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TRENDS IN THE EFFECTS OF EDUCATION ON OCCUPATIONAL OUTCOME 1972-2000.

Differences between Social Class and Earnings

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ABSTRACT:

This paper analyses trends in the effects of education on occupational outcome in Great Britain. I aim to show that the direction and strength of the trend in the effects of education varies between measures of occupational outcome, and between periods within the observed time span. The trend in the effect of education on social class is unequivocally downward. With regard to earnings the trend in the effect of education depends on how we operationalise earnings. When we use a categorical measure of earnings sextiles, we observe a downward trend in the effects of schooling. However, when linear models using logged hourly earnings are employed, we find the expected U-shaped trend in the effect of schooling. Left-wing policies have increased schooling levels up to the early 1980s, which led to a downward trend in the schooling effect on earnings. From the 1980s onwards, rapid technological developments and the abandonment of left-wing politics caused an increase in the demands for qualifications, which led to increased effects of schooling on earnings. Much of this trend runs indirectly through trends in social class differences in earnings, suggesting that the social classes have further differentiated their employment relations.

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1. INTRODUCTION

During the rise of industrial society, many social scientists observed a decrease in the effect of schooling on occupational outcomes such as income or status (e.g. Freeman 1976; Clogg & Shockey 1984). Also more recently it has been shown for a number of countries that education's effects on occupational social class decreased, often explained by an increase in the relevance of qualities obtained outside education (Breen & Goldthorpe 2001; Goldthorpe & Mills 2003; Jonsson 1996; Vallet 2001; Whelan & Layte 2002).

However, claims have also been made that jobs have become more complex, leading to a need for qualified personnel for an increasing number of jobs. The sharp rise in the wage premium from higher education during the last decades must be seen in this context (McCall 2001; Levy & Murnane 1992; Ashenfelter & Rouse 2000). Similarly, modernization theory has argued that the impact of education on occupational status increases due to increased complexity of work (Blau & Duncan 1967; Featherman & Hauser 1978; De Graaf & Luijkx 1992).

This paper tries to unravel trends the impact of education on work outcomes in Great Britain, and to explain the anomalies discussed above. To do this, I will first analyze whether observed differences are due to differences in measurement. Is it just a matter of using social class as a dependent variable to show a decreasing trend, and income to show an increasing trend? And how can this be explained? Surely the fact that Elias and Pierre (2002) found an increasing effect of education on wages across cohorts, whereas Breen and Goldthorpe (2001), using the same two datasets, showed a decreasing effect of education on social class, points in that direction. These two occupational outcomes, social class and earnings, are interesting to compare because class is a categorical variable that has a 'ceiling', whereas earnings has in principle no upper limit. This means that earnings can be adjusted more easily in relation to demands for qualifications than social class. Moreover, we could operationalise earnings in a categorical (ordinal) way, implying that such an operationalisation would, unlike raw earnings, lead to similar trends as found with regard to social class.

But there is more to it than just measurement issues. For example, Harmon et al. (2001) showed that trends in the impact of education on earnings vary from upward to

downward among a number of European countries, and trends vary between time periods within countries as well. Therefore, secondly, I will analyse cross-temporally in what direction the association has moved and how cross-temporal dissimilarities can be explained. Cross-temporal variation may be related to the speed of changes in technology and/or governmental policies to increase schooling in specific time periods.

It is relevant to study the trends in the effects of education on both social class and earnings for two reasons. First, although both trends have received considerable attention in their own right, a comparison has, as far as we know, not been made using exactly the same datasets within the same research framework. Secondly, and more importantly, the trends in the impact of education on social class has been put in a broader discussion on meritocracy in the last few years (e.g. Breen & Goldthorpe 2001; Whelan & Layte 2002). A downward trend indicates, these authors argue, that education-based skills become less important for the distribution of life chances to the benefit of other types of ‘competencies’ such as social skills or personality. In so far these other skill types, increasingly relevant in the modern economy, are related to social origins, a ‘meritocratic’ society could legitimately select on social origins as a basis for productive skills (Goldthorpe 1996). Selecting on origin-related skills would thus bring productivity into the organization, which could hardly be denied as being at least partly meritocratic. This places the ‘from ascription to achievement’ paradigm (Blau & Duncan 1967) as a way to study increased selection on merits into a somewhat problematic situation; merit-enhancing attributes are no longer synonymous with achieved characteristics such as education, but are also directly related to social origin.¹

However, this line of reasoning would of course lose some of its validity if *earnings* are *increasingly* dependent on education. If the modern economy would become increasingly inefficient by selecting on education as a basis for merits, as studies on increased selection on non-educational skills suggest, then we should observe this most directly in the earnings that result from negotiations about skills and productivity. So, claims about the decreasing relevance of education as a basis for the

¹ A similar argument has been put forward by Juhn et al. (1993). They argue that economic developments during the recent decades called for types of skill that are, if at all, only loosely related to education. The rising wage inequality is not caused by increased returns to education, but by increased returns to other components of skill. Their argument is based on the fact that also within detailed educational groups income inequality has risen.

social differentiation of life chances resulting from a downward trend in the education effect on social class would then be somewhat premature.

The research questions are:

1. To what extent has the impact of education on different occupational outcomes changed over time in Great Britain?
2. How can we explain cross-temporal variation in trends in the association between education and occupational outcome?
3. How can we explain differences in these trends among measurements of occupational outcome?

2. DIFFERENCES ACROSS TIME PERIODS

We distinguish two possible explanations for upward and downward trends in the effects of education on class and earnings. These two approaches can be seen as complementary rather than competing. The first sees changes in the impact of education resulting from changes in the aggregate ‘match’ of supply of and demand for qualifications, i.e. over- or underschooling. Educational attainment has increased tremendously, which has, according to many, not been matched by a restructuring of the labour market. This means that people became increasingly overqualified for the available jobs, which led to changes in bargaining power of various educational levels. This is the approach most often encountered in studies on the impact of overschooling on returns to education, for instance by distinguishing between required and obtained levels of schooling for a specific job. The second explanation considers trends in the impact of education on occupational outcomes resulting from time-varying selection on qualifications *within* jobs. This explanation holds that the same job requires more education in some periods than in other periods, without this being a consequence of increased or decreased supply of qualifications. Particularly technological developments are generally linked to this approach. Studies on the college/non-college wage gap take, for example, this approach.

2.1 Changes in the match between supply of and demand for qualifications

The impact of education on work seems to have decreased most substantially in the period up to the 1980s. Human capital theory seeks part of the explanation for this phenomenon in the sharply increased supply of high-level qualifications since WWII (e.g. Freeman 1976; Levy & Murnane 1992). Because too many people received higher-level training, their bargaining power decreased, leading to lower earnings than before. But not only absolute earnings of college graduates went down according to human capital theorists. Returns to years of schooling in excess of the required level of schooling for a job are much lower than to the years of required schooling (Harmon et al. 2001; Groot & Maassen van den Brink 2001). This means that the rate of return to schooling on average, thus the difference between schooling levels, goes down if average qualification levels rise faster than the restructuring of the labour market requires. Similarly, studies on the college/non-college wage gap argue that this gap becomes smaller when educational attainment increases relative to the occupational structure (Ashenfelter & Rouse 2000; McCall 2000; Levy & Murnane 1992).

Another stream of research has shown, however, that an average rise in qualification levels leads to a decrease in the absolute returns for each qualification level, but most severely for the lowest qualification levels (Wolbers et al. 2001). This implies that differences between schooling levels become *larger* in times of overschooling. The latter finding is consistent with the job competition model of Thurow (1975), that sees education as a relative good. Employers select the highest available qualification level to fill any job, so that, in times of overschooling, people of highest qualifications not only occupy 'highest-level' jobs, but also jobs of lower skill level. The most serious consequences of this process are for people with no or few qualifications; they are pushed out of low-skill jobs by people with at least some qualifications.

Thus, human capital theory and the job competition model provide different predictions as regards the trend in the effect of schooling in reaction to over- or undersupply of skills (cf. Hoek & Groot 1997). Because the job competition model assumes that education is a relative good, it predicts that overschooling leads to an upward trend in the effect of schooling. Human capital theory, on the other hand, implies that overschooling adjusts wages of highly skilled workers downwardly, leading

to a smaller wage differential between educational levels. Thus, the impact of schooling on occupational outcomes will go down instead of up in times of overschooling.

The objective of the present paper is not to study trends in overschooling and underschooling and relate those to returns to education. In other words, I do not study whether educational achievements match occupational positions and see how this affects, for example, earnings. But in our understanding of the trends in returns to schooling we need to be aware of these two different predictions as regards the impact of over- and underschooling.

