-socialism * transition 2	-1.07(.17)	-1.01(.17)							
state-socialism * transition 3	-.26(.14)	-.06(.15)							
modernization	-2.38(.23)	-2.41(.22)	-2.37(.22)						
modernization * transition 0	-3.15(.43)	-3.28(.42)							
modernization * transition 1	-3.18(.34)	-3.12(.34)							
modernization * transition 2	-1.85(.35)	-1.91(.35)							
modernization * transition 3	-1.38(.39)	-.91(.40)							
intercept	3.80(.08)	4.30(.11)	4.35(.20)	4.22(.11)	3.79(.12)	3.78(.11)	3.90(.12)	3.68(.12)	3.80(.12)
wald chi2	1242.69	1408.11	1411.08	1466.39	1789.74	1958.16	2071.01	1979.88	2124.33
loglikelihood	-5405.43	-5386.95	-5378.08	-5370.02	-5344.11	-5329.99	-5323.18	-5326.03	-5319.37
degrees of freedom	8	10	11	14	16	17	20	20	23
AR (1) coefficient	.298	.294	.295	.290	.281	.258	.259	.260	.260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austria
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brazil > '71
bulgaria
canada
china
czech republic
denmark
england
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finland
france
germany (e)
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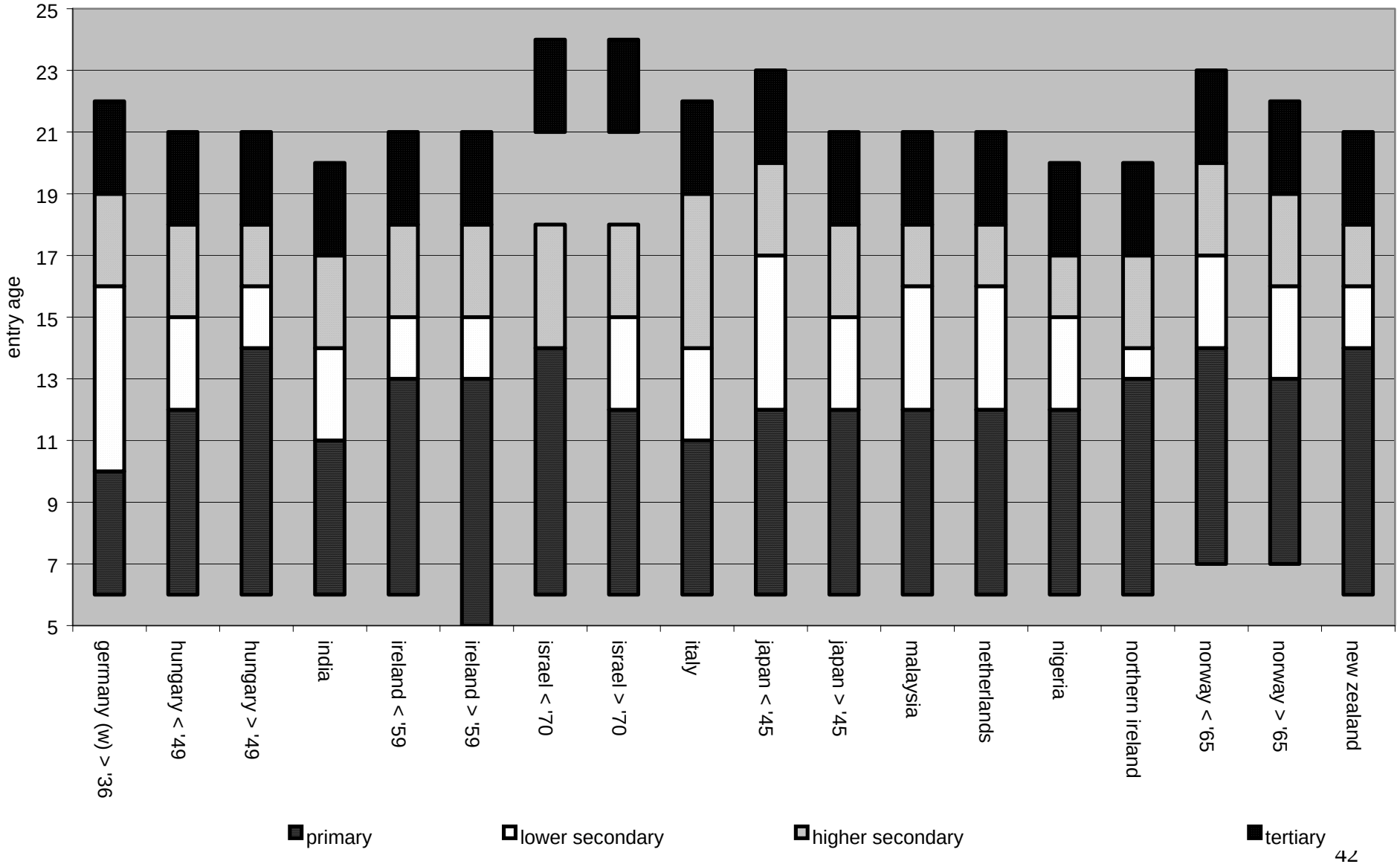
primary
lower secondary
higher secondary
tertiary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india
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israel < '70
israel > '70
italy
japan < '45
japan > '45
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norway < '65
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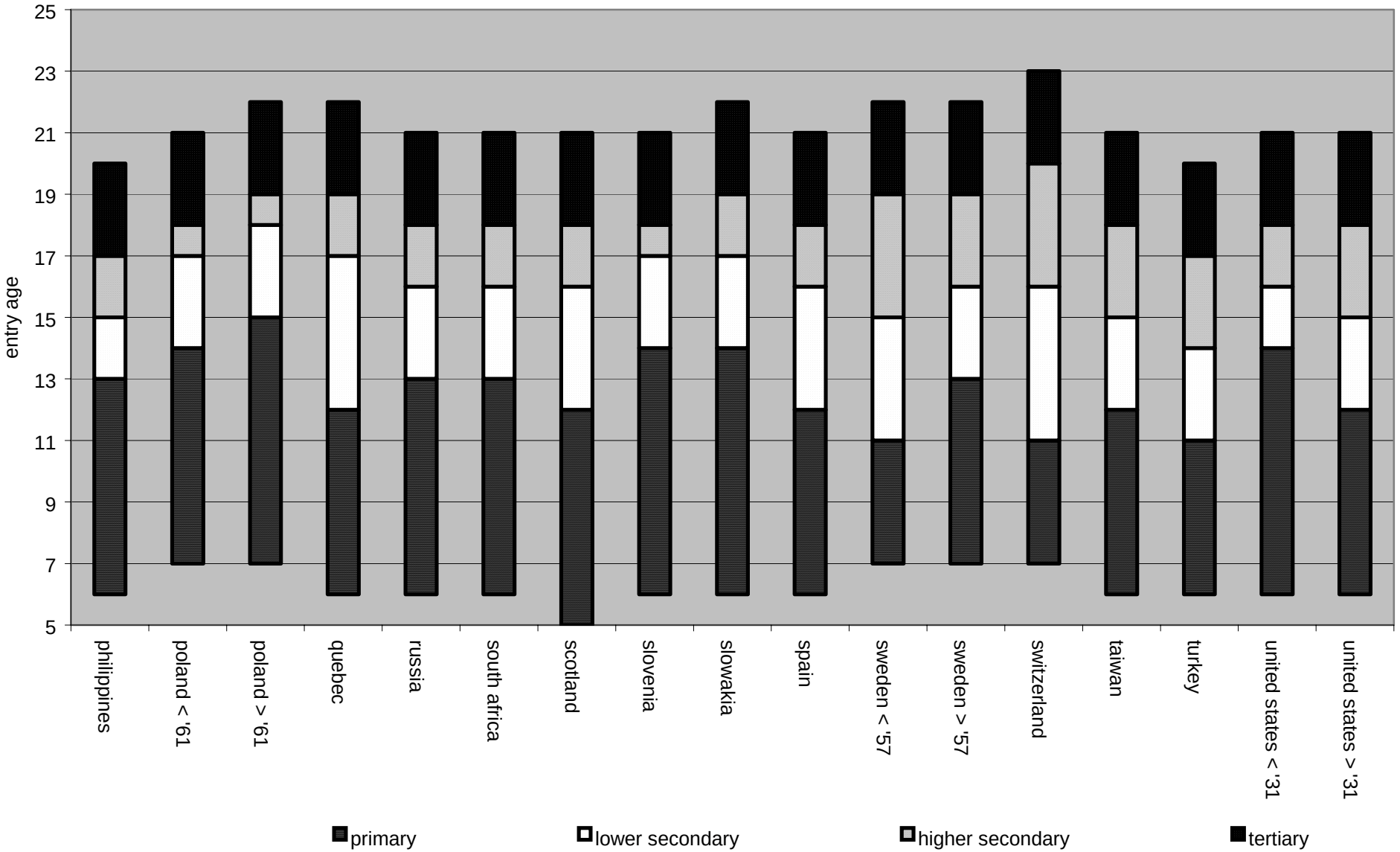
new zealand
primary
lower secondary
higher secondary
tertiary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slowakia
spain
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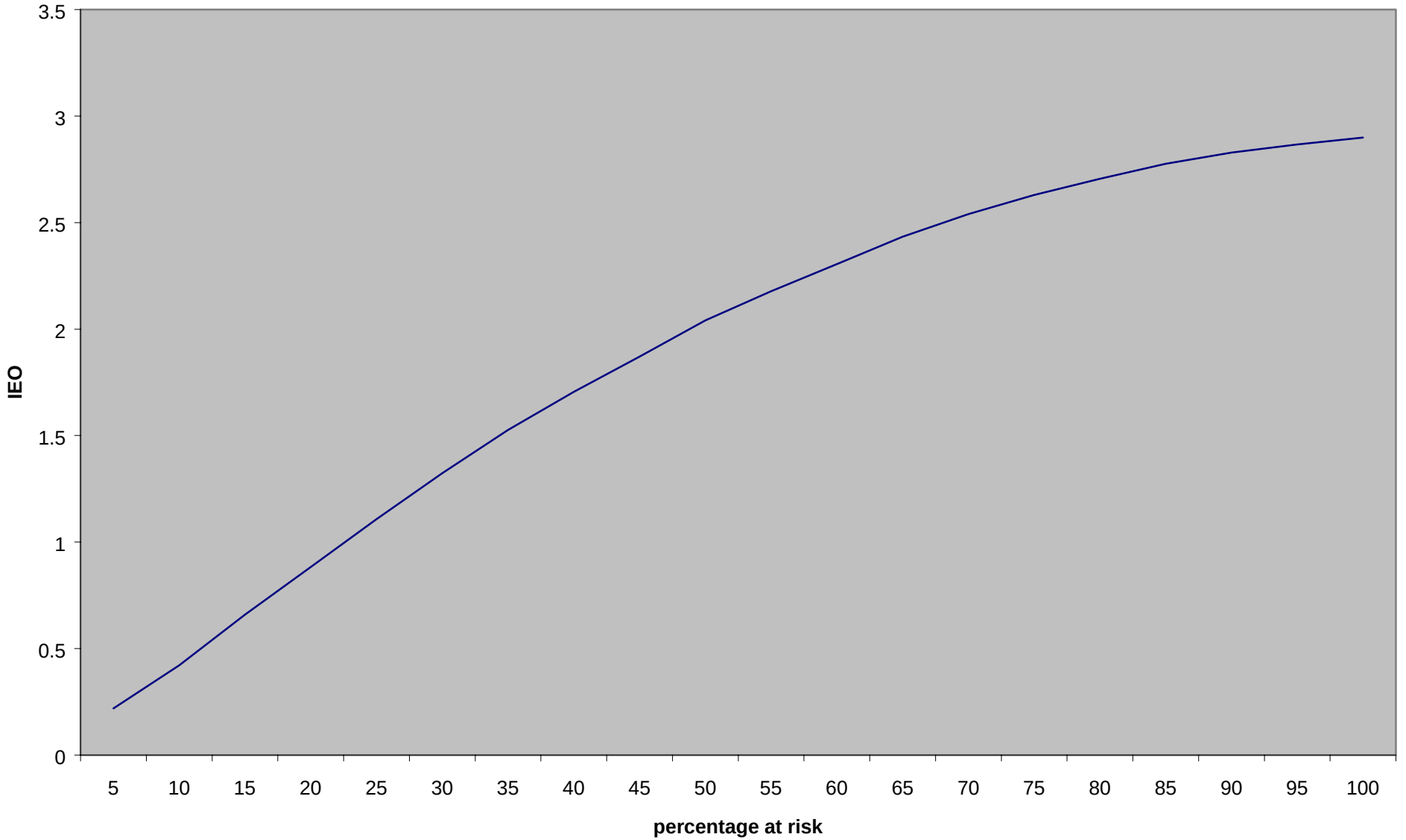
lower secondary
higher secondary
tertiary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percentage at risk