One factor responsible for a tremendous upward shift in educational attainment is the political climate in the 1960s and 1970s. Educational systems in many countries have been restructured in these decades, largely induced to increase schooling levels and reduce inequality. Left-wing governments were in power in many countries, including the United Kingdom. Redistribution of power and knowledge, an important aim of social democracy, could be established by enlarging enrolments into higher education. The new influx led to the emergence of many new institutions of higher education. Such policies were, if at all, only indirectly motivated by changes in demands on the labour market. This climate could easily lead to an increasing discrepancy of educational achievements and occupational demands. Brown (1990) called this period the ‘second wave’ of British educational policy. This wave started with the 1944 Education Act, which promoted a schooling system in which ability determined educational opportunities, and not parental wealth like in the ‘first wave’. Also the comprehensive schooling system initiated in the 1960s is generally seen as part of this wave to prevent a waste of talent in the lower social classes.²

After the 1970s policies were far less focussed on increasing schooling levels. Particularly in Britain under the Conservative governments of Thatcher, the ‘second wave’ of educational policy was abandoned to make room for a ‘third wave’ (Brown 1990). This third wave was primarily aimed at promoting the market in the education

² Meyer et al. (1977) analyzed for a large number of countries across the world to what extent economic, political and social factors account for educational expansion. They found hardly any effect of these factors, which led them to conclude that expansion is a self-generating process that is a function of the available population to be educated and the available pool of already educated persons. However, unfortunately their analysis did not include a variable indicating the political orientation of governments but only included political factors such as participation ratios and political modernization. As Brown

system, where enrolment in education was not something that the government should interfere with. Part of this third wave is the 1988 Education Reform Act, which further promoted market rules in education.³ The evident differences in educational policies between the Labour and Conservative governments makes Britain an interesting case to study cross-temporal variation in the education effect on schooling. In addition, particularly in countries where the education system has a strong screening function rather than being an indicator of productive skills, like Britain, credential inflation makes people invest in education more even if its absolute returns fall (cf. Boudon 1974; Groot & Maassen Van den Brink 2000).

2.1 Time-varying selection within jobs

The second argument behind possible trends in the effect of schooling on work assumes that, irrespective of over- or underschooling, in some periods educational qualifications are more important in the selection, allocation and compensation of workers than in other periods. The labour market has been developed towards more knowledge-intensive, highly-skilled work tasks, including a large emphasis on (computer) technology (Gallie et al. 1998). Technological developments are a crucial determinant of whether jobs become more complex, and thus of the demand for detailed qualifications that prepare for particular types of jobs. If a certain job becomes more complex, an employer will look for a candidate who possesses a qualification that prepared for the job more than if a job becomes more routinised. If, on the other hand, investments have been made some time ago, routinisation of jobs implies that formal educational credentials become less relevant, because informal on-the-job training will enhance skills to be productive in that job.

(1990) demonstrates, however, the political orientation of governments does have a clear impact on policy measures to increase schooling levels.

³ According to Brown (1990), the third wave of education policy led to a 'Parentocracy', where parents' interference in school decisions became more important again (as it was before the 1944 Education Act in the 'first wave'). By introducing formal school tests at various ages across the school career, it was attempted to provide parents with the necessary consumer information to decide which school to send a child to. The call for a change in policy in the late 1970s and 1980s came after research showed that inequality of educational opportunity had not decreased despite the education reforms (Halsey et al. 1980). However, policy under the 'second wave' is hardly ever judged against its other ambition, namely to increase schooling levels. This part of educational policy was probably more successful than its aim to decrease educational inequality.

Some, particularly in the status attainment tradition, have argued that job complexity increases linearly with ‘modernization’ (Blau & Duncan 1967; Featherman & Hauser 1978; Treiman 1970). However, the comparative study on wage returns to schooling by Harmon et al. (2001) shows that the trend in the impact of education is far from linear. Rather, it seems that complexity of jobs increases most substantial if there is much technological development. As investment in research and technology varies with the economic tide (OECD), it seems logical to expect that trends in the effects of schooling, in-so-far not related to over- or underschooling, follow the economic tide and related technological investments.⁴ This means that the impact of education on occupational outcomes (particularly earnings, see below) goes downward in the period up to the early 1980s, when economic growth was slow. After the economic stagnation of the early 1980s, the upward boom in economic growth has increased the impact of schooling on earnings from this period onwards. In sum, we would expect a U-shaped trend in the effect of schooling on earnings.

Alongside technological developments, there is another factor that implies that, within jobs, educational requirements vary over time. This approach holds that, in the modern economy, education-based skills become less important in the distribution of life chances, to the benefit of other components of competencies (Breen & Goldthorpe 2001; Jackson 2001; Juhn et al. 1993). In the modern economy, it is said, various types of productive capacities become increasingly relevant that are, if at all, only very loosely related to education. Examples of these kinds of ‘capacities’ are social and communicative skills and personal appearance. Thus, it is shown that the effect of education on social class goes downward in a number of countries during the last decades (Breen & Goldthorpe 2001; Goldthorpe & Mills 2003; Jonsson 1996; Vallet 2001; Whelan & Layte 2002). This contradicts the above-mentioned prediction on the education effect on earnings.⁵ We will now turn to the question whether and why

⁴ This also implies that educational differentials follow the same pattern as the aggregate income inequality, which is also often linked to technological developments. Income inequality in many Western societies, including Britain, follows a pattern of a ‘great U-turn’: first downward, then upward (Alderson and Nielsen 2002; Harrison & Bluestone 1988). The ‘great U-turn’ came after the ‘Kuznets curve’, which refers to an inverted U-shaped relation of income inequality with economic development. The total pattern, first upward, then downward, then upward again, can be seen as a N-shaped pattern, which is found for a number of OECD countries (Alderson & Nielsen 2002).

⁵ To me it is, from a theoretical point of view, not clear why an increase in the relevance of ‘other components of competencies’ in the modern free-market economy would imply a decrease in the

differences in the trend in the education effect could exist between social class and earnings as measures for occupational outcome.

3. DIFFERENCES BETWEEN EARNINGS AND SOCIAL CLASS

The upward trend in returns to education is often used to explain increased wage inequality as measured by, for example, Gini coefficients or decile ratios. The logic behind this reasoning is that rising wage inequality is a consequence of the increase in bargaining power, or ‘control over the job’ (Sørensen & Kalleberg 1981) of people with higher educational achievements due to the increasing shortage of high-level skills and the growing surplus of low-level skills (Levy & Murnane 1992). Thus, in so far we see increasing wage dispersion, increasing educational differentials might (partly) explain it.

However, if we look at other measures of occupational outcome, it is less evident that dispersion has increased. Instead, the restructuring of the labour market has probably caused a *decrease* in the dispersion in a number of measures of occupational outcome. The most significant changes in the economy are the tremendous decrease of the primary sector, a steep increase of the secondary sector from the late 19th century up to the mid 20th century, and a sharp rise of the tertiary sector afterwards (Lenski 1966; Bell 1974; OECD). Average job levels have increased, and plausibly variance in job level might have decreased similar to what has been shown for educational distributions (Hauser & Featherman 1976; Rijken 1999). Relatedly, the social class distribution seems to have moved strongly towards a large middle class. As these occupational outcomes have, unlike earnings, a ‘ceiling’, the upward movement in occupational distributions has plausibly caused a decrease in ‘inequality’ in these measures. This makes the explanandum different from the example on earnings, thus leading to a need for a different theory.

It is most likely that the U-shaped trend in the effect of schooling (first downward, then upward) is most pronounced when we look at earnings as occupational

relevance of education. Selection on various characteristics is not a zero-sum game; it is very well possible that other types of capacities become increasingly relevant *in addition to* education in ‘people processing’ occupations (Breen & Goldthorpe 2001: 84).

outcome, because, at least according to neo-classical economic theory, bargaining power has direct consequences for the earnings that are realized. With regard to social class, bargaining power does not automatically lead to higher positions. This is partly so because there is a ‘ceiling’ in the social class structure (see above), but also because employees do not seem to negotiate about their social class on the labour market. Social classes can be seen as groups of similar employment relations (Goldthorpe 2000), but whether people are paid monthly salaries or hourly wages, or whether the company participates in a private pension scheme are issues that are usually not negotiated about in individual job interviews.

Moreover, if we take it that earnings are the main occupational outcome where to expect a U-shaped trend alongside a monotonously downward trend on social class, we can further argue that the changes in bargaining power of different educational levels – and thus the trends in the effect of education – are moderated by trends in social class differences in earnings. Gallie et al. (1998) have shown that members of the service class (managers and professionals) generally experienced more upskilling in their job and increased job responsibility than members of the working classes in the five years prior to their 1992 survey. As both aspects are related to earnings, class differences in earnings could very well have increased. Additionally, the decline in union membership during the 1980s and 1990s has probably deteriorated the position of the working classes (cf. Ebbinghaus & Visser 2002), which further increases class differences in earnings. The service classes may have become more successful in gaining better employment relations (including income) in times of economic growth.

Following this line of reasoning, we could also argue that the trend in the effects of education on earnings is dependent of how we measure earnings. If we make a categorical earnings classification, which is ‘ceiling-sensitive’, we might find a different trend than when we operationalise earnings in the more standard, logged form.

4. HYPOTHESES

The arguments put forward above can be summarized in the following hypotheses:

1. The effect of education on social class continuously goes downward between the 1972 and 2000;

2. The trend in the effect of education on earnings follows a U-shaped pattern: downward up to the early 1980s, and upward afterwards;
3. The U-shaped trend in the effect of education on earnings is moderated by changes in class differences in earnings.

5. RESEARCH DESIGN

5.1 Data

The datasets that are used to study trends in the effects of education come from the General Household Surveys of 1972-2000. These surveys are carried out in Great Britain on a yearly basis among members of a representative sample of households. Only household members between 25 and 64 years of age are included in the present analyses. We use two sets of respondents. To study trends in the effects of education, sociologists often control for social origin (e.g. Blau & Duncan 1967; Breen & Goldthorpe 2001). However, since father's occupation, used for our measure of social origin, is no longer coded in the surveys after 1992, including social origin in our analysis would severely limit the time span under study. Furthermore, also in the years that father's occupation was coded, there are many missing values on father's occupation. Hence, we study trends in the returns to education both with and without father's social class, our measure of social origin.⁶ Furthermore, for both types of analyses, only cases were included that had no missing values on any of the used variables. The total number of observations that are analysed are $N = 217,450$ if father's class is omitted (96,060 women and 121,390 men); and $N = 127,400$ if father's class is included (55,176 women and 72,224 men).

5.2 Variables

The following variables are used in the analysis. *Education* is measured in four categories: primary/no qualification, O-levels including vocationally oriented tracks of similar length (roughly taken at age 16), A-levels including vocationally oriented tracks of similar length (roughly taken at 18), and Higher education (including courses with

⁶ It should be noted that Wolbers (1998) has shown for the Netherlands that omitting father's occupation from the study of trends in the effects of education does not lead to a severe bias in these trends.

and without degree). No distinction could be made into vocational and general tracks, given the strong demands that our (partly loglinear) analyses have to the number of observations.

To study trends with the cross-sectional data that are at hand, I choose to compare *periods* (i.e. the years of interview) rather than birth cohorts. The reason for this is that there is no information on the ‘first’ job after leaving school. This means that, if we were to use birth cohorts instead of periods, it is hard to disentangle trends in the effects of education across cohorts and across the life cycle. Across the surveys our sample consists of people born between 1908 (age 64 in 1972) and 1975 (age 25 in 2000). This means that the older birth cohorts give on average information about their occupation and income at an older age than the younger birth cohorts. If the expectation is that education effects have decreased across birth cohorts, we might find the opposite just because earlier in the life cycle the effects are stronger, off-setting the overall decreasing impact. If we use period as the basis for cross-temporal comparison, this problem is more or less eliminated, since people of all ages are included in each survey year. The time span is much smaller this way, only running from 1972 to 2000, but the anomalies discussed above about trends in the effects of education on occupational outcome cover mostly this time span. Furthermore, comparison of periods seems useful because, if the value of educational credentials changes, this holds for all credentials, not only for the recently acquired. Time periods that are distinguished are 1972-1976, 1977-1981, 1982-1986, 1987-1992, and 1993-2000 (the period 1993-2000 is omitted in the analyses including father’s class, since in these years father’s occupation was no longer coded).

Social class (both origin and destination) is measured with a widely used version of the Erikson and Goldthorpe class scheme into six categories (Erikson & Goldthorpe 1992; see Ishida et al. 1995 and Ganzeboom et al. 1989 for the same version): the service class (I and II in the EG scheme); the routine non-manual labour class (III), the petty bourgeoisie (self-employed with no or few employees, IVa and IVb), the farmers and farm workers (IVc and VIb), skilled manual workers and foremen (V and VI), and, lastly, semi- and unskilled manual workers (VIIa).

Earnings are measured on an hourly basis, both from dependent employment and own business. A large majority of our sample (90.9 % in the sample including

father's class; 90.6 % in the sample excluding father's class) has only earnings from dependent employment. The remaining group consists of mainly people with only earnings from self-employment (8.1 % and 8.6 % respectively), and of people with both dependent and self-employed sources of earnings (1.0 % and 0.8 %). Earnings of employees are, if possible, checked by the interviewer on payslips. Self-employed income was measured by gross profits before taxes. It was asked for the year previous to the interview, but if people had been self-employed for a shorter period, profits were adjusted accordingly. The top and bottom 0.5% of the earnings distribution in every year is omitted. Hourly wages of the years under study are adjusted for inflation using the Retail Price Index obtained from the Office of National Statistics, so that all amounts are in January 1987 pounds sterling. Two earnings measures are derived from hourly earnings. First, for the loglinear association models we employ a categorical income measure with six income sestiles. As we run the loglinear analyses for men and women separately, we computed sestiles for each sex separately. Second, for the regression analysis we employ the natural logarithm of hourly earnings. It must be noted that, in the light of our arguments on using 'ceiling-sensitive' measures of occupational outcome, a downward trend may be expected as regards the categorical income variable, whereas the second, more common-practical operationalisation of earnings could reveal an upward trend in the effects of schooling.⁷

5.3 Models

Two types of statistical analyses are carried out to study trends in the effects of education on occupational outcome. First, loglinear association models are used. One of our measures of occupational outcome, social class, is a multi-dimensional concept. Classes can not only be ordered in a hierarchical way, but have other dimensions too. In particular the farmers and the petty bourgeoisie fit less well on the hierarchical dimension (Erikson & Goldthorpe 1992). Loglinear association models are well suited for studying associations between variables of nominal measurement level. Obviously

⁷ Hansen (2001) showed for Norway that the more inclusive an income measure is, for example by including income from stocks in addition to salaries and self-employed income, the stronger the effect of education is. Although more income variables are available in the GHSs, we chose to restrict our analysis to earnings obtained from work, as we attempt to shed light on trends in the effects of education on work outcomes.

income does not necessarily have these limitations of measurement level. However, to illustrate the dependence of the trend in the education effect on how we measure occupational outcome, we will first use a categorical earnings measure and employ similar loglinear association models as we use for social class. The basic four educational categories by six occupational outcome categories table is made for each time period (and by each origin class in the analysis including father's class). 'Uniform difference' (Erikson & Goldthorpe 1992) or the identical 'log-multiplicative layer-effect' (Xie 1992) models have been developed that estimate with one parameter the change in all the log odds ratios between two tables. More specifically, it estimates in what way all the log odds ratios of the education by occupational outcome table change between two time periods. In the case where the Education by Destination (class) table varies only by period (so excluding father's class), these models can be expressed as follows:

$$\log F_{ij} = \mu + \lambda_i^E + \lambda_j^D + \beta_k X_{ij}$$

Where $\log F_{ij}$ is the natural logarithm of the expected frequency in cell ij , μ is the intercept, λ_i^E the main effect of education, and λ_j^D the main effect for destination. Furthermore, $X_{ij} = \lambda_{ij}^{ED}$, is equal to the interaction between education and destination and its effect. For each period k (of a total of K periods) a β_k is estimated, called a uniform difference (unidiff) parameter, which indicates by which factor the log odds ratios of the ED table should be multiplied compared to a reference period. If the association between education and occupational outcome goes down compared to the reference period, then the unidiff parameter is smaller than 1. If it goes up, it is bigger than 1. See for applications of the uniform difference models in studies on educational inequality Marshall et al. (1997).

The second method for studying change employs regression type analyses with earnings as a dependent variable. The central focus in this analysis is on the short-term changes within the observed period, in particular whether the effects of education on income have first decreased (roughly until the mid 1980s), and later increased. These models are better suited for studying effects on interval variables such as earnings, particularly since various interactions between variables can be modelled in a

parsimonious way. This analysis will, partly, also include social class as an independent variable. If we find the expected differences in trends between the two measures of occupational outcome, then we might explain these differences by increased income differences between the social classes.

6. RESULTS

Loglinear association models

6.1.1 Social class

Tables 1 and 2 show fit statistics for loglinear association models for social class, with and without father's class, respectively. Models are fitted for men and women separately. Fit statistics that are displayed are the χ^2 -distributed G^2 , Δ (the percentage of subjects wrongly classified by the model) and the Bayesian Information Criterion (*BIC*) (Raftery 1995). Especially the latter is relevant because we deal with large sample sizes. Large sample sizes make it hard for acceptable models to fit the data using G^2 . *BIC* takes account of the number of degrees of freedom and the sample size. Negative *BIC* values indicate a good fit of the data, and the more negative *BIC* is, the better the fit.

Model 1 of table 1 is the independence model, where no interaction between variables determines cell frequencies. This model fits the data very poorly. Improvement is obtained by the merit selection model (model 2), which allows associations between origin class and education, and between education and destination. A model that allows for direct transmission of social class between generations (model 3) improves on model 2. This implies that there is a direct effect of social origin on class destination independent of educational attainment. However, still model 3 does not fit the data well enough. More can be gained by letting origin class, education and destination class vary between periods (model 4), which is the first model that shows an acceptable fit. However, this model does not allow a trend in the effect of education on social class. To see whether such a trend is prevalent, we fitted uniform difference models 6 and 7, which extend on models 5 and 4, respectively. Model 6 allows a three-way interaction between origin class, education and destination class, whereas model 7 just allows two-way interactions.

Table 1 Fit statistics for POED* table, men and women separately, including origin class

Model	Men N=72,224				Women N=55,176			
	G ²	Df	Δ (%)	BIC	G ²	df	Δ (%)	BIC
1. Main effects P + O + E + D	52472.56	559	32.60	46217.35	43619.28	559	34.21	37515.00
2. Merit Selection P + OE + ED	17592.86	529	18.65	11673.35	9633.90	529	16.44	3857.22
3. Direct OD: P + OE + ED + OD	10225.77	504	15.12	4586.01	8525.31	504	15.93	3021.63
4. Period effects OE OD ED PD PE PO	1219.38	465	4.47	-3983.97	894.90	465	3.50	-4182.90
5 OED + PE + PD + PO	1009.52	390	4.10	-3354.58	789.01	390	3.36	-3469.79
6. OED + PE + PD + PO + P*ED	695.48	373	3.25	-3478.39	785.09	373	3.34	-3288.07
7. OD + OE + PE + PD + PO + P*ED	1041.29	462	4.16	-4128.49	742.43	462	3.06	-4302.61
8. POE + OD + P*ED	937.38	427	3.80	-3840.75	618.49	427	2.55	-4044.35
9. POE + OD + PD + P*ED	806.97	417	3.31	-3859.26	578.44	417	2.28	-3975.20

* 4 Periods by 6 Origin classes by 4 Educational levels by 6 Destination classes.

Source: General Household Surveys 1972-1992

Table 2 Fit statistics PED* table, Men and women separately, no origin class

Model	Men N=121,390				Women N=96,060			
	G ²	df	Δ (%)	BIC	G ²	df	Δ (%)	BIC
1. Main effects P + E + D	59910.75	107	27.87	58657.78	59774.42	107	31.19	58547.13
2. Merit Selection P + ED	13723.61	92	13.32	12646.29	14073.86	92	15.72	13018.62
3 Period effects ED PD PE	733.04	60	2.58	30.44	670.31	60	2.26	-17.89
4. PE + PD + P*ED	331.23	56	1.67	-624.53	214.82	56	1.08	-427.50

* 5 Periods by 4 Educational levels by 6 Destination classes.

Source: General Household Surveys 1972-2000

Additional models 8 and 9 are included to observe whether a trend model would improve when the three-way association between period, origin class and education (POE) is included, with and without period effects on destination class (the term PD). From these models it becomes clear that two-way interactions are sufficient to reach a good fit to the data, where a model with a trend (model 7) fits better than one without a trend. Allowing the periodic changes in the origin-education association is not necessary to reach a good fit; at least when temporal changes in the education-destination association are included. Thus, model 7 would be the preferred model.

If we exclude father's (origin) class (Table 2), we see a similar pattern; for both men and women the uniform difference model has the best fit to the data; there is certainly a trend in the effect of education on social class for both men and women.

In what direction does this trend go? Uniform difference parameters for the models are displayed in Figure 1. The trend in the effect clearly goes downward: in later periods the effect of education on social class is weaker than in earlier periods. The log odds ratios of the education by destination table have to be multiplied with a factor below 1 for successive cohorts. Furthermore, the downward trend in the effect of education on social class is similar for men and women. Also noticeable is the fact that the trend is more or less linear.

6.1.2 Earnings sestiles

In tables 3 and 4 we fit similar models as above, but now with earnings sestiles as measure of occupational outcome. The results are broadly similar to what was found with social class. In table 3, where the impact of origin class is included, the results are as follows. Allowing differences across periods in the distributions of origin class, education and earnings sestiles gives an acceptable fit to the data (model 4), but improvement is obtained by allowing the association between education and earnings sestile to vary between periods (model 7). Similar to what was found with regard to destination class above, the three-way interaction between period, origin class and education does not improve on the fit of the model to the data. As regards the model fits, the pattern for men and women are somewhat similar, but with a stronger

Figure 1 Trends in the effect of education on social class as measured by Uniform Difference parameters (and 95% confidence interval)

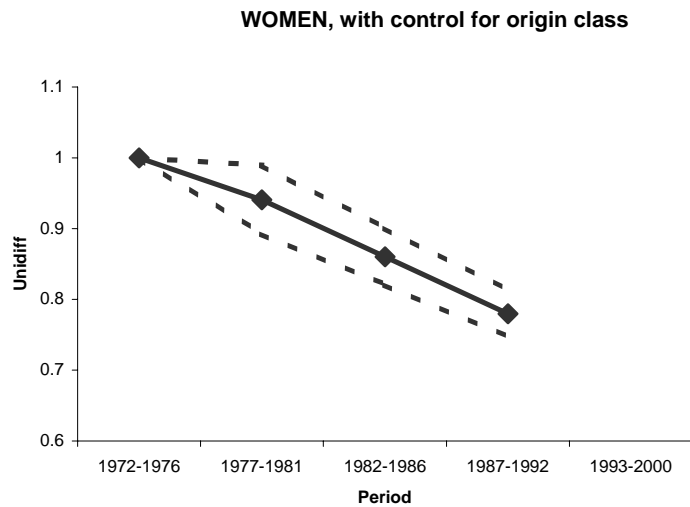
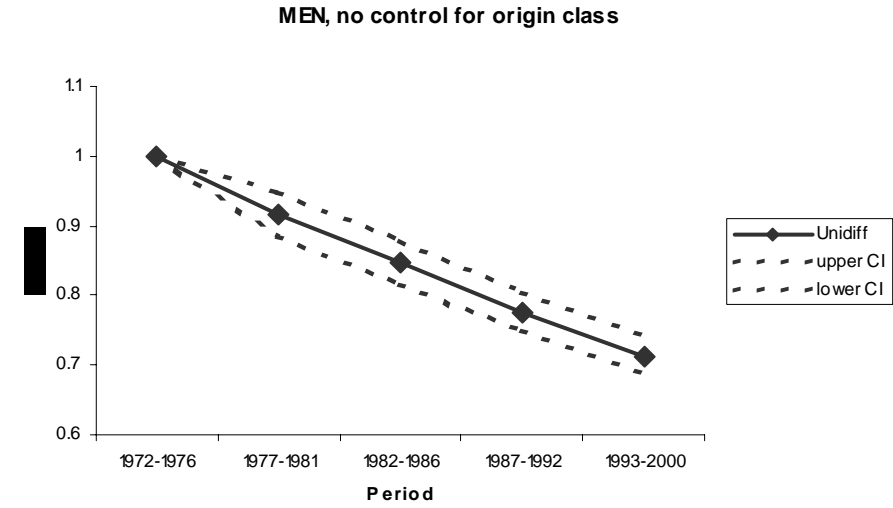
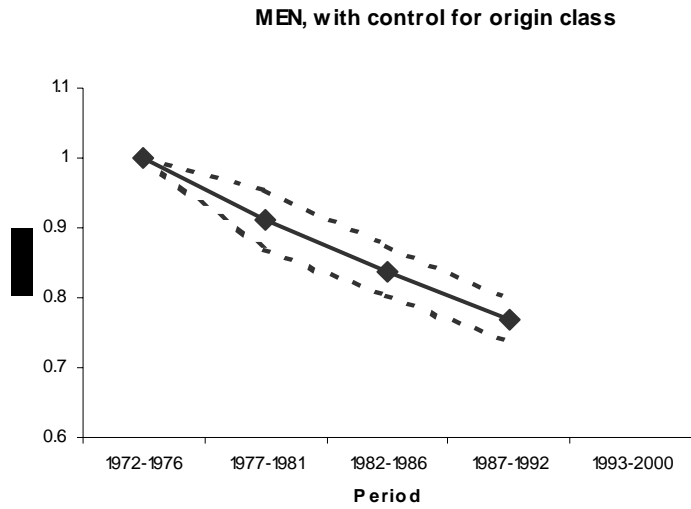


Table 3 Fit statistics for POEI* table, men and women separately, including origin class

Model	Men N=72,224				Women N=55,176			
	G ²	df	Δ (%)	BIC	G ²	df	Δ (%)	BIC
1. Main effects P + O + E + I	39694.67	559	28.11	33439.46	40994.83	559	33.13	34890.55
2. Merit Selection P + OE + EI	14517.58	529	18.17	8598.07	14012.23	529	19.66	8235.55
3. Direct OI: P + OE + EI + OI	13485.85	504	17.40	7846.09	13511.03	504	19.34	8007.35
4. Period effects: OE + EI + OI + PE + PI + PO	1146.50	465	4.26	-4056.85	1171.40	465	4.43	-3906.40
4b. Period effects minus OI: OE + EI + PE + PI + PO	2338.24	490	6.32	-3144.86	1648.79	490	5.84	-3702.01
5. OEI + PE + PI + PO	1026.72	390	4.10	-3337.38	1057.07	390	4.24	-3201.73
6. OEI + PE + PI + PO + P*EI	654.08	373	3.25	-3519.79	607.14	373	3.22	-3466.02
7. OI + OE + PE + PI + PO + P*EI	918.84	462	3.89	-4250.94	1138.05	462	4.43	-3906.99
7b OE + PE + PI + PO + P*EI	2102.49	487	5.98	-3347.04	1614.38	487	5.78	-3703.66
8. POE + OI + P*EI	1154.14	427	4.43	-3623.99	1567.25	427	5.87	-3095.59
9. POE + OI + PI + P*EI	729.61	417	3.45	-3936.62	998.78	417	4.18	-3554.86
9b POE + PI + P*EI	1916.70	442	5.69	-3029.28	1461.62	442	5.53	-3365.02

* 4 Periods by 6 Origin classes by 4 Educational levels by 6 Earnings sestiles.

Source: General Household Surveys 1972-1992

Table 4 Fit statistics PEI* table, Men and women separately, no origin class

Model	Men N=121,390				Women N=96,060			
	G ²	df	Δ (%)	BIC	G ²	df	Δ (%)	BIC
1. Main effects P + E + I	48921.81	107	24.22	47668.84	58799.95	107	30.44	57572.66
2. Merit Selection P + EI	17495.92	92	14.89	16418.60	22610.00	92	18.46	21554.76
3 Period effects EI PI PE	706.98	60	2.29	4.38	1118.39	60	3.24	430.19
4. PE + PI + P*EI	343.60	56	1.79	-312.16	965.39	56	3.23	323.07

* 5 Periods by 4 Educational levels by 6 Earnings sestiles

Source: General Household Surveys 1972-2000

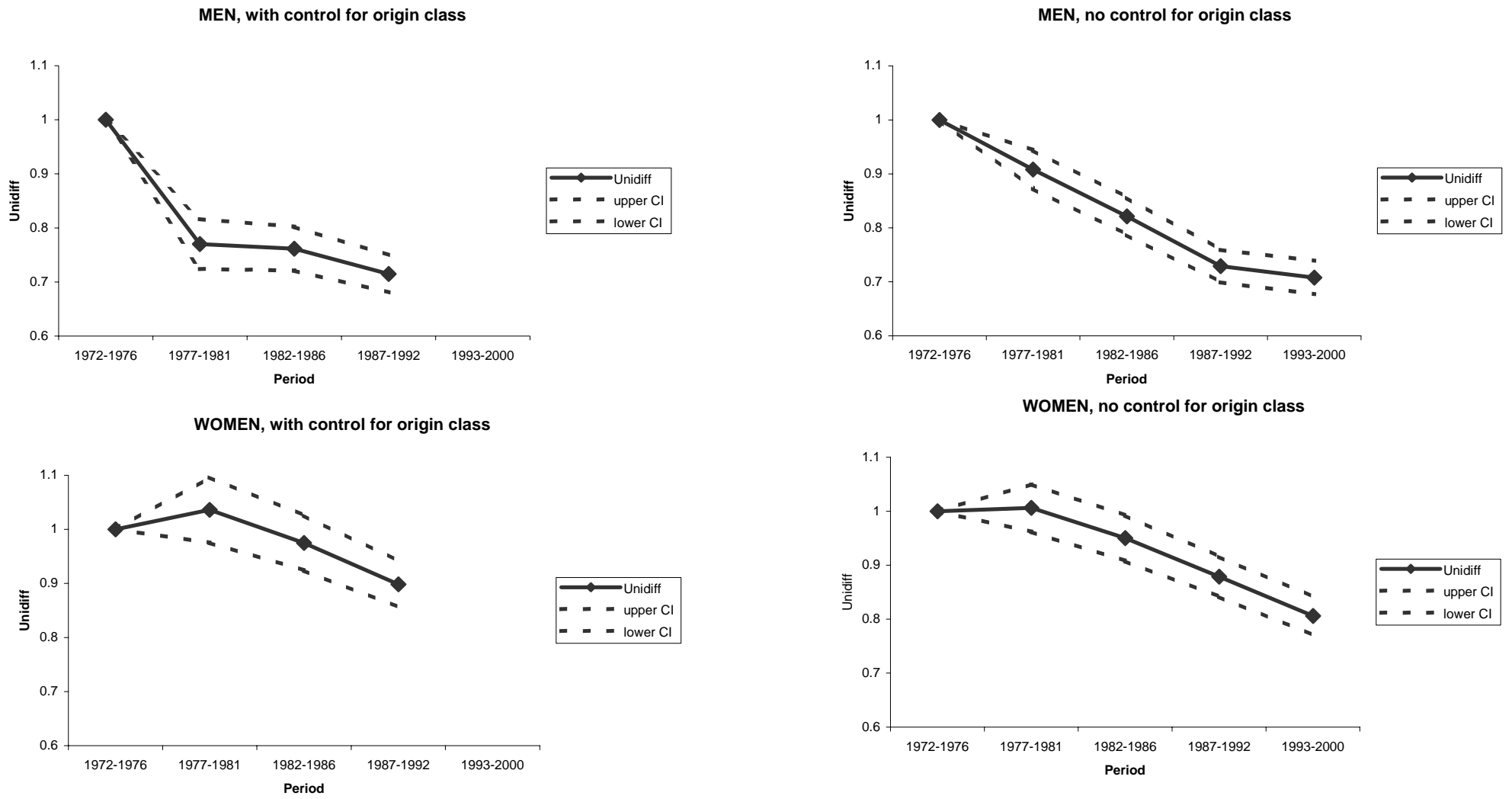
improvement by allowing a trend in the effect of education on earnings sestile for men than for women. Again model 7 is the preferred model, for both men and women.⁸

With regard to the models excluding origin class (table 4), the model which allows for period effects (model 3) fits well for men, but not for women. Allowing a trend in the education effect improves the fit for men, but shows no good fit for women. So, there is not a good fit possible for women, unless we saturate the model. Based on these two tables we maintain that the trend in the effect of education is more pronounced for men than for women.

So what does this trend look like? Figure 2 shows uniform difference parameters for the log odds ratios of the education by earnings sestile table. The trend in the effect of education on earnings sestile clearly goes *downwards* for men, both with and without controls for origin class. So, using a categorical income variable shows, similar to what we found for social class, a downward trend in the effect of education on occupational outcome. For women the trend is far less clear-cut. In the years 1987-1992 the association between education and earnings sestile is significantly lower than that of the 1972-1976 period. The unidiff parameters for women without origin class require caution as the model fitted the data poorly, but here too the trend is less pronounced than for men. Overall, the trends are less steep than what we found with regard to social class. This can be explained by the fact that changes in supply and demand of educational qualifications more easily lead to changes in earnings sestile than in social class.

⁸ With regard to earnings sestiles three further models were fitted that were not fitted using social class. These three models, models 4b, 7b and 9b of Table 3, drop the Origin class-earnings sestile associations. We felt that, as we do not have parental income in our data but use origin class instead, we should be cautious in including the OI association and drop it where possible. However, models 4b, 7b and 9b clearly show that omitting the OI association has severe consequences for the fit; we should thus allow a direct impact of origin class on earnings sestiles

Figure 2 Trends in the effect of education on earnings sestile as measured by Uniform Difference parameters (and 95% confidence interval)



To summarize, we showed that for men and women, there is a clear trend in the impact of education on occupational outcome measured categorically. This trend is downward, implying that education becomes less and less important to reach advantageous social positions. Now it is time to study trends in the impact of education on earnings using the more common-practical way of studying income attainment, i.e. using linear models with logged earnings as a dependent variable. That is done in the next section.

6.2 Regression models on earnings

In tables 5 to 8 the regression models are shown where the natural logarithm of hourly earnings is the dependent variable, estimated for men and women separately. In model 1 (including father's class; table 5) and model 3 (excluding father's class; table 6) all effects are constant across time. In the same tables models 2 and 4 allow the effects of schooling to vary across time. These models thus show to what extent there is a trend in the effect of education on earnings. We call this the *gross trend* in the effect of schooling; in model 2 with a control for father's class, and model 4 without such a control. The regression models in tables 7 and 8 analyse to what extent the gross trend is explained by earnings differences between the social classes (models 5 and 7 with and without father's class, respectively), and, more importantly, by a *trend* in the effects of social class on earnings (models 6 and 8). The remaining trend in the effect of education after controlling for a possible trend in the effects of social class on earnings is called the *net trend* in the effect of schooling. So, comparison of the gross and net trend in the effect of schooling shows to what extent a possible increasing effect of schooling is due to increased class differences in earnings. The gross and net trends in the effects of education are also displayed in figures 3 and 4.

The results of models 1 and 2 (table 5) show that origin class has a strong effect on earnings, independent of educational attainment. Furthermore, there is an increasing overall trend in earnings; in later periods higher (inflation-corrected) earnings are reported than in earlier periods. Education has a positive effect, with particular high incomes for people with some form of tertiary education. The gross trend in the education effect of model 2, probably best seen in figure 3, follows the expected U-shaped pattern of decreasing effects of schooling during the 1970s and early 1980s, but

Table 5 Trends in the effects of education. Regression of log hourly wages on selected independent variables, with controls for father's class

	Women				Men			
	Model 1		Model 2		Model 1		Model 2	
	b	se	B	se	b	se	b	se
Father's class I/II Service (ref)								
III RNM	-.019*	.008	-.019*	.008	-.027***	.007	-.026***	.007
IVab Self-em	-.045***	.009	-.045***	.009	-.093***	.008	-.093***	.008
IVc/VIIb Farm	-.114***	.010	-.114***	.010	-.207***	.008	-.207***	.008
V/VI Skilled manual	-.052***	.006	-.052***	.006	-.064***	.005	-.064***	.005
VII Unskilled manual	-.065***	.007	-.065***	.007	-.086***	.005	-.087***	.005
Age	.009***	.002	.008***	.002	.058***	.001	.057***	.001
Age squared	.000***	.000	.000***	.000	-.001***	.000	-.001***	.000
Period 1972-76 (ref)								
1977-81	.108***	.007	.144***	.009	.046***	.005	.094***	.008
1982-86	.157***	.006	.180***	.009	.068***	.005	.092***	.008
1987-92	.306***	.005	.312***	.008	.180***	.004	.198***	.007
Education: Primary (ref)								
O-level	.206***	.005	.236***	.009	.155***	.004	.175***	.006
A-level	.388***	.010	.580***	.025	.291***	.006	.350***	.012
Tertiary	.703***	.007	.707***	.013	.490***	.005	.531***	.009
Period 1977-81 x education								
O-level			-.080***	.016			-.055***	.012
A-level			-.313***	.039			-.123***	.019
Tertiary			-.045*	.020			-.120***	.014
Period 1982-86 x education								
O-level			-.053***	.014			-.024*	.012
A-level			-.238***	.032			-.073***	.017
Tertiary			-.015	.018			-.067***	.013
Period 1987-92 x education								
O-level			-.022	.013			-.034**	.011
A-level			-.204***	.029			-.075***	.015
Tertiary			.006	.016			-.033**	.012
Constant	.496***	.036	.500***	.036	.085**	.027	.087**	.027
Adjusted R ²	.296		.297		.237		.238	

* p < 0.05 ** p < 0.01 *** p < 0.001

Source: General Household Surveys 1972-1992 (N = 55,176 women and 72,224 men)

clearly increasing benefits of qualifications afterwards. It is also evident, though, that in the 1990s the effect of schooling on social class has not fully come back the size of the earliest observed period between 1972 and 1976.

Similar results are found when we omit father's class from the analysis. Models 3 and 4 (table 6) show that the effect of education is equal in size if we omit father's class, so none of the observed education effect is in fact spurious. Model 4 (see also figure 4) again shows that the effect of educational qualifications decreased during the 1970s and early 1980s, and increased afterwards.

Table 6 Trends in the effects of education. Regression of log hourly wages on selected independent variables, without controls for father's class

	Women				Men			
	Model 3		Model 4		Model 3		Model 4	
	b	se	B	se	b	se	B	se
Age	.013***	.001	.013***	.001	.054***	.001	.054***	.001
Age squared	.000***	.000	.000***	.000	-.001***	.000	-.001***	.000
Period 1972-76 (ref)								
1977-81	.090***	.005	.118***	.006	.028***	.004	.057***	.006
1982-86	.161***	.005	.182***	.007	.073***	.004	.092***	.007
1987-92	.298***	.005	.299***	.007	.175***	.004	.195***	.007
1993-2000	.317***	.005	.345***	.009	.126***	.005	.130***	.008
Education: Primary (ref)								
O-level	.216***	.004	.254***	.009	.168***	.004	.196***	.007
A-level	.378***	.008	.615***	.025	.311***	.005	.374***	.012
Tertiary	.713***	.005	.733***	.013	.540***	.004	.569***	.009
Period 1977-81 x education								
O-level			-.072***	.013			-.050***	.010
A-level			-.313***	.034			-.104***	.017
Tertiary			-.057***	.017			-.063***	.012
Period 1982-86 x education								
O-level			-.056***	.013			-.031**	.011
A-level			-.258***	.032			-.070***	.017
Tertiary			-.025	.017			-.044***	.013
Period 1987-92 x education								
O-level			-.020	.012			-.040***	.011
A-level			-.212***	.029			-.073***	.016
Tertiary			.001	.016			-.033**	.012
Period 1993-2000 x education								
O-level			-.053***	.013			-.023*	.012
A-level			-.279***	.028			-.059***	.016
Tertiary			-.036*	.016			-.007	.013
Constant	.366***	.028	.351***	.028	.078***	.022	.066**	.022
Adjusted R ²		.279		.280		.206		.207

* p < 0.05 ** p < 0.01 *** p < 0.001

Source: General Household Surveys 1972-2000 (N = 96,060 women and 121,390 men)

So what happens to this trend if we control for social class? First, the overall education effect seems to decrease somewhat by including social class (models 5 and 7). However, the trend in the education effect seems to be similar to what we found when social class was left out of the regression equation. However, the pattern changes when not only social class is included in the model, but also the trend in the effect of social class (models 6 and 8). Then, we first see that social class differences increase during the observed period, particularly in the period from the mid 1980s onwards. This has strong implications for the trend in the effect of schooling, because the net trend is much smaller, if at all present, than the gross trend (see figures 3 and 4). Thus, trends in the effects of earnings are for a large part intermediated by trends in class differences in earnings.

Table 7 Trends in the effects of education after controlling for trends in class differences in earnings. Regression of log hourly wages on selected independent variables, with controls for father's class

	Women				Men			
	Model 5		Model 6		Model 5		Model 6	
	b	se	b	se	b	se	B	se
Father's class I/II Service (ref)								
III RNM	-.011	.008	-.010	.008	-.014*	.006	-.012*	.006
IVab Self-employed	-.027**	.009	-.027**	.009	-.039***	.007	-.035***	.007
IVc/VIIb Farm	-.082***	.009	-.081***	.009	-.080***	.008	-.077***	.008
V/VI Skilled manual	-.045***	.006	-.044***	.006	-.036***	.004	-.035***	.004
VII Unskilled manual	-.054***	.007	-.053***	.007	-.049***	.005	-.048***	.005
Age	.007***	.002	.007***	.002	.051***	.001	.051***	.001
Age squared	.000***	.000	.000***	.000	-.001***	.000	-.001***	.000
Period 1972-76 (ref)								
1977-81	.142***	.009	.124***	.023	.089***	.007	.000	.014
1982-86	.176***	.008	.179***	.020	.092***	.007	.046***	.013
1987-92	.303***	.007	.360***	.017	.203***	.007	.207***	.011
Education: Primary (ref)								
O-level	.203***	.009	.214***	.009	.117***	.006	.114***	.006
A-level	.425***	.024	.438***	.025	.227***	.011	.222***	.011
Tertiary	.431***	.014	.447***	.016	.321***	.009	.304***	.010
Period 1977-81 x education								
O-level	-.069***	.015	-.070***	.016	-.044***	.012	-.030*	.012
A-level	-.223***	.037	-.215***	.038	-.092***	.018	-.066***	.019
Tertiary	-.044*	.020	-.026	.027	-.109***	.013	-.037*	.017
Period 1982-86 x education								
O-level	-.043**	.014	-.057***	.014	-.012	.011	-.008	.011
A-level	-.177***	.031	-.190***	.032	-.041*	.016	-.031	.017
Tertiary	-.006	.017	-.009	.023	-.049***	.012	-.013	.015
Period 1987-92 x education								
O-level	-.018	.012	-.048***	.013	-.019	.010	-.022*	.010
A-level	-.128***	.028	-.166***	.029	-.046**	.015	-.054***	.015
Tertiary	.026	.016	-.025	.020	-.017	.011	-.021	.013
Own class								
I/II Service (ref)								
III RNM	-.308***	.007	-.310***	.013	-.224***	.006	-.290***	.009
IVab Self-employed	-.724***	.012	-.620***	.022	-.507***	.007	-.386***	.011
IVc/VIIb Farm	-.577***	.023	-.540***	.036	-.624***	.012	-.561***	.017
V/VI Skilled manual	-.292***	.011	-.274***	.019	-.222***	.005	-.266***	.008
VII Unskilled manual	-.373***	.008	-.331***	.014	-.337***	.006	-.364***	.009
Period 1977-81 x Own class								
III RNM			.033	.023			.114***	.018
IVab Self-employed			-.212***	.040			-.122***	.022
IVc/VIIb Farm			.049	.068			-.079*	.033
V/VI Skilled manual			.009	.037			.140***	.014
VII Unskilled manual			.018	.026			.107***	.018
Period 1982-86 x Own class								
III RNM			.029	.020			.139***	.016
IVab Self-employed			-.163***	.035			-.202***	.019
IVc/VIIb Farm			.000	.068			-.065*	.032
V/VI Skilled manual			.020	.033			.087***	.013
VII Unskilled manual			-.040	.023			.059***	.016
Period 1987-92 x Own class								
III RNM			-.013	.017			.095***	.014
IVab Self-employed			-.116***	.029			-.196***	.016
IVc/VIIb Farm			-.140*	.056			-.205***	.029
V/VI Skilled manual			-.057*	.027			.027*	.011
VII Unskilled manual			-.123***	.019			.001	.014
Constant	.838***	.035	.821***	.036	.460***	.026	.467***	.026
Adjusted R ²		.352		.353		.315		.321

* p < 0.05 ** p < 0.01 *** p < 0.001

Source: General Household Surveys 1972-1992 (N = 55,176 women and 72,224 men)

Table 8 Trends in the effects of education after controlling for trends in class differences in earnings. Regression of log hourly wages on selected independent variables, *without* control for father's class

	Women				Men			
	Model 7		Model 8		Model 7		Model 8	
	b	se	B	se	b	se	b	se
Age	.011***	.001	.011***	.001	.048***	.001	.048***	.001
Age squared	.000***	.000	.000***	.000	-.001***	.000	-.001***	.000
Period 1972-76 (ref)								
1977-81	.116***	.006	.120***	.018	.053***	.005	-.011	.011
1982-86	.176***	.007	.207***	.018	.095***	.006	.065***	.012
1987-92	.291***	.007	.363***	.017	.205***	.006	.217***	.011
1993-2000	.345***	.008	.437***	.017	.156***	.008	.203***	.013
Education: Primary (ref)								
O-level	.213***	.009	.229***	.009	.121***	.006	.121***	.007
A-level	.437***	.024	.466***	.025	.229***	.012	.230***	.012
Tertiary	.432***	.013	.471***	.016	.323***	.009	.319***	.010
Period 1977-81 x education								
O-level	-.062***	.012	-.066***	.013	-.034***	.009	-.025*	.010
A-level	-.216***	.033	-.224***	.034	-.074***	.016	-.053**	.016
Tertiary	-.056***	.016	-.058**	.022	-.053***	.011	.000	.014
Period 1982-86 x education								
O-level	-.046***	.013	-.062***	.013	-.020	.010	-.015	.011
A-level	-.184***	.031	-.209***	.032	-.044**	.016	-.039*	.017
Tertiary	-.011	.016	-.038	.022	-.029*	.012	-.005	.015
Period 1987-92 x education								
O-level	-.017	.012	-.048***	.012	-.023*	.010	-.029**	.010
A-level	-.127***	.028	-.175***	.029	-.046**	.015	-.057***	.016
Tertiary	.025	.015	-.040*	.020	-.018	.011	-.028*	.014
Period 1993-00 x education								
O-level	-.058***	.013	-.096***	.013	-.016	.011	-.028*	.011
A-level	-.199***	.027	-.255***	.028	-.039*	.016	-.063***	.016
Tertiary	.000	.016	-.082***	.020	.010	.012	-.025	.014
Own class I/II Service (ref)								
III RNM	-.329***	.005	-.305***	.013	-.242***	.005	-.293***	.010
IVab Self-em	-.729***	.009	-.628***	.022	-.541***	.005	-.383***	.012
IVc/VIIb Farm	-.597***	.018	-.567***	.035	-.661***	.009	-.594***	.017
V/VI Skilled manual	-.319***	.009	-.274***	.019	-.241***	.004	-.272***	.008
VII Unskilled manual	-.406***	.006	-.330***	.014	-.368***	.005	-.372***	.010
Period 1977-81 x Own class								
III RNM			.004	.018			.079***	.015
IVab Self-em			-.115***	.033			-.075***	.018
IVc/VIIb Farm			.058	.053			-.013	.026
V/VI Skilled manual			.009	.028			.098***	.012
VII Unskilled manual			-.011	.020			.076***	.014
Period 1982-86 x Own class								
III RNM			-.005	.018			.123***	.016
IVab Self-em			-.142***	.032			-.254***	.018
IVc/VIIb Farm			.000	.058			-.057	.029
V/VI Skilled manual			-.013	.030			.071***	.012
VII Unskilled manual			-.064**	.021			.036*	.015
Period 1987-92 x Own class								
III RNM			-.030	.016			.076***	.015
IVab Self-em			-.108***	.029			-.215***	.016
IVc/VIIb Farm			-.166**	.053			-.214***	.028
V/VI Skilled manual			-.073**	.027			.023	.012
VII Unskilled manual			-.136***	.019			-.009	.014
Period 1993-00 x Own class								
III RNM			-.044**	.016			.031*	.015
IVab Self-em			-.123***	.028			-.234***	.016
IVc/VIIb Farm			.042	.060			-.089**	.031
V/VI Skilled manual			-.111***	.028			-.012	.012
VII Unskilled manual			-.168***	.019			-.080***	.015
Constant	.747***	.027	.708***	.029	.493***	.022	.493***	.023
Adjusted R ²		.338		.339		.289		.294

* p < 0.05 ** p < 0.01 *** p < 0.001

Source: General Household Surveys 1972-2000 (N = 96,060 women and 121,390 men)

Figure 3 Gross and net trends in the education effect on logged wages *with control for father's class*

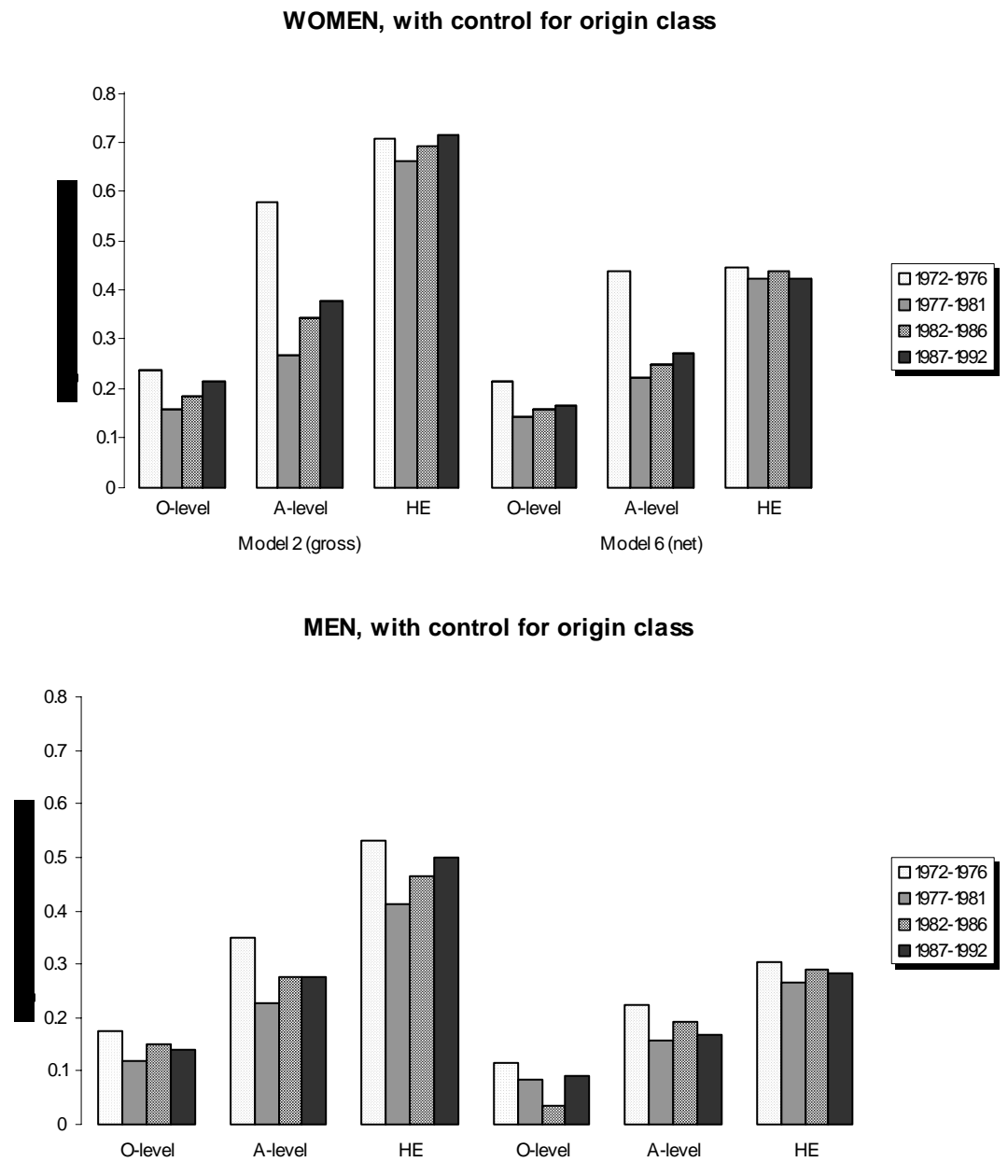
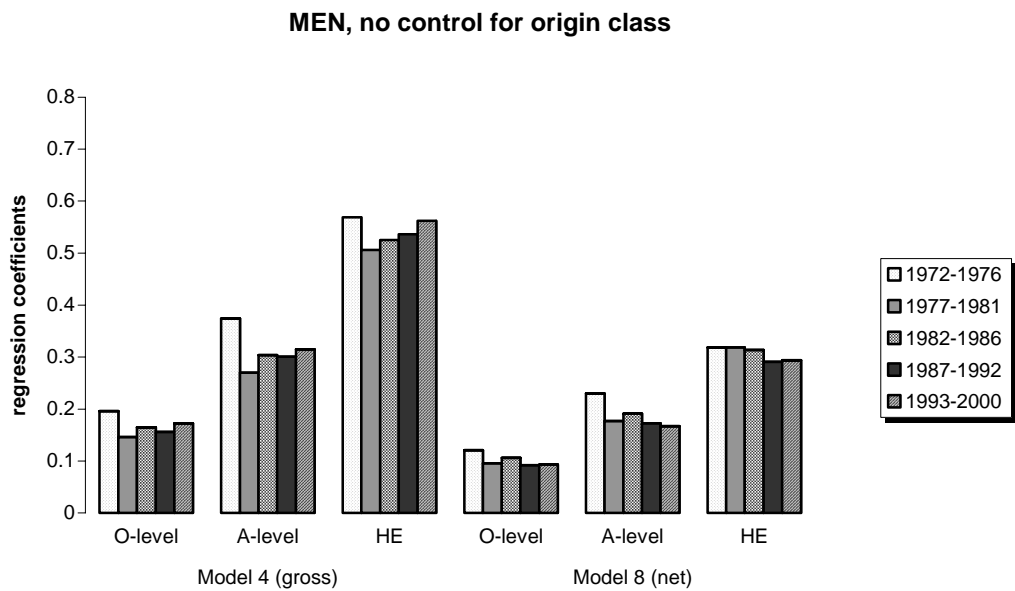
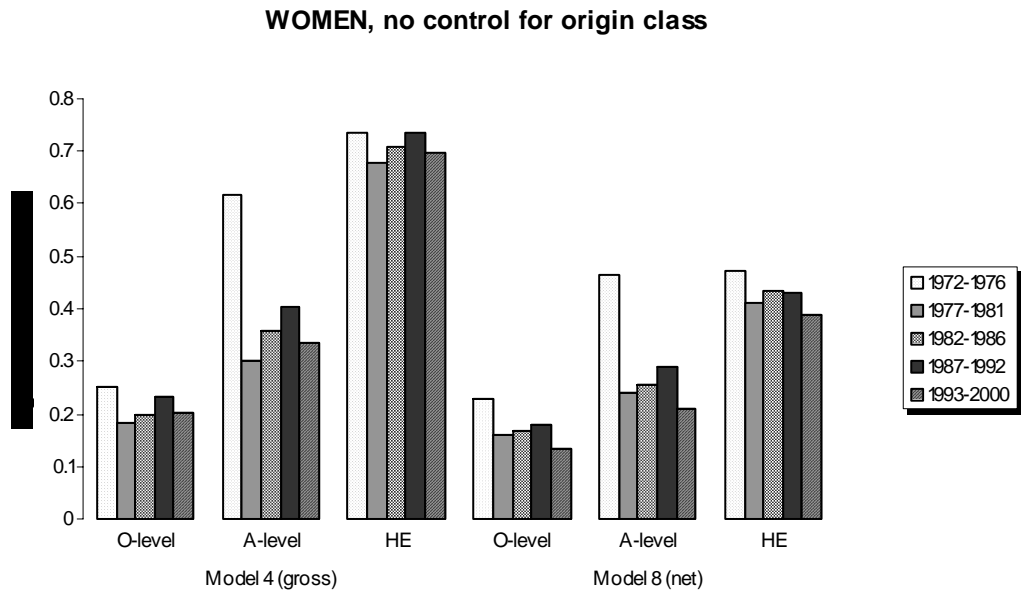


Figure 4 Gross and net trends in the education effect on logged wages *without* control for father's class



7. CONCLUSIONS AND DISCUSSION

This paper tried to shed some light on the developments in the effects of education on occupational outcome during the last thirty years. More specifically, we aimed to show that the direction and strength of the trend in the effects of education varies between measures of occupational outcome, and between periods within the observed time span. As regards differences across measurements, we focussed on social class and earnings, and revealed that the trend in the effect of education on social class is unequivocally downward. This is in line with earlier findings on a number of European countries (Breen & Goldthorpe 2001; Breen & Whelan 1993; Goldthorpe & Mills 2003; Jonsson 1996; Vallet 2001; Whelan & Layte 2002).

With regard to earnings the trend in the effect of education depends on how we operationalise earnings. When we use a categorical measure of earnings sestiles, and employ loglinear association models, we observe a *downward trend* in the effects of schooling. However, when we employ the more standard linear models using logged hourly earnings as dependent variable, we find the expected *U-shaped trend* in the effect of schooling. Differences across measurements are explained by the fact that social class and earnings sestiles are measures for which dispersion can not unlimitedly increase; an under-supply of highly skilled workers can not lead to unbounded upward shifts in social class or earnings sestile for those with higher levels of schooling. Whereas neo-classical economic theory would predict that, in case of under-schooling, the effect of schooling would increase because earnings of highly educated people are adjusted upwards, such adjustments can only limitedly be realized with regard to social class and earnings sestile.

With regard to changes between periods, we found support for the expected U-shaped trend in the impact of education on earnings over the observed time span. Indeed, until the early 1980s the effect of education on earnings went down. Explanations for this downward trend are, first, that Labour governments have promoted increased access to education. This plausibly led to overschooling which decreased the wages paid to highly skilled workers and thus the educational differentials. In addition, the sharp increase in educational attainment possibly meant that an increasing number of lower-ability students entered higher levels of schooling, for example by the employment of less stringent selection procedures in new institutes for higher education. Thus, schooling became less evidently a signal of individual

abilities. Under the Conservative governments in the 1980s and 1990s there was no active policy to increase schooling levels (Brown 1990). A second explanation is that economic growth was very low, which diminished investments in technology. In turn, job complexity only limitedly increased, which implied that employers decreasingly select on the basis of educational skills. This routinisation of jobs in such periods of low investments indicates that informal on-the-job training replaces formal qualification demands. From the mid 1980s the effect of schooling on earnings increased. Most jobs experienced increases in skill, computer technology required higher schooling levels for all jobs (Gallie et al. 1998), leading to a need for upskilling rather than downskilling to match educational distributions with the structure of the labour market.

Much of this U-shaped trend in the education effect disappears once we take account of the trend in income inequality among social classes. This means that the variations in bargaining power of people of specific educational levels lead to trends in the effects of schooling because the social classes related to these educational achievements have altered their earnings. There are three possible explanations for increasing class differences in earnings since the early 1980s. First, union membership has decreased (Ebbinghaus & Visser 2000), which has deteriorated the collective bargaining position of predominantly medium and lower level jobs. Second, the service classes have increased their relative position. Structural employment relations, which define social classes (Goldthorpe 2000), are improved, particularly of the service classes. Trends in over- or under-supply of educational qualifications then lead to earnings differentiation through the employment relations that are formed on the labour market. Thirdly, according to Gallie et al. (1998), social classes differ in the extent they have experienced changes in skill and job responsibility, with more changes experienced by the professional and managerial class, and less changes among the working classes. As these job assets have a positive relation to earnings, and are directly linked to the educational qualification that people brought with them, the trend in bargaining power of different qualifications may have led to increasing inequality in wages via the social class position that is obtained.

So what do these findings tell us about issues of meritocracy in modern free-market economies? There have been a number of sociological studies in the past years that have attributed the decreasing impact of educational credentials on social class position to either the suggestion that these societies are not becoming increasingly

meritocratic, in-so-far education is a good indicator of merits, or that non-educational meritocratic characteristics, such as personality or social-communicative skills, are increasingly relevant in an advanced free-market economy (Breen & Goldthorpe 2001; Breen & Whelan 1993; Goldthorpe & Mills 2003; Jonsson 1996; Vallet 2001; Whelan & Layte 2002). The present findings that indicate an increasing effect of education on earnings from the mid-1980s onwards suggest that such a conclusion seems premature. In-so-far education is a good indicator of merits, we *do* observe ‘increased merit selection’ (or better: increased merit compensation). Also others have shown that the impact of education on occupational outcomes increased, such as being employed or not (Breen 1998); job level (Wolbers et al. 2001), or income (Levy & Murnane 1992; Elias & Pierre 2002). The fact that the impact of education on social class consistently decreases, leaves us with an explanandum that needs further explanation. One possible way forward for future research is to incorporate the unemployed ‘under-class’ in the analyses. Usually studies on class attainment and mobility omit the under-class – just like is done in the present study – but it is possible that treating this as a separate class in the class schema has a severe consequence for the observed trend in the education effect. Another way forward would be to incorporate education-based and non-educational meritocratic criteria in empirical research on trends in selection and allocation. Obviously such an approach would have potential problems in gathering historical survey data with the necessary information, but present-day survey designers might take this into account. One solution to this data problem is to analyse job advertisements in newspapers across many years (Jackson 2001; Moelker 1992). In such a content analysis Moelker found, for example, an increasing emphasis on social-normative qualifications such as personality and sociability between the 1950s and the 1990s.

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